



ISSN:2455-7838 (Online)
DOI : 10.36713/epra2016

SJIF Impact Factor(2023) : 8.574

ISI I.F Value : 1.241

EPRA International Journal of

RESEARCH & DEVELOPMENT

(IJRD)

Monthly, Peer Reviewed (Refereed) & Indexed International Journal

Volume - 8 Issue - 12 December 2023

RESEARCH & DEVELOPMENT



Chief Editor

Dr. A. Singaraj, M.A., M.Phil., Ph.D.

Managing Editor

Mrs.M.Josephin Immaculate Ruba

EDITORIAL ADVISORS

1. Prof. Dr.Said I.Shalaby, MD,Ph.D.
Professor & Vice President
Tropical Medicine,
Hepatology & Gastroenterology, NRC,
Academy of Scientific Research and Technology,
Cairo, Egypt.
2. Dr. Mussie T. Tessema,
Associate Professor,
Department of Business Administration,
Winona State University, MN,
United States of America,
3. Dr. Mengsteab Tesfayohannes,
Associate Professor,
Department of Management,
Sigmund Weis School of Business,
Susquehanna University,
Selinsgrove, PENN,
United States of America,
4. Dr. Ahmed Sebihi
Associate Professor
Faculty of General Education,
Skyline University College (SUC),
University City of Sharjah,
UAE.
5. Dr. Anne Maduka,
Assistant Professor,
Department of Economics,
Anambra State University,
Igbariam Campus,
Nigeria.
6. Dr. D.K. Awasthi, M.Sc., Ph.D.
Associate Professor
Department of Chemistry,
Sri J.N.P.G. College,
Charbagh, Lucknow,
Uttar Pradesh. India
7. Dr. Tirtharaj Bhoi, M.A, Ph.D,
Assistant Professor,
School of Social Science,
University of Jammu,
Jammu, Jammu & Kashmir, India.
8. Dr. Pradeep Kumar Choudhury,
Assistant Professor,
Institute for Studies in Industrial Development,
An ICSSR Research Institute,
New Delhi- 110070, India.
9. Dr. Gyanendra Awasthi, M.Sc., Ph.D., NET
Associate Professor & HOD
Department of Biochemistry,
Dolphin (PG) Institute of Biomedical & Natural
Sciences,
Dehradun, Uttarakhand, India.
10. Dr. C. Satapathy,
Director,
Amity Humanity Foundation,
Amity Business School, Bhubaneswar,
Orissa, India.
11. Dr. Ibatova Shoirav Mavlunovna PhD.
Department of Propaedeutics of Paediatric
Diseases, Samarkand State Medical University



ISSN (Online): 2455-7838

SJIF Impact Factor (2023):8.574

ISI I.F. Value : 1.241

DOI : 10.36713/epra2016

EPRA International Journal of Research & Development (IJRD)

Monthly Peer Reviewed & Indexed
International Online Journal

Volume: 8, Issue:12, December 2023

Indexed By:



Published By
EPRA Publishing

CC License





CONTENTS

S.NO	TITLE	AUTHOR/S	PAGES
1	A SINGLE CASE STUDY ON Madhumeha w.s.r. TO DIABETES MELLITUS (TYPE II)	Dr.Chanchal, Dr.Asha Kumari, Dr.O.P Singh, Dr. Deshraj Singh	1-5
2	MEIOSIS IN PLANT CARRYING $2n = 21$ CHROMOSOMESTELO-TRISOMIC ($2n + t = 21$)	Shrimant Raut, Datta Chamle	6-10
3	RECREATIONAL DRUG USE IN ALGERIA: A SHORT COHORT STUDY	T. Ait Mouheb, L. Ait Mokhtar, Z. Amine	11-17
4	ECO-FARM SIMULATION RECREATION THERAPY KIT PROMOTES SENSE OF COHERENCE AMONG THE ELDERLY – A FEASIBILITY PRODUCT ANALYSIS	Arjun Nanduri, Leoh N. Leon, M.D , Savithri Chandana Veluri, MD , Laura M. Kim, M.D	18-26
5	A STUDY ON THE PHYSICOCHEMICAL PROPERTIES OF SOIL OF BUTAPANI AREA LOCATED IN SELF-FLOWING WATER, LUNDRA BLOCK, SURGUJA DISTRICT, CHHATTISGARH, INDIA	Shailesh Kumar Dewangan, Nima Yadav, Preeti,	27-32
6	HISTORICAL FICTION FILMS IN UZBEK CINEMA ART	Nasimov Fotih Hilol ogli	33-35
7	INTERNATIONAL RATING AND INDEX AND STRENGTHENING OF UZBEKISTAN'S POSITION IN THE GLOBAL SCALE	Usmanova Rano Mirjalilovna	36-38
8	THE USE OF ONE SABAB AN-NUZUL NARRATIONS FOR ONE VERSE IN TAWILAT AL-QURAN	Yakhshilikov Abdulaziz Mominovich	39-41
9	THE RESEARCH OF HISTORY OF LAND IRRIGATION IN CENTRAL FERGANA	Mamajanov Azizbek Alisher ugli	42-44
10	LOGICAL TEACHING IN THE INTERPRETATION OF AL-KINDI PHILOSOPHY	Baratova Makhbuba Mubinjanovna	45-47
11	ASSESSMENT OF LONG - TERM RESULTS OF TREATMENT PAGET'S BREAST CANCER	Urmanbaeva Dilbaroy Abdulkosimovna	48-49
12	THE ISSUES OF THE LANGUAGE OF THE INHABITANTS OF THE QOVUNCHI CULTURE	Inomov Odiljon Ulugkhoja ugli	50-53
13	INHERITANCE OF THE TRAIT OF THE WEIGHT OF 1000 SEEDS IN ORIGINAL SOURCES AND F1 HYBRIDS OF BEANS BELONGING TO PHASEOLUS VULGARIS L. TYPE	Tursunova Nilufar Moydinovna, Amanov Bakhtiyar Khushbakovich	54-56
14	COCOON PRODUCTIVITY AND YIELD IN LATEST-STAGE IMPROVEMENT OF Z LETHAL GENES BALANCED BREED OF MULBERRY SILKWORM	Murodkhuja ABDIKODIROV	57-59

15	DESIGN DEVELOPMENT OF PHOSPHOLIPID COMPLEX OF SMILAX CHINA EXTRACT FOR EFFECTIVE TREATMENT OF DIABETES	Mr.Mayank Singh, Dr. Arun Patel, Mr. Shailendra Patel, Mr. Vijay Pratap Ahirwar	60-64
16	GENETICS AND BREEDING POTENTIAL OF INTRASPECIFIC POLYMORPHISM IN TETRAPLOID SPECIES OF GOSSYPIUM L	Bakhtiyar Khushbakovich Amanov	65-67
17	BRAKE RESISTOR TEMPERATURE ESTIMATION IN POWERED-OFF RAILWAY CONTROLLER	Lalit G.Patil	68-73
18	ROLE OF WELLNESS SECTOR IN UTTARAKHAND; OPPORTUNITIES AND CHALLENGES	Dr.Asha Kumari, Dr.Chanchal, Dr.O.P Singh	74-78
19	GROWING AFRICAN IN RESERVOIRS	Atanazarov Kural Maulenovich	79-80
20	STUDYING THE HYDROCHEMICAL REGIME OF SURFACE WATER IN THE Aral Sea BASIN	Khozhamuratova Roza Tajimuratovna, Reimova Gulzhamal Batyrbaevna, Jangabaev Daniyar Mansurovich	81-83
21	BIOLOGICAL FEATURES OF AMORPHA FRUTICOSA	Kosbaulieva Bayan Zharylkasynovna	84-85
22	BIOECOLOGY AND TREE MONITORING IN THE CITY OF NUKUS	Kurbaniyazov B.T., Saitova A.K.	86-88
23	PROSPECTS FOR THE USE OF HYDROPHILIC PLANTS	Serekeeva G.A.,Utamuradova M.Ya.	89-91
24	SETTING UP THE ECOLOGICAL BALANCE OF WATER OBJECTS OF THE SOUTH ARAL REGION	Tureeva Kuralay Zhumabaevna, Maturazova Elmira Matiyazovna, Valieva Orazgul	92-94
25	HISTORY OF THE DEVELOPMENT OF HUNTING IN UZBEKISTAN	Atashov Azhiniyaz Shaniyazovich	95-97
26	FORMATION OF HERBAL TEA USING NATURAL INGREDIENTS: AN COMPLETE STUDY	Anand Khendke, Gitesh Vyas, Shivani Khendke	98-114
27	NAVIGATING SYNERGY-OUTCOME-BASED EDUCATION IN ENGLISH LANGUAGE CURRICULUM	Jhunisa Ann A. Meruena	115-118
28	EXPLORING THE ROLE OF TEACHING TRAINING AND DEVELOPMENT	Smt.Jayashri Purushottam Borase	119-122
29	IMPACTS OF YOGIC PRACTICE WITH PLYOMETRIC TRAINING ON SELECTED MOTOR FITNESS VARIABLES AMONG VOLLEYBALL PLAYERS	P. Mahesh,Dr. V.Vallimurugan	123-126
30	SUBSTANCE-RELATED AND ADDICTIVE DISORDERS-SUICIDE RISK ASSESSMENT	Marco Silenzi	127-134
31	SCIENTIFIC HERITAGE OF THE SAMANI FAMILY	Halilulloh Yusupov	135-137
32	PREPARATION OF SHORT-DISTANCE PARALYMPIC ATHLETES FOR COMPETITION	Umarova Mohiroy Rasiljon qizi	138-139
33	PIRIMKUL KADIROV'S STYLE IN WRITING HISTORICAL-BIOGRAPHICAL NOVELS	Radjabova Dildora Rakhimovna	140-142
34	A COMPARATIVE STUDY ON SELECTED PHYSICAL FITNESS VARIABLES BETWEEN SCHOOL LEVEL KABADDI AND KHO-KHO PLAYERS	V.Tamilvanan, V.Thiyagarajan, G Pushpa	143-145
35	EVALUATION OF THE RESULTS OBTAINED BY VARIOUS METHODS IN	Kurbanov Khasan Askarovich	146-148

	TRADITIONAL SURGICAL PRACTICE AND THE USE OF OPTIMAL SUTURE MATERIALS		
36	THE USE OF INTERNET IN SEX EDUCATION AMONG UNDERGRADUATE STUDENTS: A CASE STUDY IN UNIVERSITY OF PORT HARCOURT	Ukwuije, Chinedu Kelechi	149-155
37	IMPROVING STUDENTS' RESEARCH ACTIVITIES IN COLLABORATIVE LEARNING CONDITIONS	Boltaeva Z.Z.	156-159
38	AYURVEDIC REVIEW ON NETRA RACHANA AND KRIYA SHAREERA	Dr.Sachin A M, Dr.Veerayya R Hiremath, Dr.Shashikala Khadabadi , Dr.Gururaj Natikar	160-166
39	DEVELOPMENT OF HERBAL GRAIN TABLETS WITH PESTICIDE, INSECTICIDE, AND ANTISEPTIC PROPERTIES USING NATURAL INGREDIENTS	Yogesh Bhimrao Yevale, Gitesh Vinod Vyas, Anand Daulatrao Khendke	167-176
40	DYNAMIC LANGUAGE LEARNING FRAMEWORK (DL2F) INSTRUCTIONAL MODEL	Jhunisa Ann A.Meruenta	177-181
41	THE SCIENTIFIC DESCRIPTION OF CONTENT, MANUSCRIPT, MODERN EDITIONS AND TRANSLATIONS OF THE BOOK NAMED "AL-AMSAL MIN AL-KITAB WAS-SUNNA"	Bahadirjon Azamov	182-188
42	THE FORMATION OF THE SCIENCE OF TAFSIR IN MAWARANNAHR	Dr.Davronbek Makhsudov	189-192
43	UZBEK PROVERBS AND NATIONAL CHARACTER	Makhsudova Nilufar Abdurasulovna	193-201
44	EXPRESSION OF SCIENCE FICTION GENRE FEATURES IN THE WORKS OF DAN BROWN	Niyazova Dilnoza, Safarova Zilola Tolibovna	202-204
45	A REVIEW ON INTEGRATING ARTIFICIAL INTELLIGENCE INTO DRUG DEVELOPMENT: REVOLUTIONIZING THE PHARMACEUTICAL LANDSCAPE	Oza Vrushant Pranay, Dr. Anuradha P. Prajapati, Mrs. Bhoomi S. Patel, Dr. Sachin B. Narkhede, Dr. Shailesh Luhar	205-210
46	THE IMPORTANCE OF THE FAMILY INSTITUTE AND EDUCATIONAL SYSTEM IN IMPROVING THE POLITICAL AND LEGAL CONSCIOUSNESS OF YOUNG PEOPLE	Yuldashev Doniyor Ikhtiyor ugli	211-214
47	CRITICLE REVIEW ON DARUNAKA WSR TO TWAK SHAREERA	Vaidya Gagana, Dr. Veerayya R Hiremath, Dr. Gururaj N	215-222
48	FORMATION OF ECO-FRIENDLY FLOOR CLEANER PHENYL USING HERBAL INGREDIENTS	Sima Lahu Rathod, Gitesh Vinod Vyas, Anand Daulatrao Khendke	223-234
49	ANALYSIS OF MAIN GOTHIC ELEMENTS IN ENGLISH BILDUNGSROMANS	Safarova Zilola Tolibovna, Barotova Latofat Karimovna	235-237
50	ARAB-MUSLIM CULTURE IN THE PERIOD OF EARLY ISLAM-PROMOTION AND APROBATION	Mirdjalalova Ezozakhon Ramazon qizi	238-241
51	A REVIEW ARTICLE ON NOVEL DRUG DELIVERY BIGEL	Prajapati Hardik Narendra, Dr.Kantilal Narkhede, Dr.Anuradha P. Prajapati, Dr.Sachin B.Narkhede,	242-246

		Dr.Shailesh Luhar, Ms.Vidhi Patel, Ms.Urmi Prajapati	
52	A REVIEW ON NUTRITIONAL MANAGEMENT IN RHEUMATOID ARTHRITIS	Ahir Meet Jiteshbhai, Mrs.Neha S.Vadgama, Dr. Anuradha P. Prajapati, Dr.Sachin B. Narkhede, Dr.Shailesh Luhar, Oza Vrushant	247-251
53	A REVIEW ON PHARMACOVIGILANCE AND DRUG SAFETY MEASURES	Bhanushali Mayank Ratilal, Dr.Anuradha P. Prajapati, Dr.Kantilal Narkhede, Dr.Sachin B.Narkhede, Dr.Shailesh Luhar	252-255
54	UBHAYAMARGA SHODHANA DUO DIRECTIONAL CLEANSING IN KITIBHA KUSHTA -A CASE STUDY	Dr Bhaskar B, Dr Gavisiddanagouda Patil, Dr Suresh N Hakkandi, Dr Manjunath P Akki. Dr Gurumahantesh TM	256-264
55	TRANSFORMING BREAST CANCER CARE-THE IMPACT OF TELEPHARMACY AND TECHNOLOGY	Barot Mansi ManojKumar, Mrs.Neha S. Vadgama, Dr.Anuradha P. Prajapati, Dr.Sachin B. Narkhede, Dr.Shailesh Luhar	265-269
56	NAVIGATING MODERN LIVING THROUGH ADVANCEMENTS IN MOBILE SERVICES AND BIOELECTRONIC MEDICINE	Ansari MDAshfaque M., Dr. Anuradha Prajapati, Dr. Sachin Narkhede, Dr.Shailesh Luhar	270-274
57	EXPRESSION OF THE IDEAS OF PATRIOTISM AND PRINCIPALITY IN THE CREATION OF ALISHER NAVOI	Ahmedov Hoshim Hakimovich	275-277
58	A REVIEW ON ROLE OF ARTIFICIAL INTELLIGENCE: IN DIAGNOSIS OF DISEASE AND DRUG MANAGEMENT	Prajapati Hardikkumar Bharatbhai, Dr. Anuradha P. Prajapati, Dr. Sachin Narkhede, Dr. Shailesh Luhar	278-283
59	A REVIEW ON NUTRITIONAL MANAGEMENT IN OSTEOPOROSIS	Nitin E. Patil, Dr.Kantilal B.Narkhede, Dr.Anuradha P.Prajapati, Dr.Sachin B.Narkhede, Dr.Shailesh Luhar, Oza Vrushant	284-288
60	TARGETING EPIDERMAL GROWTH FACTOR RECEPTOR FOR CANCER TREATMENT	Chitroda Devalben Narendrabhai, Dr. Anuradha P. Prajapati, Mrs. Bhoomi S. Patel, Dr.Sachin B. Narkhede, Dr.Shailesh Luhar	289-294
61	RELEVANCE OF VOICE QUALITY AND MELODY WHEN READING THE QURAN	Rakhmatov Ikboljon Izzatullo ugli	295-296
62	A REVIEW ON OVERVIEW OF GENE AND RNA BASED THERAPIES	Tandel Muskan Vijaykumar, Prajapati Hardikkumar Bharatbhai, Dr. Anuradha P. Prajapati, Dr.Sachin Narkhede, Dr.Shailesh Luhar	297-302
63	THE SILENT STRUGGLE: A QUALITATIVE STUDY ON MENSTRUAL CHALLENGES AMONG UNIVERSITY WOMEN RESEARCHERS	Monika Sangral, Sunil Kumar	303-306
64	THE ECONOMIC EFFICIENCY OF THE TECHNOLOGY OF INTENSIVE IN VITRO PROPAGATION OF CHERRY VARIETIES	Abduramanova Salomat Khudaybergenovna, Rustamova Iroda Bakhramjanovna,	307-311

		Saimnazarov Yuldash Bekmirzayevich	
65	NON-VERBAL EXPRESSIONS OF THE EYES IN THE HOLY QURAN	Muydinov Pakhlavon Kaxramonovich	312-315
66	THE SCIENTIFIC SIGNIFICANCE OF THE WORK NAWABIGUL-KALIM	Bakirov Begzod	316-318
67	SOCIO-ECONOMIC IMPORTANCE OF GLOBAL WHEAT PRODUCTION BY REGION	Donaev Sheroli Burkhonovich	319-321
68	HUMANISTIC IDEAS: KINDNESS, GENEROSITY, AND TOLERANCE IN THE WORK OF MAVERANNHAR SCIENTISTS	Nematullo Mukhamedov, Nurulloh Turambetov	322-325
69	LITERATURE REVIEW OF NEO BANKING: AN ACCEPTABILITY AND COMPATIBILITY STUDY	Elroy Monis, Ramesh Pai	326-333
70	MAIN LIMNOLOGICAL CHARACTERISTICS OF RESERVOIRS	Tureeva Kuralay Zhumabaevna, Bazarbaeva Dilbar Ongarbaevna, Allaniyazova Muazzam Khaitbaevna	334-337
71	MODERN STATE OF PHYSICS IN THE RESEARCH OF MICROPLASMA BREAKDOWN IN SILICON P-N JUNCTIONS AND DIODES AND SCHOTTKY	Tagaev Marat, Abdreymov Ali	338-345
72	FLORA AND FAUNA OF THE REPUBLIC OF KARAKALPAKSTAN	Nagashybaeva Aigerim, Bekpanov Atamurat, Abipov Rustem	346-347
73	PECULIARITIES OF ARTHROPOD DISTRIBUTION IN VEGETABLE AND MELON CROPS UNDER CONDITIONS OF KARAKALPAKSTAN	Koshanova Rosa Erezhepovna	348-349
74	PLANT WORLD OF THE KYZYL KUM DESERT	Kaipov Kydyrbay Pakhretdinovich	350-351
75	BEHAVIORAL FEATURES OF BUKHARA DEER353(Cervus Elaphus Bactrianus) DURING THE RUT	Dosnazarova Umit, Kidirbaeva Arzygul Yuldashevna	352-353
76	STUDYING THE POPULATION DYNAMICS OF BACKGROUND SPECIES OF SMALL MAMMALS IN TECHNOGENIC POLLUTION ZONES OF THE SOUTH ARAL REGION	Bekmuratova Dilaram, Mambetullaeva Svetlana Mirzamuratovna	354-358
77	SCREENING AND STUDYING THE DESTRUCTIVE ACTIVITY OF PERSISTENT ORGANOCHLORINE PESTICIDES	Bazarbaeva Dina Erkinovna	359-363
78	SEISMIC EVALUATION OF VERTICAL IRREGULARITY IN HIGH-RISE BUILDINGS WITH AND WITHOUT HANGING COLUMN	Avinash Yadav, Dr. Jyoti Yadav Vivek Shukla	364-368
79	DESIGN AND ANALYSIS OF A HIGH-RISE BUILDING WITH AND WITHOUT HANGING COLUMN BY ETAB SOFTWARE	Avinash Yadav, Dr. Jyoti Yadav, Vivek Shukla	369-374
80	A SYSTEMATIC LITERATURE REVIEW ON IMPACT OF HYBRID WORK CULTURE ON EMPLOYEE JOB ENGAGEMENT AND PRODUCTIVITY - A STUDY OF IT PROFESSIONALS IN KARNATAKA	N. Vanitha, Dr. Shailashri V. T	375-384

81	QUALITY OF EARLY DIAGNOSIS OF BREAST CANCER	Urmanbaeva D.A., Makhmudzhonova S.Sh., Rasulova D.K., Isomitdinov Sh.A.	385-387
----	---	---	---------



A SINGLE CASE STUDY ON *Madhumeha* w.s.r. TO DIABETES MELLITUS (TYPE II)

Dr. Chanchal¹, Dr. Asha Kumari², Dr. O.P Singh³, Dr. Deshraj Singh⁴

¹PG Scholar 3rd Year, PG Department of Kayachikitsa, Rishikul Campus, Haridwar

²PG Scholar 3rd Year, PG Department of Kayachikitsa, Rishikul Campus, Haridwar

³Professor and Head, PG Department of Kayachikitsa, Rishikul Campus, Haridwar

⁴Medical Officer, Pithoragarh

ABSTRACT

Diabetes mellitus, a non-communicable disease commonly that emerges various health issues globally along with huge social and economic consequences. High incidence of diabetes mellitus categorized by the metabolic activity of hyperglycemia those results in imperfection of insulin oozing, insulin exploits or both. Diabetes symptoms are excessive thirst, frequent urination, sweating, blurred vision, sudden weight loss, fatigue and slow healing sores. Chronic hyperglycemic complications are seen in nephropathy, retinopathy, neuropathy, cardiovascular disease, kidney, blood vessels, stroke and death, they can be prevented with appropriate treatment. A 54 years old male patient treated in the OPD of Rishikul Campus, Haridwar from 27th October 2022 with a complain of generalised weakness, weight loss, increase of urination and attraction of ant towards the excreted urine for 7 months. Examination, laboratory investigations and history leads to diabetes mellitus. Ayurvedic drugs which were mentioned in different texts were given to the patient. It shows the effective results in the management of Madhumeha (Diabetes mellitus).

KEYWORDS- *Diabetes mellitus, Insulin, Hyperglycemia, Ayurved*

INTRODUCTION

Diabetes mellitus is a metabolic disorders where metabolism of carbohydrate remain underused which leads hyperglycemia. The most common symptoms are excessive thirst, frequent urination, sweating, blurred vision, sudden weight loss, fatigue and slow healing sores. It also considered as lifestyle disorders and its prevalence is rising very rapidly in developing countries. Its leads complication like nephropathy, neuropathy or retinopathy. Though there are mainly two types of diabetes – Type 1 and Type 2 but prevalence rate of type 2 diabetes is more. Type 1 diabetes is mainly autoimmune- mediated where absolute insulin deficiency present and its frequency less than type 2 diabetes. Type 2 diabetes is either due to insulin resistance and/or abnormal insulin secretion.

Madhumeha (Prameha)

Ayurvedic remedies for *Madhumeha* (diabetes mellitus) are the oldest and are classified as *Prameha*. *Pramehas* are a group of urinary illnesses characterised by excessive urination and many aberrant features caused by *Doshic* imbalances. *Prameha* is caused primarily by a lack of exercise and poor dietary habits. The basic causes of this ailment include excessive food intake in the categories of *Ushna*, *Snigdha* and *Guru*- fish and curd are good examples. The etiological causes for *Prameha* are foods that enhance *Kapha*, *Medhas* and *Mootra*. *Prameha* is derived from the words *Pra* (overflow) and *Meha* (*Ksharane*) (urine passing). *Prameha* is passing turbid urine as a result (*Prabhootha avila mootrata*).

Case Report: A 54 years old male patient was treated in the OPD of Kayachikitsa of Rishikul Campus, Haridwar from 27th October 2022 with a complain of generalised weakness, weight loss, increase of urination and attraction of ant towards the excreted urine since 7 months. There was history of dryness of mouth, palate and throat. He was diagnosed as type 2 DM 2 years back and did not take any medicine and after that he had come to the OPD of Rishikul Campus, Haridwar on 24th October 2022 to take ayurvedic treatment. He was advised to do lab investigations. Then he had done the investigations on 27th October 2022. Apart from this he didn't suffer from other medical problems like HTN, asthma, thyroid disorder etc. Patient was doing private job in a company. There was family history.

**Table 1****General Examination**

Height	168cm
Weight	73kg
BP	130/90mmkg
Pulse	82/min
Temperature	98.6
General condition	Not good

Family History

Father- DM

Mother- Not Any

S/E (Systemic examination)

CVS-S1S2 NORMAL

CNS-Conscious Oriented

GIT-Liver, Spleen Not Palpable

Asthtavidha Pariksha

Nadi- 82/min

Mutra- Atipravarti

Mala- Sama

Jihva- Sama

Shabda- Normal

Sparsha- Normal

Drik- Normal

Akriti- Average

Dashvidha Pariksha

Prakriti- Kaphaj Vataj

Vikriti- Vata Kapha and Medodhatu dushti

Sara- Meda

Samhanana- Madhyam

Satmya- Madhyam

Satva- Madhyam

Pramana- Madhyam

Ahara shakti- Madhyam

Vyayama shakti- Madhyam

Vaya- Madhyavastha

Investigations (Before Treatment)

- FBS- 140.8 mg/dl
- PPBS- 210 mg/dl
- HBA1C- 7.6%
- Urine examination- In urine examination sugar is present.
- As per ayurveda text the symptoms of *Madhumeha* are *Prabhoota mutrata, Avila mutrata, Shrama* etc.

MATERIAL AND METHODS

Sr. No	Name of Drug	Dose of drug	Frequency and Anupana
1.	<i>Amalaki</i> powder	50gm	
2.	<i>Haridra</i>	10gm	
3.	<i>Vijayasara</i>	50gm	Mix the combination and
4.	<i>Gurmara</i>	20gm	take 5gm BD with luke
5.	<i>Methika</i>	20gm	warm water 30min before
6.	<i>Bilva patra</i> powder	50gm	meal.



Advice-

Pathya (Do's)

1. Diet- Old cereals like *Shali* rice, *Shastika* rice, Barley, *Munga*, *Kulathi*, *Arhar*, Bitter leafy vegetables (*Karela*, *methi*, *parvala* etc.) Fresh fruits (*Jamuna*, *amla* etc)
2. Lifestyle- Regular exercise is recommended 4-6 times/ week. *Pranayama*, *yogasana* (*Bhujangasana*, *Sarvangasana*, *Pawanmukta Asana*).

Apathya (Don't's)

1. Diet- Vinegar, *Tusodaka*, *Sura*, *Asava*, New grains, Oil, milk, ghee, Sugarcane products, Preparation of rice flour, Sour substances, Meat of domestic, Aquatic animals
2. Lifestyle- Avoid sitting, Day sleeping, *Dhumpana*, *Swedana*, Controlling natural urges like *Mutravega* (*Vega Dharana*).

RESULT

Criteria	Before Treatment (27 October 2022)	After Treatment (1 February 2023)
<i>PrabhootaMutrata</i> (Polyuria)	7-8 times a day and 3-4 times at night	3-6 times a day and 1-2 times at night
<i>Shrama</i> (Weakness)	Present	Absent
<i>Mukha kantha shosha</i> (Dryness of mouth and throat)	Moderate	Absent
FBS	140.8 mg/dl	110.4 mg/dl
PPBS	210 mg/dl	150 mg/dl
HBA1C	7.6%	6.8%

HBA1C Before-

NOVUS
NUTRITION

Patient ID: 102211441 | Date: 27/10/2022
 Name: [Redacted] | Collection Date Time: 27/10/2022 14:05:10
 Age/Gender: Male/41 Yrs | Received Date Time: 28/10/2022 14:35:12
 Ref. By Doctor: Dr.Chanchal | Reg. Print Date Time: 28/10/2022 16:42:19
 Address: [Redacted]

Test Name	Value	Unit	Biological Ref Interval
HEMATOLOGY			
HBA1C	7.6	%	

EXPECTED VALUES :-
 Metabolically healthy patients = 4.8 - 6.2 % HbA1C
 Good Control = 5.5 - 6.8 % HbA1C
 Fair Control = 6.8 - 7.5 % HbA1C
 Poor Control = > 7.5 % HbA1C

REMARKS :-
 In vitro quantitative determination of HbA1C in whole blood is utilized in long term monitoring of glycaemia. The HbA1C level correlates with the mean glucose concentration prevailing in the course patient's recent history (approx. - 6-8 weeks) and therefore provides much more reliable information for glycaemia monitoring than do determination of blood glucose or urinary glucose.
 It is recommended that determination of HbA1C be performed at intervals of 4-6 weeks during Diabetes Mellitus therapy.
 Results of HbA1C should be assessed in conjunction with the patient's medical history, clinical examination and other findings.

End of Report

DR. SANJEEV
MD PATH
CONSULTANT PATHOLOGIST
Reported By: MGR
Checked By: MGR

HBA1C After-

NOVUS
NUTRITION

Patient ID: 102211783 | Date: 1/2/2023
 Name: [Redacted] | Collection Date Time: 1/2/2023 13:02:30
 Age/Gender: Male/54 Yrs | Received Date Time: 2/2/2023 14:35:12
 Ref. By Doctor: Dr.Chanchal | Reg. Print Date Time: 2/2/2023 14:35:19
 Address: [Redacted]

Test Name	Value	Unit	Biological Ref Interval
HEMATOLOGY			
HBA1C	6.8	%	

EXPECTED VALUES :-
 Metabolically healthy patients = 4.8 - 6.2 % HbA1C
 Good Control = 5.5 - 6.8 % HbA1C
 Fair Control = 6.8 - 7.5 % HbA1C
 Poor Control = > 7.5 % HbA1C

REMARKS :-
 In vitro quantitative determination of HbA1C in whole blood is utilized in long term monitoring of glycaemia. The HbA1C level correlates with the mean glucose concentration prevailing in the course patient's recent history (approx. - 6-8 weeks) and therefore provides much more reliable information for glycaemia monitoring than do determination of blood glucose or urinary glucose.
 It is recommended that determination of HbA1C be performed at intervals of 4-6 weeks during Diabetes Mellitus therapy.
 Results of HbA1C should be assessed in conjunction with the patient's medical history, clinical examination and other findings.

End of Report

DR. SANJEEV
MD PATH
CONSULTANT PATHOLOGIST
Reported By: MGR
Checked By: MGR



Blood Sugar Level Before-

After-



Tests	Results	Biological Reference Range	Units
GLUCOSE FASTING, PLASMA	148.8	High 74.0 - 100.0	mg/dL
GLUCOSE FASTING			
METHOD: UNICLONAL/HEXAMIN, GLUCOSE			
Specimen:			
FASTING PLASMA, FL			
POST PRANDIAL	218	High 80.0 - 140.0	mg/dL

Tests	Results	Biological Reference Range	Units
GLUCOSE FASTING, PLASMA	110.4	High 74.0 - 100.0	mg/dL
GLUCOSE FASTING			
METHOD: UNICLONAL/HEXAMIN, GLUCOSE			
Specimen:			
FASTING PLASMA, FL			
POST PRANDIAL	150	High 80.0 - 140.0	mg/dL

DISCUSSION

Prameha has been described as *Anushangi* by *Acharya Charaka* which means a disease that runs for a prolonged course and remains attached forever. In *Brihat trayi prameha* is included under *Ashtamahagada* which shows dreadfulness of disease. Diabetes mellitus is a long term metabolic disorder with multiple etiological factors, variable clinical manifestations, progression and number of complications. *Madhumeha* is a *Tridoshasaja vyadhi*. Basic pathology behind it is *Avritta vata* and *Bahudrava Shlesma*. *Madhumeha* comes under *Vataja Prameha*. In Ayurvedic texts there is indication of *Amalaki*, *Haridra*, *Vijayasara*, *Gurmara*, *Methika*, *Bilva patra*.

Haridra is mentioned as *Pramehanashak* in *Charak Samhita*, its *Rasa* is *Tikta*, *Virya* is *Ushna* and *Vipak* is *Katu* and according to *Vagbhatta Haridra* is *Tridosha shamaka*. *Haridra* powder is very effective with *Amalaki* and is known to contain terpenoids, cucuminoids, glycosides and flavonoids. Maximal inhibition of the enzyme human pancreatic Amylase (HPA) was obtained with curcuma longa isopropanol extract and it causes reduction in starch hydrolysis which lowered glucose levels. In classical text *Amalaki* is said as *Pramehghna*.

The chemical constituents of *Vijayasara* phenolics, marsupin, pterosupin and pterostilbene have been identified as the blood sugar lowering and antihyperlipidemic components.

Gurmara has gymnemic acids that has been reported to be an effective anti-diabetic agent in lowering blood sugar level in both type 1 and type 2 diabetes.

The main chemical components of *methika* has been shown to regulate blood sugar levels and increase good cholesterol while lowering total cholesterol.

Bilva patra powder could be be strongly recommended in the daily diet of NIDDM subjects for effective management of diabetes.

CONCLUSION

In this case study it shows that *Amalaki Churna*, *Haridra*, *Vijayasara*, *Gurmara*, *Methika*, *Bilva patra Churna* along with following the rules of *pathya* and *apathya* has great role to mitigate diabetes mellitus (type 2) in both subjective and objective parameters.



REFERENCES

1. Monika Sharma, Pankaj Sharma, A single case study on Madhumeha w.s.r. to Diabetes Mellitus (Type II). *J Ayu Int Med Sci.* 2022;7(11): 195-200
2. Julee Meena, Pramod Kumar Mishra, Indu Sharma, Brahmanand Sharma, Pooja Rani. *Diabetes Mellitus- An Ayurvedic Perspective.* AYUSHDHARA, 2023;10 (Suppl 4): 18-23.
3. Nidhi Aggarwal and Shishu, A Review of recent Investigations on Medicinal Herbs Possessing Anti- Diabetic properties, *J Nutrition Disorder Ther* 2011, 1:1
4. Aarti Sankhla, Shashi Sharma and Nidhi Sharma, Hypoglycemic effect of Bael patra (Aegle Marmelos) in NIDDM patients, *www.arcc journals.com, J.Dairying, Foods & H.S.*



MEIOSIS IN PLANT CARRYING $2n = 21$ CHROMOSOMESTELO-TRISOMIC ($2n + t = 21$)

Shrimant Raut¹, Datta Chamle²

¹Pratibha Niketan Mahavidyalaya, Nanded - 431605 (M.S.) India

²Sharda Mahavidyalaya (Art's & Science), Parbhani - 431401, (M.S.), India

ABSTRACT

Coix L. a genus which is very much known for the chromosomal variations within its species. The aneuploidy to polyploidy and hybridization is common in the genus as it has ill-defined species or cytological forms growing in the same habitats. The meiotic abnormalities have reported many times in the *Coix aquatica*, *C. gigantea* and *C. lacrymajobi*. But the presence of telo-trisomic condition is not so common which has been reported in self-pollinated population of *C. gigantea* with mosomictelo-trisomy. Morphologically the plant was similar to diploid plants, so investigated for the meiotic behavior of a telo-chromosome during various stages of the meiosis. During the study method of single plant cytology has been followed. Telo-chromosome showed the varied behavior sometimes it behaved like normal chromosomes especially during meiosis I but in considerable number of meiocytes behaved abnormally to give the tetrads with variable number of micronuclei in the tetrads after meiosis II. Telo-chromosome though a fragmented part of the chromosome might be getting included in some the gamete instead of its disintegration and elimination by the nature as a corrective measure.

KEY WORDS: *Coix*, Meiosis, aneuploids Telo-trisomic, Trisomy.

INTRODUCTION

The *Coix L.* is an oriental wild relative of maize. It is a member of tribe Maydeaeina family Poaceae. It is widely distributed all over South-East Asian countries. In India also, its occurrence has been reported from almost all states, showing its adaptation to a variety of climatic and edaphic conditions. *Coix* has been extensively studied and exploited as food, fodder and medicine point of view, in countries like China, Japan, Thailand, Indonesia, Korea and Brazil etc. In India, its commercial value as a food crop has been totally neglected, though it has been studied here widely for its cytology and genetics.

In India the genus *Coix* is represented mainly by three species viz. *Coix aquatica* Roxb with $2n = 10$ chromosomes (Mangelsdorf and Reeves 1939; Nirodi 1955; Nirmala 2003; Barve and Sangeetha 2008)., whereas *Coix gigantea* Koen Ex Roxb known to have variable number of chromosomes like $2n = 12, 20, 32, 40$ etc. (Nirodi, 1955; Venketshvarlu and Rao, 1956; Koul and Paliwal, 1964; Christopher and Jacob, 1991). But the *C. lacryma-jobi L.* is having well established diploid chromosome number as $2n = 20$ (James 1943; Bor 1960). The two species *C. aquatica* and *C. gigantea* are morphologically ill defined and cross breed freely in nature (Sapre and Barve 1986; Deshpande, 1986) to give rise to hybrids. The aneuploids produced through the hybridization are known to have been established successfully with diploids as well (Barve, 1983). Monosomictrisomic and Telotrisomic in the *Coix gigantea* has been reported (Barve and Sapre, 1986 and Barve 2013) respectively. Here in this communication the monosmic for one chromosome and telo-trisomic for another chromosome with chromosome number $2n - 1 + t = 20$ (Monosome + telo-chromosome) has been investigated thoroughly.

Three monosomictelo-trisomic $2n = 20$ plants were isolated from the progeny of diploids the plants were observed to be two in one aneuploids showing monosomic condition of one chromosome and telo-trisomic condition of the other chromosome without any change in diploid chromosome number i.e. $2n - 1 + t = 20$.

MATERIALS AND METHODS

The seeds of *Coix gigantea* collected from Uttar Dist. Kolhapur. Their plants were grown in the Botanical Garden of Pratibha Niketan Mahavidyalaya Nanded. All the plants in the field were serially numbered with tags before the flowering starts. When the flowering starts male racemes of appropriate size has been transferred to acetic acid : alcohol (1:3) and kept at room temperature and then stored in the refrigerator until meiotic analysis is performed. Each plant was studied as single plant cytology. 1 % acetocarmine was used as meiotic stain for this study. From each plant a number of slides were prepared and observed for meiotic analysis and chromosome counts at different stages. Micro photomicrography was done with the temporary slides by using an Olympus Research Microscope at 100X.



Plate : 1 Meiosis in plant carrying $2n=21$ Chromosomes (Telo-trisomic)




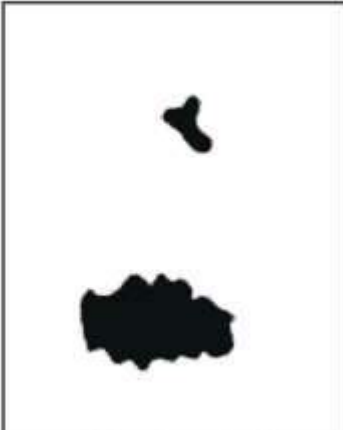










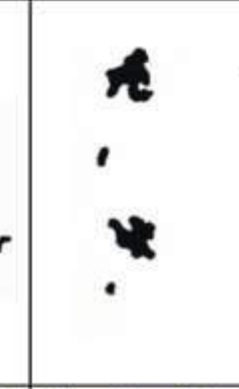
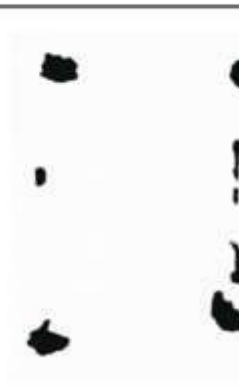

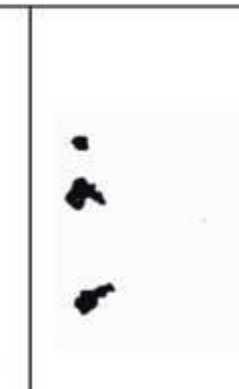
		
a) Diakinesis Showing 10II and a Telochromosome	b) Diakinesis with 9II and two-I and Telosome	c) Diakinesis Showing 9II+Telotrivalent
		
d) Metaphase-I with Unorientated Telotrivalent	e) Metaphase-I with Lagging Telochromosome	f) Metaphase-I with Unorientated II
		
g) anaphase-I with precocious II	h) Anaphase-I showing lagging II and a telochromosome	i) Anaphase-I showing normal segregation



Plate 2 : Meiosis in plant carrying 2n=21 Chromosomes (Telo-trisomic)

		
j) Normal Anaphase-I	k) Telophase-I showing lagging telosome	l) Late Anaphase-I showing excluded telosome
		
m) Late telophase-I showing excluded telosome	n) Metaphase/Anaphase-II showing varied behaviour of three I in Telotrisomic	o) Anaphase-II showing varied behaviour of the chromosomes
		
p) Late anaphase-II Showing Chromosome bridges and laggards	q) Telophase-II showing Excluding Telochromosome and Univalent	r) Tetrad Showing Exclusion of Telotrivalent



RESULTS

At diakinesis, majority of the PMCs showed nine bivalent and telo-trivalent (9II + II_t) configuration which is of typical trisomoc. However the additional chromosome was smaller in size and always paired with one of the two homologous at the end forming a telo-trivalent (Fig. c). In some meiotic cells, ten bivalent and telo-univalent (10II + t) configuration was also observed. (Fig. a). Rarely 9II + 2II + t configuration was observed at diakinesis (Fig. b, Table 1).

Table 1 : Chromosomal configurations at Diakinesis

Total No. of cells scored	9II+II _t	10II+t	9II+2II+t
129	89	37	3

At metaphase-I the trivalent was seen oriented at equatorial plate along with rest of the bivalents. Rarely even the trivalent was seen precociously to one of the poles (Fig. d) or randomly placed in a cell. In few cells ten bivalents were observed to be oriented at equator whereas the tel-trivalent was either seen precociously to one of the poles or randomly placed in the meiocytes (Fig. e). In many microsporocytes the other univalent was seen precociously to one of the poles (Fig. e). Rarely some other bivalents was seen randomly placed in the cell, whereas telo-trivalent was observed on metaphase plate (Fig. g). In many PMCs three univalent of telo trivalent were seen precociously to one of the poles (Fig. h, Table 2).

Table 2: Chromosomal behavior at Mataphase-I

Total No. of cells scored	Normal	Precocious telounivalent	Precocious three univalent (2II+telo)	Un-orientated / randomly placed trivalent (II _t)
248	196	19	27	6

Most of the PMCs showed regular segregation of trivalent as bivalent and telo-univalent giving 10---10 + t distribution (Fig. i) of chromosomes. Due to non-disjunction of trivalent or irregular distribution of univalents, anaphase-I showing unequal distribution of chromosomes like 9---11 + t were recorded (Fig. h) Rarely the trivalent was observed to be late separating or completely lagged. In few cells at anaphase-I / telophase-I lagging univalent (Fig. k) or telo chromosome (Fig. l) were recorded (Table 3). Same configurations continued in meiosis-II (Figs. n - r). Most the cells at meiosis-II were observed to be normal leading to 10---10---11---11 distribution of chromosomes (Fig. n), with two microspores (n=11) incorporating telo-chromosome in their complement. In few cells at anaphase-II, segregation were observed to be distributed showing precociously moved univalent to one of the poles getting excluded from the telophase-II group (Figs. o and p) or laggard univalent/chromatids (Figs. q and r). Few cells also showed sticky - trails of chromatin along with lagging univalent / chromatids leading to their elimination in the form of micronuclei in tetrads (Table 4).

Table 3: Chromosome distribution during Anaphase-I / Telophase-I

Total No. of cells scored	Normal 10I+t-----10I	Lagging telosome 10I---t---10I	Late separating trivalent 9I---II _t ---9I
189	176	08	05

Table 4: Tetrads showing one or two micronuclei

Total No. of tetrads scored	Normal (cleantetrads)	Tetrads with one micronucleus in one of the cell	Tetrads with one small and one big micronucleus in one cell	Two micronuclei in one Cell
238	187	41	3	7

DISCUSSION

It appeared that n-1+t gamete is functional as monosomictelo-trisomic plants were obtained in the selfed progeny of monosomictelo-trisomic 2n=20 plants. Similarly one telo-somic and one monosomictelo-trisomic plant were appeared in the selfed progeny of the same plant. It indicates n+t gamete is functional. Its mating with n gamete have resulted in formation of 2n+t =21 i.e. telo-trisomic plant. Univalency of smaller bivalent and inclusion of univalent in to tetrad having n constitution might have resulted in to n+I gamete. This plant also produced n-1 gametes. Chance mating of n=I and n-1 gamete during selfing might have resulted in to the formation of 2n-1=i 20 (monosomic / trisomic for small chromosome). Mostly telochromosome arise from the miss division, sometimes they modified in to iso-chromosomes or get eliminated during cell division. It means that telochromosomes are unstable and get eliminated and cannot survive in nature. (Darlington 1939). But in this case the addition of telo-chromosome had not disturbed the meiosis as much. Though in some meiotic divisions laggards and precocious movements of monosome and telo-chromosome was observed. Ultimately in the tetrad formation large number of clean tetrads observed, which indicates that the



additional telo-chromosome will persist in the next progeny instead of its elimination. This may be because of the unstable nature of the plant genome in *Coix gigantea*.

CONCLUSION

The plant having an additional telochromosome behaves abnormal and tries to eliminate the extra chromosome i.e. telo-chromosome. But it also affects the behavior of other chromosomes especially the complementary II of the telochromosome. The meiosis of the plant leads to the possibility of gametic combinations like $n = 9$, $n = 9+t$, $n = +I+t$ and $n = 9+I+I+t$ which may lead to further possible hypo or hyper aneuploids.

REFERENCES

1. S. S. Barve, *Telotrisomics in Coix gigantea koen ex roxb Bioinfolet Volume : 10, Issue : 1b, 2013 : 309 - 310.*
2. S. S. Barve and J. S. Sangeetha, *Cytological studies in $2n=17$ Coix gigantea (Maydeae). Journ. Cytol .Genet. 9, 2008, 79 - 83.*
3. S. S. Barve and A. B. Sapre, *Monotrisomic in Coixgigantean (Poaceae). Curr. Sci.,1976, 55: 660 - 661.*
4. N, L. Bor, *Grasses of Burma,Ceylon,India and Pakistan. New York: Pergamon Press,1960.*
5. Christopher and Thayasingh, *Chromosome number of Coix aquatic Roxb. Current Science December 5, 1986, Vol, 53 PP 23.*
6. J. Christopher, and B. Jacob, *Cytological studies of Coix gigantea Koenex Roxb from South India. Cytologia, 1991, 56: 265 - 268.*
7. C. D. Darlington, *Recent Advances in Cytology; p. 39. London. & mdash., 1939, J. Genet. 37, 341.*
8. C. D. Darlington and A. P. Wylie, *Chromosome atlas of flowering plants. G. Allen and Unwin, London, 1955.*
9. James W. Cameron, *Chromosomes of A Maize Relative, PolytocaMacrophyllaBenth. American Journal of Botany, 1943, Vol. 30, No. 10, pp. 776 - 778*
10. P. C. Mangelsdorf and R. G. Reeves, *The origin of Indian corn and its relatives. Texas Agri. Exp. Sta. Bull, 1939, 574: 1 - 315.*
11. Nirmala, *Cytomorphological study of Coix gigantea Koen ($2n = 8x = 40$) and its interracial and interspecific hybrids. Nucleus, 2003, 40: 115 - 119.*
12. N. Nirodi, *Studies in Asiatic relatives of maize. Ann. Missouri Bot. Gard., 1955, 42: 103 - 130.*
13. Sapre, A. B. and S. S. Barve, *Occurrence of pentasomic and hexasomic plants in wild population of Coix gigantea; Current Science, 1983, 52(1): 614 - 615.*
14. B. Sapre and D. S. Deshpande, *A change inchromosome number due to cytomixis in an interspecific hybrid of Coix L. Cytologia, 1987, 52: 167 - 174.*
15. J. Venkateswarlu and Rao, Rajeswara G., *Progress Report on the 1. C. A. R. Scheme on Cytological Studies in Maize and Its Relatives, 1956.*



RECREATIONAL DRUG USE IN ALGERIA: A SHORT COHORT STUDY

T. Ait Mouheb, L. Ait Mokhtar, Z. Amine

Article DOI: <https://doi.org/10.36713/epra15064>

DOI No: 10.36713/epra15064

ABSTRACT

In the Middle East and worldwide, drug abuse is a growing problem for authorities Defined as the ingestion of substance for their psychoactive effect .it's a main reason for cardiovascular neuronal avoidable comorbidities The aim of this study is to settle the prevalence of "Recreational drug" (RD) and the tendency of consumption

METHOD: *We analyzed the data of 40 cases that came to the medical and surgery emergency department units in 03 months starting from July,1st 2023*

The data were analyzed by IBM SPSS

RESULTS: *Among the 40 included cases, 7 were female. The median age was 30 years. The patient presented at night (20:00– 07:59) in 25 cases, and during the weekend in19 cases (47.5%). The average length of stay is 57h34 minutes. The drugs most commonly involved were Cocaine 35.5% followed by buprenorphine 27.5% and pregabalin 22.5% then cannabis 17.5% Drugs were combined with other toxic agents in 20 cases (50%) to cocaine In 3 cases, the patient died during his hospitalization (7.5%) 8 cases (20%) required naloxone use*

CONCLUSION: *The trend of drug consumption is different from the European model. Cocaine is 35.5%*

KEY-WORDS: *Recreational drug use, intoxication, emergency medical department, prevalence, North Africa, substance abuse*

INTRODUCTION

"Recreational drug" refers to the use of drugs that are not intended for medical reasons but for its psychoactive nature and leisure. These drugs can be synthetic or naturally available (1) such as: Opioids, analgesics, benzodiazepines, antidepressants, cannabinoids, cocaine, and amphetamines...

The use of drugs for recreational purposes is a burdensome public health issue, especially in the young adult's population (2).

In 2021, around 275 million people worldwide used recreational drugs (3).

In 2020, "the national office against drugs and toxicomania" (ONLCDT) identified 21638 cases of drug abuse in Algeria: 4.30% Aged under 15-year-old, 46.20% between 16 et 25-year-old, and 34.86% between 25 et 35-year-old.

The global deaths due to it increased by 60% from 105,000 deaths (2000) to 168,000 deaths (2018) (4)

The chronic consumption of those substances can lead to an avoidable increasing mortality and morbidity such as e neurotoxicity (5), acute cardiovascular events (sudden death, acute coronary syndrome, acute heart failure, thromboembolic events, myocarditis, and cardiac arrhythmias) (6.7) addiction, mental health issues and disorder, accidents, involvement in criminal activity and risky sexual behaviors (8.9.10.11.12.13)...

However, the RD consumption is underestimated, the prevalence and actual trend in Algeria are unknown ...

METHOD

SEARCH METHODS

Articles were identified through a literature search using Pub-med,

Keywords and synonyms of the following common categories of recreational drugs, prevalence of illicit drugs, complication and recreational drug



Studies were included if they were full-text journal or full articles, were published in English language peer-reviewed journal, published in the last 10 years

STUDIED POPULATION

It is a retrospective study analyzing case-series of patients under recreational drug (the notion of toxic agent ingestion earlier or a positive analytic test) that were registered in one of the units of the medical and surgery emergency department units in “Lamine Debaghine” university hospital center Bab El Oued from July 1st,2023 to September 30th,2023.

DATA COLLECTION

We registered gender, age, toxic agents taken, whether The patient was brought by ambulance, length of stay, time, and day of presentation, analytical test, ingestion of ethanol, treatment given, administration of naloxone, disposition from the outpatient clinic or hospital emergency department (admitted critical care unit, admitted psychiatric ward, admitted other hospital unit, medically discharged, or self-discharge), and whether the patient died or is alive.

Data was collected from the local registers of the medical and surgery emergency department units : consultation boxes, observation ward, intensive care unit, surgery emergency boxes, and the hospitalization ward

STATISTICAL ANALYZES

All analyses and figures were done in IBM SPSS version 25. As more than one toxic agent was taken in.

In many cases, one case may be counted in several categories of prescription drugs.

Hence, there are overlaps between the categories, and they are not independent of each other for statistical purposes. Consequently, descriptions are presented, using the number of cases, percentages for categorical variables.

RESULTS

There were 40 cases of acute poisoning related to recreational drug use during the 92 days of inclusion.

The patient was brought by ambulance in only 22.5% of cases (fig 3).

The patient presented at night (20:00– 07:59) in 25 cases, and during the weekend in 19 cases (47.5%)

The proportion of patients using drugs for recreational purpose varied by age. The median age is 30 years (15% aged between 17–21 years, 20% aged between 22–26 years, 25% aged between 27–31 years, 22.5% aged between 32–36 years and 15% were 39 years-old and more) by gender (In 7 cases (17.5%) The patient is a woman).

Analytical tests on urinal or blood samples were run in 29 of the cases (72.5 %) in the other cases (27.5%) they either came to the Emergency department with the toxic or reported the substance themselves.

Over 50% of the patients stayed between 7–15 hours in the Emergency department. The average length of stay is 57h34 minutes.

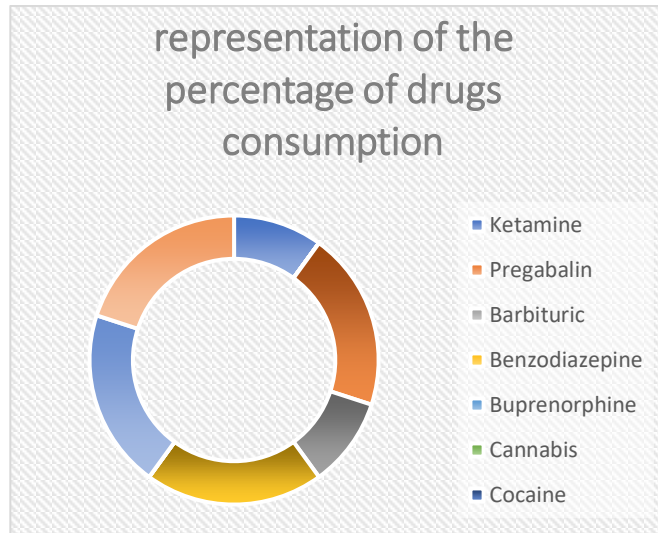
From the outpatient clinic 50% were medically discharged, 12.5% self-discharged, 7.5% died, 7.5% transferred to psychiatric ward, only 5% admitted to the ICU and 5% were taken to other wards

In 3 cases, the patient died during his hospitalization (7.5%)

Cocaine was the most frequent drug taken 35.5% followed by buprenorphine 27.5% and pregabalin 22.5% then cannabis 17.5% (tab 1)

Drugs were combined with other toxic agents in 20 cases (50%). About 14 associations were with cocaine (5 cases of buprenorphine, 4 with cannabis...) (fig 4)

85 % were given treatment and put in observation. About 8 cases (20%) naloxone was given.



	%	Average	Standard deviation
<i>Ketamine</i>	5	1,95	,221
<i>Pregabalin</i>	22.5	1,78	,423
<i>Barbituric</i>	2.5	1,97	,158
<i>Benzodiazepine</i>	17.5	1,82	,385
<i>Buprenorphine</i>	27.5	1,73	,452
<i>Cannabis</i>	17.5	1,82	,385
<i>Cocaine</i>	35.5	1,65	,483
<i>Ecstasy</i>	10	1,90	,304
<i>Lexomyl</i>	5	1,95	,221
<i>Haloperidol</i>	10	1,90	,304
<i>Mianserine</i>	2.5	1,97	,158
<i>THC</i>	2.5	1,97	,158
<i>Gabapentin</i>	10	1,90	,304
<i>Tramadol</i>	10	1,90	,304

Tab 1: Percentage and Standards Deviation of Toxic in the cases

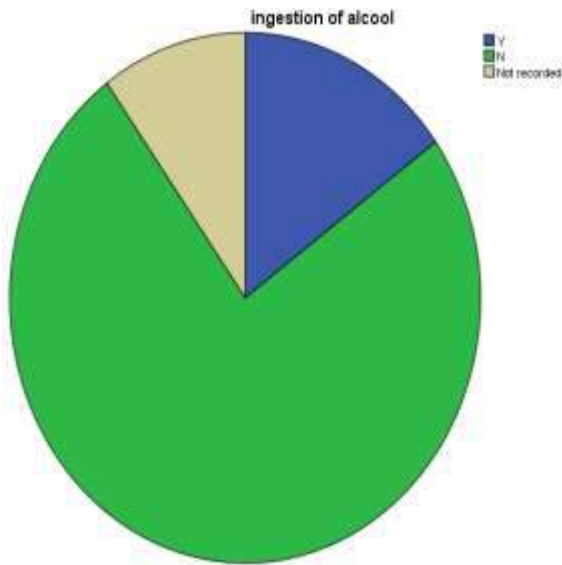


Fig 1: Co Ingestion of Ethanol and Recreational Drugs

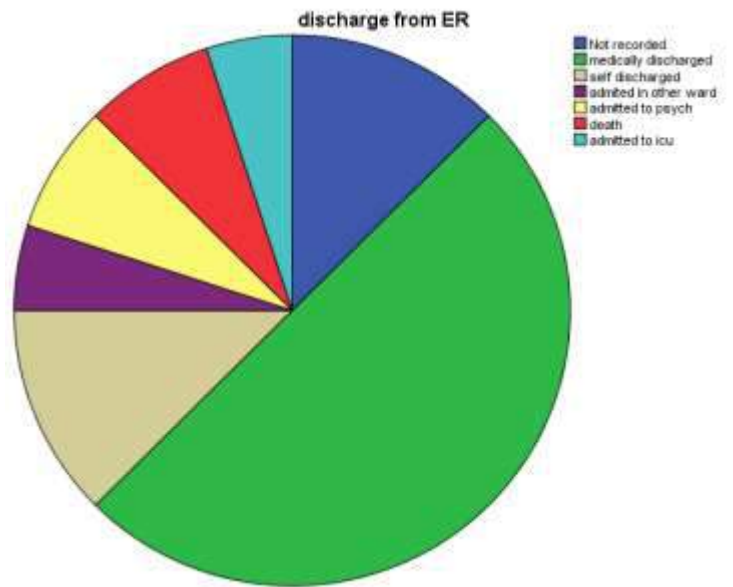


Fig 2 : Discharges Modality

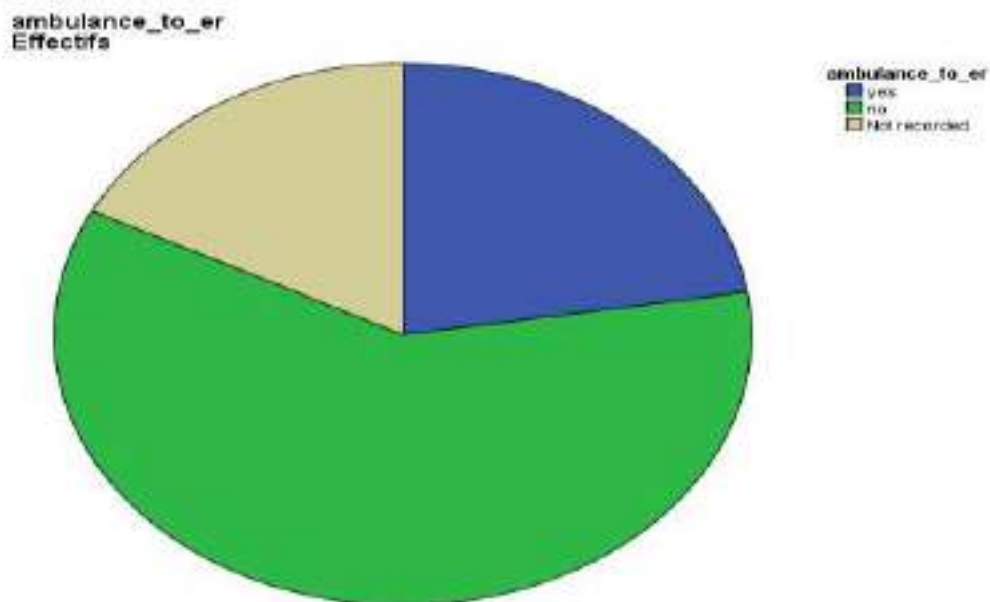
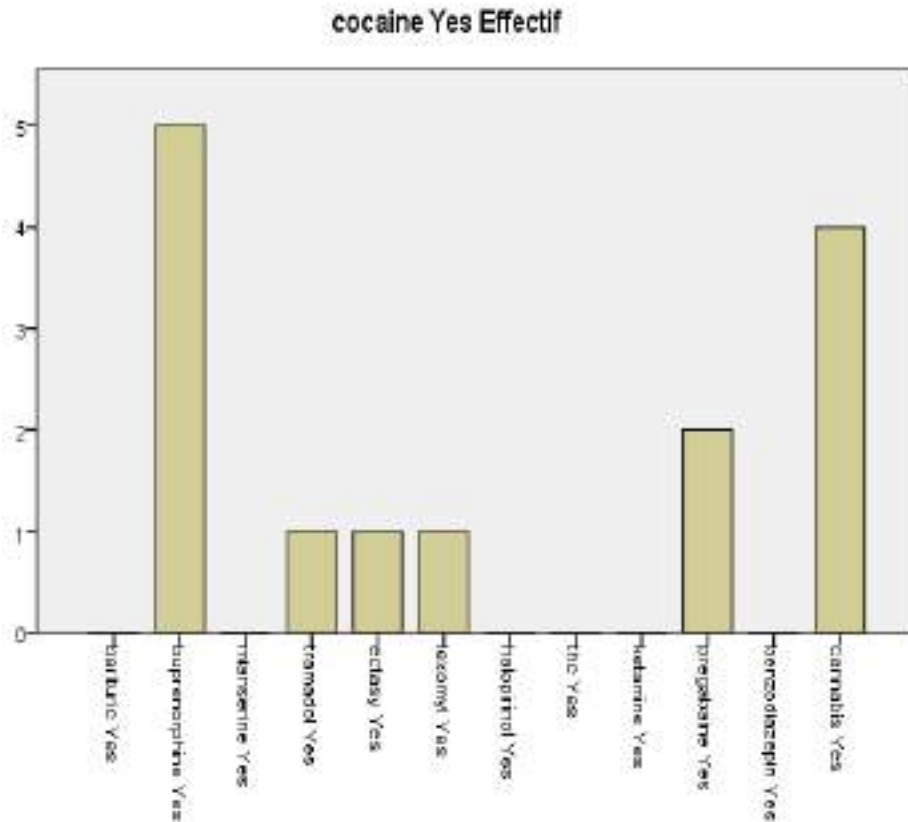


Fig 3: Transportation Modality to the Emergency Departmen



	Cocaine
Barbituric	0
Buprenorphine	5
Mianserine	0
Tramadol	1
Ecstasy	1
Lexomyl	1
Haloperidol	0
THC	0
Ketamine	0
Pregabalin	2
Benzodiazepine	0
Cannabis	4

Fig 4 : Comparison of the number of cases of Co-Ingestion of Cocaine and other Recreational Drugs

DISCUSSION

Summary of Main Findings

The drugs most commonly involved were Cocaine 35.5% followed by buprenorphine 27.5% and pregabalin 22.5%, then cannabis and benzodiazepine 17.5%.

Drugs were combined with other toxic agents in 20 cases (50%) to cocaine

In 3 cases, the patient died during his hospitalization (7.5%)

8 cases (20%) required naloxone use

Opioids

Buprenorphine is an opioid and the second most used substance in our study after cocaine (27.5%). Opioids were also the second most frequent class of prescription drug reported, in line with European studies (16)

Cannabinoids

Cannabinoids are a chemical compound with the chief pharmacologically active delta 9 -tetrahydrocannabinol (THC). THC is a depressant of the central nervous system. It can cause numerous problematics.

Effects such as dizziness, confusion, hallucinations, speech and vision problems, ataxia, euphoria, lack of strength, and fatigue (14)

In our study, it represents only 2.5%



Cocaine

Cocaine has numerous effects as a CNS stimulant, including insomnia, euphoria, Fatigue, dyskinetic, dizziness, tremors, and dysphoria, Tiredness, depression, and insomnia (15)
In our study, it's the most common drug used 35.5%, in European studies it's about 11% (18)

Ecstasy

Restlessness, disorientation, agitation, nervousness, insomnia, tremor, agitation, dizziness, euphoria, fast speech, staggering, dyskinesia, and dysphoria in users. Prolonged use can lead to changes in personality, psychosis, and hyperactivity (16)
In the European society, 8.5% (18) versus 10% of the cases in our study

Benzodiazepine

Third most consummate drug in our study, 17.5%
In European studies 2.5% of the cases, and it's the most frequent drug (18)

Ketamine

In our study, represented 5% of cases, in a European multi-center study of recreational drug toxicity, ketamine was reported in 2.3% of cases (18)

Other drugs

In addition to cocaine, cannabis, and opioids, smaller numbers of other prescription drugs also appeared; Pregabalin and gabapentin, used for neuralgia and as antiepileptics, an antipsychotic and antidepressant have been previously reported in many studies (17) that suggested a growing trend of gabapentin abuse. In our study, pregabalin is the third place of most commonly used drug represented 22.5% cases and gabapentin 10% cases.

Limit of the study

This study has some limitations.
First, the mean burden of missing data on all the variables collected
Second, the population was limited to babe l Oued and only for 3 months.
Then, urine tests at admission detected only recent recreational drug use with a risk of underestimating recreational drug use several days or weeks before
The dataset is based on patient self-reporting of the drugs used and/or the physician's interpretation of the clinical features.

Conclusion

The trend of drug consumption is different from the European model. Cocaine is the most taken, especially associated with others. However, we can't explain the difference of tendencies between European and our study.

Furthermore, the high use of drugs like pregabalin and gabapentin must under-go a strict checking in order to avoid events like the US opioid epidemic

BIBLIOGRAPHY

1. Chaudhery Mustansar Hussain, Deepak Rawtani, Gaurav Pandey, Maithri Tharmavaram *Handbook of Analytical Techniques for Forensic Samples Current and Emerging Developments 2021*, Pages 109-128
2. Buck JM, Siegel JA. *The effects of adolescent methamphetamine exposure. Frontiers in neuroscience.* 2015; 9:151 <https://doi.org/10.3389/fnins.2015.00151> PMID:25972781
3. United Nations Office on Drugs and Crime. *World Drug Report 2021.* Available: www.unodc.org/unodc/en/data-and-analysis/wdr2021.html [Accessed 7 Oct 2021].
4. The United Nations Office on Drugs and Crime (UNODC). *World Drug Report 2018 Vienna, Austria: The United Nations Office on Drugs and Crime (UNODC)*, 2018.
5. *The effects of licit and illicit recreational drugs on prospective memory: a meta-analytic review Psychopharmacology (2019) 236:1131-1143, Springer* <https://doi.org/10.1007/s00213-019-05245-9>
6. Pezel T, Dillinger JG, Trimaille A, et al. *Heart* 2023;109:1608-1616. [Http://dx.doi.org/10.1136/heartjnl-2023-322808](http://dx.doi.org/10.1136/heartjnl-2023-322808)
7. Page RL, Allen LA, Kloner RA, et al. *Medical marijuana, recreational cannabis, and cardiovascular health: a scientific statement from the American Heart Association. Circulation* 2020;142:e13152.



8. Volkow ND, Baler RD, Compton WM, Weiss SRB. Adverse health effects of marijuana use. *New England Journal of Medicine*. 2014; 370(23):2219–27. <https://doi.org/10.1056/nemra1402309> PMID:24897085
9. Di Forti M, Sallis H, Allegri F, Trotta A, Ferraro L, Stilo SA, et al. Daily use, especially of high-potency cannabis, drives the earlier onset of psychosis in cannabis users. *Schizophrenia bulletin*. 2013; (6):1509–17. <https://doi.org/10.1093/schbl/sbt181> PMID: 24345517
10. Degenhardt L, Hall W. Extent of illicit drug use and dependence, and their contribution to the global burden of disease. *The Lancet*. 2012; 379(9810):55–70.
11. Pierce M, Hayhurst K, Bird SM, Hickman M, Seddon T, Dunn G, et al. Insights into the link between drug use and criminality: Lifetime offending of criminally-active opiate users. *Drug and alcohol dependence*. 2017; 179:309–16. <https://doi.org/10.1016/j.drulcdep.2017.07.024> PMID:28837946
12. PLOS ONE Recreational drug use among Nigerian university students PLOS ONE
a. <https://doi.org/10.1371/journal.pone.0232964> May 18, 2020 12/14
13. Ritchwood TD, Ford H, deCoster J, Sutton M, Lochman JE. Risky sexual behavior and substance use among adolescents: A meta-analysis. *Children and youth services review*. 2015; 52:74–88. <https://doi.org/10.1016/j.childyouth.2015.03.005> PMID:25825550
14. Hartman, R.L.; Huestis, M.A. Cannabis effects on driving skills. *Clin. Chem*. 2013, 59, 478–492.
15. Cusack, D.A. Medical Bureau of Road Safety an Lia-Bhiúró um Shábháilteacht ar Bhóithre Report on Roadside Drug Testing and Equipment and Related Matters; The Department of Transport, Tourism, and Sport (DTAS): Dublin, Ireland, 2012
16. Alhefeiti, M.A.; Barker, J.; Shah, I. Roadside Drug Testing Approaches. *Molecules* 2021, 26, 3291. <https://doi.org/10.3390/molecules26113291>
17. Evoy KE, Morrison MD, Saklad SR. Abuse and misuse of pregabalin and gabapentin. *Drugs*. 2017;77:403–26.
18. Dines AM, Wood DM, Yates C, Heyerdahl F, Hovda KE, Giraudon I, et al. Acute recreational drug and new psychoactive substance toxicity in Europe: 12 months data collection from the European drug emergencies network (euro-DEN). *Clin Toxicol*. 2015;53:893–900



ECO-FARM SIMULATION RECREATION THERAPY KIT PROMOTES SENSE OF COHERENCE AMONG THE ELDERLY – A FEASIBILITY PRODUCT ANALYSIS

**Arjun Nanduri ¹, Leoh N. Leon, M.D ², Savithri Chandana Veluri, MD ³,
Laura M. Kim, M.D ⁴.**

¹Valencia College; Orcid: 0000-0002-3832-7928

²Assistant Professor, University of Central Florida, College of Medicine, Emergency Medicine

³Assistant Professor, University of Central Florida, College of Medicine, Family Medicine; ORCID: 0003-5385-3541

⁴Sim learn Physician instructor, University of Central Florida, College of Medicine, Internal Medicine
Orcid 0008-6960-0983,

ABSTRACT

Background: The aging population across the world and in America, the mental distress of chronic illnesses, the projected shortage of caregivers, and the anticipated burden healthcare will face are identified as interconnected problems through systemic design principles. A human centric wellness solution is crafted through the product development of a comprehensive DIY (Do it yourself) recreational therapy kit, integrating three evidence-based interventions: horticultural therapy, journaling, and whole health coaching. This product also aims to engage users in a simulated real-life experience of crop cultivation on a farm. A feasibility analysis was then conducted to determine the effectiveness of this point-of-care human-centered design product.

Objective: The primary aim of this educational activity is to test the effectiveness of a product called Eco-Farm Simulation, Recreation Therapy Kit (EFS RT) . It engages users in a simulated experience of crop cultivation on a farm within a controlled indoor environment requiring minimal complexity and skill.

Methods: N=28 participants aged 65-83 living in the states of Florida and Virginia used this RT Kit over two weeks. A pre- and post-survey consisting of nine questions were administered using a modified sense of coherence scale that measured the three components of comprehension, manageability, and meaningfulness. The post-survey also included two open-ended questions querying user experience with the kit.

Results: EFS RT Kit resulted in significant positive changes in all three components of elderly individuals' sense of coherence.

Conclusion: The EFS RT Kit increases comprehension, manageability, and meaningfulness among its users in period of less than 2 weeks. This paper aims to lay a solid foundation for future exploration in the field of point-of-care product development. The content presented in this paper serves as an educational endeavor and should not be regarded as equivalent to formal research on the subject. Additional investigations employing larger sample sizes, diverse cohorts of institutionalized and disabled individuals, and more rigorous protocols are necessary.

Furthermore, The paper aims to prompt stakeholders and decision-makers to embrace systems design principles for anticipating future problems, prioritize a human-centric approach in solution design, and promote acceptance of environmentally friendly healthcare solutions. It calls upon industry leaders to offer top-down support for the implementation of straightforward innovations such as the EFS kit, which demands multidisciplinary acceptance in healthcare institutions. These products hold the potential for evidence-based practice implementation.

KEYWORDS: Farm, simulation, recreation therapy, sense of coherence, Whole health, Systems design, human centric, point of care, product development, horticulture, journaling, wellness, coaching, Evidence based



INTRODUCTION

Product Description

An incremental design approach is applied to "microgreen trays," a popular product on Amazon. In this socially sustainable product development exploration, we've created an RT Kit for a simulated desk top crop cultivation experience. The kit enables users to engage in real-life farming within a controlled indoor environment using a desktop kit, completing a cultivation cycle in two weeks. It includes organic grow mats, serving as soil replacement, and features self-watering mechanisms for practicality and minimal maintenance. Anticipating user needs, it includes a harvesting surface mat, blunt scissors, a spray water bottle, and storage bags. The integrated instructional manual encourages SMART goals, supported by health coaching prompts. Reflecting lessons learned, incremental development considers diverse requirements, including those of disabled users. The EFS RT Kit, with variable costs based on product quality, is presented in appealing packaging. In developing the "EFS" coaching solution, the initial target audience was the healthcare industry, but challenges in obtaining organizational support led to a redirection of the EFS RT Kit's feasibility analysis toward community residents. While the desktop microgreen kit produces highly nutritious harvests, the emphasis remains on the simulation experience rather than consumption. The kit is reported to have no known side effects, but a safety and quality assessment for consuming the greens was not undertaken. The user manual cautions grower's personal responsibility for checking the product before consumption, addressing potential variations in nutritional value and offering guidance on mold signs and allergen considerations. Users are advised to consult healthcare providers before consumption

OBJECTIVE

The primary aim of this educational activity is to test the effectiveness of a product called EFS RT Kit.

METHODOLOGY

A preliminary exploration focused on evaluating EFS's potential in enhancing the well-being of the elderly. The sample size was 28 and included residents from Florida and Virginia in the United States of America. The Sense of Coherence (SOC) scale, a 9-item quantitative questionnaire rooted in salutogenic theory, measured a potential improvement in "sense of coherence" over 14 days using the EFS RT product. Of 28 recruited retired independent-living adults, three dropped out, citing commitment, time management, and travel plans. The study spanned 10 months, encompassing fall, winter, and summer, with Virginia participants using the kit in summer and winter and Florida participants in summer and fall. The principal investigator, the author, provided contact information for participant queries. Six participants were actively involved throughout the project, posing questions, while the remainder required minimal instructions, relying primarily on the manual

RESULTS

Demographic analysis

The majority of participants were aged 70-80. The gender ratio of the participants was relatively even, with more female elderly individuals in both states. Of the two states where the project took place, Florida had 17 participants, while Virginia had 11. Participants from Virginia did not engage in the project during the fall season, and those in Florida did not participate in the winter season. Sixteen participants were involved in the summer, seven in the winter, and five in the fall.

Effectiveness of each of the three constructs of SOC.

All three aspects of SOC significantly improved with EFS RT Kit usage. Participants notably enhanced comprehension, with mean scores increasing from 11.4 ± 2.901 to 13.68 ± 1.651 post-survey, a +2.28point improvement (p -value=0.00001**). Manageability also rose by +3.72 points post-survey, indicating increased belief in handling life situations. Sense of meaningfulness improved by +3.56 points (p -value=0.00001**), with scores rising from a pre-survey mean of 9.64 to 13.2, reflecting a heightened appreciation for life's meaning and increased satisfaction.

Qualitative analysis

Responses to open-ended questions on EFS RT Kit use revealed four key themes. Theme 1, "Connection to nature and personal growth," highlighted participants' joy, purpose, and personal development. Theme 2, "Social interaction and bonding," emphasized family conversations and strengthened relationships during the activity. In response to toolkit suggestions, Theme 3, "Instructional Resources and Engagement," emerged, expressing a desire for videos, instructions, and community interaction. Theme 4, "Expansion and Exploration," reflected an interest in broadening the activity's scope, seeking information on other plants, and exploring new possibilities. These themes underscore the significance of instructional resources, engagement, and encouraging exploration for sustained interest.



Addressing the design principles of the EFS RT Kit, a commitment to systemic design principles guided its development (Bijl-Brouwer & Malcolm, 2020). Adhering to the five core principles of systems design, the identification of a problem necessitating the development of a social solution was pursued. (Eriksson & Lindström, 2006).

1. Recognizing aging challenges of Americans,
2. Developing empathy with the system,
3. Focusing on human relationships to foster learning and creativity within the project,
4. Recognizing challenges in influencing mental models, and
5. Adopting an evolutionary design approach.

Human-centered design and design thinking methodologies were employed during ideation, involving input from recreational therapists and iterative processes (Ahmed & Demirel, 2020).

Examining previous studies on SOC as a survey instrument in RT product design, existing evidence highlights effects on SOC levels in horticultural programs and arts-based activities (Wu et al., 2020). There is preliminary evidence about the effectiveness of a 12-week horticultural activity program on strengthening SOC levels among 86 participants studied from older adults without clinically significant dementia recruited from 12 LTCFs (long-term care facilities) in northeastern Taiwan (Jueng & Chen, 2022).

Discussing incremental improvements for the EFS RT Kit, the integration of a mobile application is proposed (Buehler et al., 2015). Features include comprehensive instruction guidance, motivational coaching, personalized reminders, education, an interactive chatbot, community support, and guided imagery with virtual reality technology (Tetzlaff et al., 2021). This approach aligns with the increasing digital literacy among the elderly, promoting engagement and personalized assistance (Klimova & Maresova, 2016).

Considering implications, the study highlights the positive impact of user-friendly human centric innovations on participants' sense of coherence (Vogt et al., 2016). It advocates for systemic thinking in social innovation and product development, challenging perceptions about sustainable solutions in healthcare institutions (Bijl-Brouwer & Malcolm, 2020). The paper aims to influence stakeholders and decision-makers toward the acceptance of sustainable solutions.

CONCLUSION

Applying systemic design principles, this paper addresses a social concern by introducing the EFS RT Kit—an incremental, human-centered innovation. The product combines horticulture therapy, therapeutic journaling, and whole health coaching, aiming to simulate real-life crop cultivation. Feasibility analysis indicates statistically significant improvements in users' sense of coherence—comprehension, manageability, and meaningfulness. Despite valuable insights, limitations highlight the need for a more rigorous trial.

AREA FOR FURTHER RESEARCH

Our project underscores a noticeable gap in the existing body of knowledge and suggests the potential utilization of SOC (Sense of Coherence) as a survey instrument for further investigations in programs such as equine therapy, music/dance therapy, and other RT arts and crafts.

ACKNOWLEDGMENTS

The authors of this project would like to extend their gratitude to the community elders who participated in this initiative. The authors also would like to express their gratitude for utilizing 'ChatGPT,' a generative AI tool that played a pivotal role in summarizing and rephrasing.

CONFLICT OF INTEREST STATEMENT

The authors of this narrative acknowledge the presence of potential biases, including but not limited to selection/familiarity bias, volunteer bias, social desirability bias, and self-funding bias. While we have made every effort to mitigate these biases, it is essential to note that the authors are not financially or personally affiliated with any entities that could potentially benefit or be adversely affected by the outcomes of this narrative. Our primary commitment is to the pursuit of objective and unbiased scientific inquiry regarding wellbeing of elderly in a community setting.



Figure 1: Composition of Fully Grown Eco-Farm Simulation Kit

ECO-FARM SIMULATION INSTRUCTION MANUAL

What's in your kit?



Surface Protective
Pad



Seed Grower Tray



Pre-cut Grow
Mats



Seed Packet (May Vary
From Picture Shown)



Tinfoil Tray



Plastic
Spoon



Spray Bottle



Scissors



Bottle of Water
Plastic bottle containing water by
Kyojorinko under Creative Commons 4.0



Ziploc Bag with
Paper Towel



Figure 2: Depiction of Fully Grown Eco-Farm Simulation Kit



Table 1: Modified Sense of Coherence Questionnaire and Post Usage of Eco-Farm Simulation

On a scale of 1-5 (1: very low, 2: little bit low 3: so so 4: a little bit high 5: very high) Over the last 2 weeks

COMPREHENSION

- 1) *I engaged in an activity that challenged me to read with speed and efficiency*
- 2) *I engaged in an activity that challenged me to comprehend & gain understanding of the information I read*
- 3) *I engaged in an activity that helped me think critically, analyze and evaluate the purpose, and credibility of the content of the text I read*

MANAGEABILITY

- 4) *I engaged in an activity that needed troubleshooting to resolve a problem*
- 5) *I engaged in an activity that allowed me to monitor my progress on a project*
- 6) *I engaged in learning a new activity and develop a new skill that I didn't do before*

MEANINGFULNESS

- 7) *I engaged in an activity that allowed me to reflect on what matters to me in life*
- 8) *I engaged in an activity that made me feel hopeful*
- 9) *I engaged in activity that made me feel confident*



Questionnaire for Post Usage of Eco-Farm Simulation

(Participants were also asked to answer the following qualitative questions post activity)

- 1. Please describe the impact of doing this activity.*
- 2. What suggestions do you have to improve this activity?*

Table 2: Frequency distribution of the study participants

Variables	Frequency	Percent
Age Group		
65 to 70	10	35.7
70 to 80	16	57.1
above 80	2	7.2
Gender		
Male	12	42.9
Female	16	57.1
Location		
Florida	17	60.7
Virginia	11	39.3
Season		
Fall	5	17.9
Winter	7	25.0
Summer	16	57.1



Table 3: Individual survey question analysis Pre and Post Activities among Participants Using Paired -T-Test

Individual questions		n	Mean Score	SD	CI		MD	t-test	p-value
					LC	UC			
Comprehension									
Q1	Pre	25	3.56	1.158	3.0821	4.0378			
	Post	25	4.48	0.653	4.2103	4.7500	0.92	5.0593	0.00001**
Q2	Pre	25	3.84	1.028	3.4157	4.2643			
	Post	25	4.6	0.646	4.3336	4.8664	0.76	4.8787	0.0001*
Q3	Pre	25	4	0.957	3.6048	4.3952			
	Post	25	4.6	0.577	4.3617	4.3952	0.60	4.2426	0.0003*
Manageability									
Q4	Pre	25	3.48	1.005	3.065	3.8948			
	Post	25	4.68	0.476	4.4834	4.8765	1.20	6.2668	0.00001**
Q5	Pre	25	3.56	0.870	3.2010	3.9191			
	Post	25	4.52	0.510	4.3100	4.7305	0.96	5.7100	0.00001**
Q6	Pre	25	3.12	0.917	2.7190	3.5209		7.7741	0.00001**
	Post	25	4.68	0.557	4.4502	4.9098	1.56		
Meaningfulness									
Q7	Pre	25	3.16	0.943	2.7706	3.5494	1.08	6.2633	0.00001**
	Post	25	4.24	0.597	3.9935	4.4865			
Q8	Pre	25	3.36	0.700	3.0710	3.6490		9.3333	0.00001**
	Post	25	4.48	0.510	4.2695	4.6904	1.12		
Q9	Pre	25	3.12	0.833	2.7762	3.4637		9.7143	0.00001**
	Post	25	4.48	0.5099	4.2695	4.6905	1.36		

p-value < 0.05 ** * = significant; n= Sample Size; SD= Standard Deviation; CI= Confidence Interval; LC= Lower limit; UL=Upper Limit; MD= Mean Difference; (Comprehension: Q1 I engaged in activity that challenged me to read with speed and efficiency; Q2 I engaged in activity that challenged me to comprehend & gain understanding of the information I read; Q3 I engaged in an activity that helped me think critically, analyze and evaluate the purpose, and credibility of the content of the text I read) (Manageability: Q4 I engaged in an activity that needed troubleshooting to resolve a problem; Q5 I engaged in an activity that allowed me to monitor my



progress on a project; Q6 I engaged in learning a new activity and develop a new skill that I didn't do before) (Meaningfulness: Q7 I engaged in an activity that allowed me to reflect on what matters to me in life; Q8 I engaged in an activity that made me feel hopeful; Q9 I engaged in an activity that made me feel confident).

Table 4: Effectiveness of each of the three constructs of SOC.

Components		n	Mean	SD	CI	MD	t-test	p-value	
Comprehension					LC	UC			
Pair 1	Pre	25	11.4	2.901	10.2025	12.5975	2.28	5.3981	0.00001**
	Post	25	13.68	1.651	12.9984	12.9984			
Manageability									
Pair 2	Pre	25	10.16	2.444	9.1516	11.1689	3.72	9.9994	0.00001**
	Post	25	13.88	1.054	13.4451	14.3149			
Meaningfulness									
Pair 3	Pre	25	9.64	2.039	8.7984	10.4816	3.56		
	Post	25	13.2	1.414	12.616	13.7838		11.4344	0.00001**

p-value < 0.05 ** * = significant; n = Sample Size; SD = Standard Deviation; CI = Confidence Interval; LC = Lower Limit; UL = Upper Limit; MD = Mean Difference

FUNDING

This educational activity was self-funded by the authors, and no external financial support or funding was received for the conduct of this study or the preparation of this journal article.

REFERENCE

- Ahmed, S., & Demirel, H. O. (2020). House of prototyping guidelines: A framework to develop theoretical prototyping strategies for human-centered design. *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, 12200 LNCS, 21–38. https://doi.org/10.1007/978-3-030-49713-2_2/COVER
- Bijl-Brouwer, M. van der, & Malcolm, B. (2020). Systemic Design Principles in Social Innovation: A Study of Expert Practices and Design Rationales. *She Ji: The Journal of Design, Economics, and Innovation*, 6(3), 386–407. <https://doi.org/10.1016/J.SHEJI.2020.06.001>
- Buehler, E., Branham, S., Ali, A., Chang, J. J., Hofmann, M. K., Hurst, A., & Kane, S. K. (2015). Sharing is caring: Assistive technology designs on thingiverse. *Conference on Human Factors in Computing Systems - Proceedings, 2015-April*, 525–534. <https://doi.org/10.1145/2702123.2702525>
- Eriksson, M., & Lindström, B. (2006). Antonovsky's sense of coherence scale and the relation with health: a systematic review. *In Journal of Epidemiology and Community Health (Vol. 60, Issue 5)*. <https://www.jstor.org/stable/40793964?seq=1&cid=pdf->
- Jueng, R. N., & Chen, I. J. (2022). The Effects of Horticultural Therapy on Sense of Coherence among Residents of Long-Term Care Facilities: A Quasi Experimental Design. *International Journal of Environmental Research and Public Health*, 19(9). <https://doi.org/10.3390/ijerph19095412>
- Klimova, B., & Maresova, P. (2016). Elderly people and their attitude towards mobile phones and their applications – a review study. *Lecture Notes in Electrical Engineering*, 393, 31–36. https://doi.org/10.1007/978-981-10-1536-6_5/COVER
- Tetzlaff, L., Schmiedek, F., & Brod, G. (2021). Developing Personalized Education: A Dynamic Framework. *Educational Psychology Review*, 33(3), 863–882. <https://doi.org/10.1007/S10648-020-09570-W/FIGURES/3>



8. Vogt, H., Hofmann, B., & Getz, L. (2016). *The new holism: P4 systems medicine and the medicalization of health and life itself*. *Medicine, Health Care and Philosophy*, 19(2), 307–323. <https://doi.org/10.1007/s11019-016-9683-8>
9. Wu, B., Ding, Y., Zhong, B., Jin, X., Cao, Y., & Xu, D. (2020). *Intervention Treatment for Myocardial Infarction With Tai Chi: A Systematic Review and Meta-analysis*. In *Archives of Physical Medicine and Rehabilitation* (Vol. 101, Issue 12, pp. 2206–2218). W.B. Saunders. <https://doi.org/10.1016/j.apmr.2020.02.012>



A STUDY ON THE PHYSICO-CHEMICAL PROPERTIES OF SOIL OF BUTAPANI AREA LOCATED IN SELF-FLOWING WATER, LUNDRA BLOCK, SURGUJA DISTRICT, CHHATTISGARH, INDIA

Shailesh Kumar Dewangan^a, Nima Yadav^b, Preeti^c & Dr.S.K.Shrivatava^d

^aAssistant Professor & HOD Department of Physics, Shri Sai Baba Aadarsh Mahavidyalaya, Ambikapur(C.G.).

^bStudents M.Sc.Ist Semester Physics. Shri Sai Baba Aadarsh Mahavidyalaya, Ambikapur(C.G.).

^cAssistant Professor, Department of Physics, Shri Sai Baba Aadarsh Mahavidyalaya, Ambikapur(C.G.).

^dProfessor & HOD Department of Physics, R.G. Govt. p.G. College, Ambikapur(C.G.).

ABSTRACT

The objective of this study is to investigate the physicochemical properties of soil in Butapani area located in the self-flowing water area of Lundra block of Surguja district, Chhattisgarh, India. Understanding soil properties in this specific geographic region is important for sustainable land management, agricultural productivity, and environmental protection. The physico-chemical properties of soil play an important role in determining its fertility, availability of nutrients, water-holding capacity and overall suitability for agriculture. By studying these properties, we can obtain information about soil structure, composition, and nutrient status, which are essential for making informed decisions about soil management practices and crop production strategies.

The study will focus on analyzing various physico-chemical parameters of the soil, including soil pH, organic matter content, moisture retention capacity, cation exchange capacity, nutrient availability and particle size distribution. These parameters will provide valuable information about soil fertility, nutrients and its ability to retain water for plant growth. By conducting this study, we aim to contribute to the existing knowledge base on soil properties in the Butapani area, especially in the self-draining watershed of Lundra block, Surguja district, Chhattisgarh, India. The findings of this research will have practical implications for farmers, land planners and policy makers, as they can use the information to develop appropriate soil management strategies and increase agricultural productivity in the field. Overall, this study on physicochemical properties of soil in Butapani area will provide valuable insights into soil characteristics, which will contribute to sustainable land management practices and agricultural development in the self-flowing water area of Lundra Block, Surguja District, Chhattisgarh, India .

KEYWORDS: Electrical Conductivity, pH-value, Zinc (Zn), Copper (Cu), Iron (Fe).

INTRODUCTION

Soil is a vital natural resource that plays a crucial role in supporting various ecosystems and sustaining agricultural productivity. Understanding the physicochemical properties of soil is essential for effective land management and sustainable agricultural practices. In this context, this study focuses on investigating the physicochemical properties of soil in the Butapani area, located in self-flowing water in the Lundra Block of Surguja District, Chhattisgarh, India.

The Butapani area is characterized by the presence of self-flowing water, which adds a unique aspect to the soil dynamics. The self-flowing water influences the soil's hydrological and chemical processes, potentially affecting its physicochemical properties. Therefore, a comprehensive study of the soil in this area is essential to assess its fertility, nutrient content, and overall quality. The objectives of this study are to analyze the pH levels, organic matter content, electrical conductivity, cation exchange capacity, and nutrient levels in the soil of the Butapani area. These parameters are crucial indicators of soil health and fertility, providing valuable insights into its capacity to support plant growth and agricultural productivity.

By examining the physicochemical properties of the soil in the Butapani area, this study aims to contribute to the understanding of soil characteristics in self-flowing water regions. The findings of this study can help in formulating appropriate land management strategies, optimizing nutrient management practices, and promoting sustainable agricultural practices in the Butapani area. This study addresses the knowledge gap regarding the physicochemical properties of soil in self-flowing water areas and highlights the importance of soil analysis for effective land use planning and agricultural development.



Geographical location of research area- Latitude: 23.080208^o and Longitude: 83.312776^o.

LITERATURE REVIEW

Soil physical properties refer to the characteristics of soil that are related to its physical structure, composition, and behavior. These properties play a crucial role in determining soil fertility, water availability, and overall soil health. Some of the key soil physical properties include-

Soil Texture: Soil texture refers to the proportion of sand, silt, and clay particles in the soil. It influences soil structure, water-holding capacity, and nutrient availability.

Soil Structure: Soil structure refers to the arrangement and organization of soil particles into aggregates or clumps. It affects soil porosity, aeration, water infiltration, and root penetration.

Soil Porosity: Soil porosity refers to the amount and arrangement of pore spaces within the soil. It affects water movement, aeration, and root growth.

Bulk Density: Bulk density is the mass of dry soil per unit volume, including both solids and pore spaces. It indicates soil compaction and influences root growth and water movement.

Soil Water Holding Capacity: Soil water holding capacity is the ability of soil to retain and supply water to plants. It depends on soil texture, structure, and organic matter content.

Soil Permeability: Soil permeability is the ability of soil to allow water movement through its pores. It is influenced by soil texture, structure, and compaction.

Soil Organic Matter Content: Soil organic matter refers to the decayed plant and animal materials in the soil. It improves soil structure, water-holding capacity, nutrient availability, and microbial activity.

Soil pH: Soil pH is a measure of soil acidity or alkalinity. It affects nutrient availability and microbial activity in the soil.

pH: Soil pH significantly affects the availability of essential plant nutrients. In acidic soils (pH below 7), aluminum and manganese toxicity can occur, limiting plant growth (Bouyoucos, 1962). On the other hand, alkaline soils (pH above 7) can lead to nutrient deficiencies, particularly for micronutrients like iron, zinc, and copper (Nable et al., 1997). pH influences the solubility and mobility of these nutrients, affecting their uptake by plants. Soil pH directly impacts microbial activity and diversity. Soil microorganisms play a vital role in nutrient cycling, organic matter decomposition, and plant-microbe interactions. Acidic soils favor the growth of acidophilic microorganisms, while alkaline conditions promote the proliferation of alkaliphilic microorganisms (Fierer & Jackson, 2006).

Conductivity: Electrical conductivity is a key indicator of soil salinity, which can have significant impacts on plant growth and agricultural productivity. High soil conductivity levels indicate high salt concentrations, which can be detrimental to plant growth and reduce crop yields (Rhoades et al., 1999). Salinity affects soil structure, water uptake, and nutrient availability, leading to reduced plant vigor and yield potential. Soil conductivity affects nutrient availability by influencing the solubility and mobility of essential plant nutrients. High soil conductivity can lead to increased nutrient leaching, reducing the availability of nutrients for plant uptake (Singh et al., 2019).

Organic Carbon Content: Soil Fertility: Organic carbon plays a pivotal role in soil fertility by providing a source of energy and nutrients for soil microorganisms. As organic matter decomposes, it releases essential nutrients such as nitrogen, phosphorus, and potassium, which are vital for plant growth and productivity (Jones & Willett, 2019). Additionally, organic carbon enhances the cation exchange capacity of soil, improving its ability to retain and supply nutrients to plants (Lehmann & Kleber, 2015).

Copper (Cu): Soil pH: Copper can influence soil pH, causing acidification in some cases. The displacement of hydrogen ions by copper ions leads to a decrease in soil pH (Smith et al., 2010; Johnson & Brown, 2015). Microbial Activity: Copper can have both stimulatory and inhibitory effects on soil microbial activity. Low copper concentrations can enhance microbial growth, while high concentrations



can be toxic to certain microorganisms, resulting in reduced microbial diversity and activity (Jones et al., 2008; Chen et al., 2012). **Zinc (Zn):** Soil pH: Zinc can influence soil pH, although the effects are variable. Some studies have reported a slight decrease in soil pH with increasing zinc levels, while others have observed no significant pH changes (Smith et al., 2012; Johnson & Brown, 2016). **Microbial Activity:** Zinc can affect soil microbial activity. Low zinc concentrations can limit microbial growth and activity, while adequate zinc levels can enhance microbial diversity and enzymatic activity (Jones et al., 2010; Chen et al., 2014). **Iron (Fe):** Soil pH: Iron can influence soil pH, although the effects are variable. Some studies have reported a slight decrease in soil pH with increasing iron levels, while others have observed no significant pH changes (Smith et al., 2012; Johnson & Brown, 2016). **Manganese (Mn):** Soil Chemistry: Manganese can influence various soil chemical properties, including redox reactions, pH, and nutrient availability. Manganese oxidation and reduction reactions play a significant role in soil redox processes (Kabata-Pendias & Mukherjee, 2007). Manganese can also influence soil pH, with high manganese levels often associated with lower soil pH (Marschner, 2012). **Boron (B):** Microbial Activity: Boron can affect soil microbial activity. Adequate boron concentrations can enhance microbial growth and activity, contributing to nutrient cycling and organic matter decomposition (Rout & Das, 2009). However, excessive boron levels can be toxic to certain microorganisms, leading to reduced microbial diversity and activity (Khan et al., 2019).

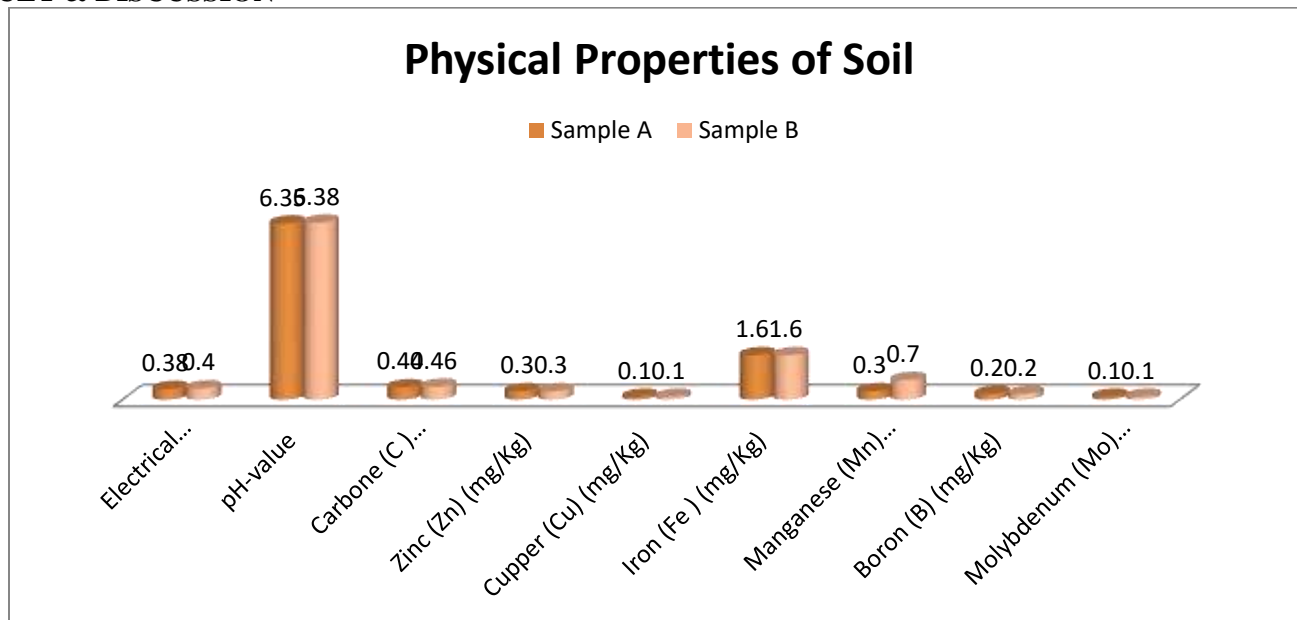
MATERIAL & METHOD

Soil testing is an important process to assess soil fertility, nutrients and pH levels. It helps determine specific requirements for plant growth and allows proper amendments and fertilization. Here is a basic method of soil testing:

- 1. Sample Collection:** Used a clean sampling tool (such as a soil auger or shovel) to collect soil samples. Soil was taken from a depth of about 6-8 inches.
- 2. Sample Preparation:** Remove any plant debris, stones or roots from the soil sample. Mix the collected soil samples thoroughly in a clean container, breaking up clumps to ensure uniformity.
- 3. Test Parameters:** Determine the specific parameters we want to test for, such as soil pH, nutrient levels, and organic matter content. pH testing was done using pH meter or soil pH testing kit. Nutrients were analyzed through laboratory testing.
- 4. Laboratory Testing:** Since we do not have a modern soil laboratory in our lab, we sent the soil samples to a nearby soil testing center. After testing, the soil testing center gave the following results, which are as follows:-

Table 1: Physico-chemical properties of Soil.

S.No.	Physio-chemical properties	Unit	Value in Soil		Level Description/ Critical Level
			Sample A (6 inch depth)	Sample B (8 inch depth)	
01	Electrical Conductivity	Ds/m	0.38	0.40	Less than 1.0-Normal
02	pH-value	pH-Scale	6.35	6.38	Neutral 7
03	Carbone (C)	Kg/Hactare	0.44	0.46	Less than 0.50- Lower
04	Zinc (Zn)	mg/Kg	0.3	0.3	0.6
05	Cupper (Cu)	mg/Kg	0.1	0.1	0.2
06	Iron (Fe)	mg/Kg	1.6	1.6	4.5
07	Manganese (Mn)	mg/Kg	0.3	0.7	3.5
08	Boron (B)	mg/Kg	0.2	0.2	0.5
09	Molybdenum (Mo)	mg/Kg	0.1	0.1	0.2

**RESULT & DISCUSSION**

The physicochemical properties of the soil in Sample A (at a depth of 6 inches) and Sample B (at a depth of 8 inches) are as follows:

1. **Electrical Conductivity:** The values for both samples are 0.38 Ds/m and 0.40 Ds/m, respectively. These values indicate a level below 1.0, which is considered normal. Electrical conductivity is a measure of the soil's ability to conduct an electrical current and can provide insights into its salinity and nutrient content.
2. **pH-value:** The pH values for both samples are 6.35 and 6.38, respectively. These values indicate a neutral pH of around 7. A neutral pH is generally considered favorable for most crops as it allows for optimal nutrient availability.
3. **Carbon (C):** The values for carbon content in both samples are 0.44 kg/hectare and 0.46 kg/hectare, respectively. These values are below the critical level of 0.50 kg/hectare, indicating a lower carbon content in the soil. Carbon is an essential component of organic matter and influences soil fertility and nutrient retention capacity.
4. **Zinc (Zn):** Both samples have a zinc content of 0.3 mg/kg. This value is below the critical level of 0.6 mg/kg. Zinc is a micronutrient necessary for plant growth and plays a role in various physiological processes.
5. **Copper (Cu):** The copper content in both samples is 0.1 mg/kg, which is below the critical level of 0.2 mg/kg. Copper is a micronutrient required for enzyme activity and plays a role in plant metabolism.
6. **Iron (Fe):** Both samples have an iron content of 1.6 mg/kg, which is below the critical level of 4.5 mg/kg. Iron is an essential micronutrient involved in various physiological processes, including chlorophyll synthesis and electron transport.
7. **Manganese (Mn):** Sample A has a manganese content of 0.3 mg/kg, while Sample B has a higher manganese content of 0.7 mg/kg. Both values are below the critical level of 3.5 mg/kg. Manganese is a micronutrient involved in enzyme activation and plays a role in plant growth and development.
8. **Boron (B):** Both samples have a boron content of 0.2 mg/kg, which is below the critical level of 0.5 mg/kg. Boron is a micronutrient required for cell wall synthesis and plays a role in plant reproduction.
9. **Molybdenum (Mo):** Both samples have a molybdenum content of 0.1 mg/kg, which is below the critical level of 0.2 mg/kg. Molybdenum is a micronutrient involved in nitrogen metabolism and is essential for plant growth.

RESULT

Based on the physio-chemical properties of the soil samples: 1. **Electrical Conductivity:** The values for both samples are below 1.0 Ds/m, indicating a normal level of salinity. 2. **pH-value:** The pH values for both samples are around 6.35-6.38, indicating a neutral pH level. 3. **Carbon (C):** The carbon content in both samples is below the critical level of 0.50 kg/hectare, indicating lower organic matter content in the soil. 4. **Zinc (Zn):** The zinc content in both samples is below the critical level of 0.6 mg/kg, indicating a deficiency of zinc in the soil. 5. **Copper (Cu):** The copper content in both samples is below the critical level of 0.2 mg/kg, indicating a deficiency of copper in the soil. 6. **Iron (Fe):** The iron content in both samples is below the critical level of 4.5 mg/kg, indicating a deficiency of iron in the soil. 7. **Manganese (Mn):** Sample A has a manganese content of 0.3 mg/kg, while Sample B has a higher manganese content of 0.7



mg/kg. Both values are below the critical level of 3.5 mg/kg, indicating a deficiency of manganese in the soil. 8. Boron (B): The boron content in both samples is below the critical level of 0.5 mg/kg, indicating a deficiency of boron in the soil. 9. Molybdenum (Mo): The molybdenum content in both samples is below the critical level of 0.2 mg/kg, indicating a deficiency of molybdenum in the soil. In conclusion, the soil samples show deficiencies in carbon, zinc, copper, iron, manganese, boron, and molybdenum levels. These deficiencies may affect the soil's fertility and nutrient availability, which could impact plant growth and productivity. It is recommended to address these deficiencies through appropriate soil management practices and nutrient supplementation to improve soil health and enhance agricultural productivity.

REFERENCES

1. Alloway, B. J. (2013). *Heavy Metals in Soils: Trace Metals and Metalloids in Soils and their Bioavailability* (3rd ed.). Springer.
2. Bergaya, F., Lagaly, G., & Bergaya, F. (2006). *Handbook of Clay Science*. Elsevier.
3. Bouyoucos, G. J. (1962). Hydrometer method improved for making particle size analyses of soils. *Agronomy Journal*, 54(5), 464-465.
4. Brady, N. C., & Weil, R. R. (2008). *The Nature and Properties of Soils*. Prentice Hall.
5. Dewangan, S. K., Kumari, J., Tiwari, V., Kumari, L. (2022). Study the Physico-Chemical Properties of Red Soil of Duldula Area Located in Jashpur District, Surguja Division of Chhattisgarh, India. *International Journal of Engineering and Management (IJSREM)*, 06(11), 1-5. <https://ijsrem.com/download/study-the-physico-chemical-properties-of-red-soil-of-duldula-area-located-in-jashpur-district-surguja-division-of-chhattisgarh-india/>
6. Dewangan, S. K., Kumari, L., Tiwari, V., Kumari, J. (2022). Study the Physico-Chemical Properties of Red Soil of Kandora Village of Jashpur District, Surguja Division of Chhattisgarh, India. *International Journal of Innovative Research in Engineering (IJIRE)*, 3(6), 172-175. <https://theijire.com/view-archives/624/Study-The-Physico-Chemical-Properties-of-Red-Soil-of-Kandora-Village-of-Jashpur-District,-Surguja-Division-of-Chhattisgarh,-India>
7. Dewangan, S. K., Minj, A. K., & Yadav, S. (2022). Study the Physico-Chemical Properties of Soil of Bouncing Land Jaljali Mainpat, Surguja Division of Chhattisgarh, India. *International Journal of Creative Research Thoughts*, 10(10), 312-315. Retrieved from http://ijcrt.org/viewfull.php?&p_id=IJCRT2210499
8. Dewangan, S. K., Minj, P., Singh, P., Singh, P., Shivlochani. (2022). Analysis of the Physico-Chemical Properties of Red Soil Located in Koranga Mal Village of Jashpur District, Surguja Division of Chhattisgarh, India. *International Advanced Research Journal in Science, Engineering and Technology*, 9(11), 116-119. <https://iarjset.com/papers/analysis-of-the-physico-chemical-properties-of-red-soil-located-in-koranga-mal-village-of-jashpur-district-surguja-division-of-chhattisgarh-india/>
9. Dewangan, S. K., Sharma, G. K., & Srivasrava, S. K. (2022). Characterization of agriculture Soil of Gangapur area located in Latori, Surguja division of Chhattisgarh. *International Journal of Science, Engineering And Technology*, 11(1), 1-3. <https://www.ijset.in/volume-11-issue-1/>
10. Dewangan, S. K., Shrivastava, S. K., Soni, A. K., Yadav, R., Singh, D., Sharma, G. K., Yadav, M., & Sahu, K. (2023). Using the Soil Texture Triangle to Evaluate the Effect of Soil Texture on Water Flow: A Review. *International Journal for Research in Applied Science & Engineering Technology (IJRASET)*, 11(6), 389-390. <https://www.ijraset.com/best-journal/using-the-soil-texture-triangle-to-evaluate-the-effect-of-soil-texture-on-water-flow-a-review>
11. Dewangan, S. K., Singh, D., Haldar, R., & Tirkey, G. (2022). Study the Physico-Chemical Properties of Hair Wash Soil of Kardana Village of Jashpur District, Surguja Division of Chhattisgarh, India. *International Journal of Novel Research and Development*, 7(11), 13-17. Retrieved from <https://www.ijnrd.org/papers/IJNRD2211103.pdf>
12. Dewangan, S. K., Soni, A. K., & Sahu, K. (2022). Study the Physico-Chemical Properties of Rock Soil of Sangam River, Wadrafanagar, Surguja Division of Chhattisgarh, India. *International Journal of Research and Analytical Reviews*, 9(4), 119-121. Retrieved from http://ijcrt.org/viewfull.php?&p_id=IJCRT2210499
13. Dewangan, S. K., Yadav, M. K., Tirkey, G. (2022). Study the Physico-Chemical Properties of Salt Soil of Talkeshwarpur Area Located in Balrampur District, Surguja Division of Chhattisgarh, India. *International Research Journal of Modernization in Engineering Technology and Science*, 4(11), 791-797. <https://www.irjmets.com/paperdetail.php?paperId=2b0e12cee61289ba3194b97b3d0cbdb&ttitle=STUDY+THE+PHYSICO->
14. Dewangan, S. K., Yadav, R., Haldar, R. (2022). Study the Physico-Chemical Properties of Clay Soil of Kandora Village of Jashpur District, Surguja Division of Chhattisgarh, India. *EPRA International Journal of Research and Development (IJRD)*, 7(11), 87-91. <https://eprajournals.com/IJSR/article/9732>
15. Dewangan, S. K., Yadav, V., Sahu, K. (2022). Study the Physico-Chemical Properties of Black Soil of Bahora Village of Jashpur District, Surguja Division of Chhattisgarh, India. *International Research Journal of Modernization in Engineering Technology and Science*, 04(11), 1962-1965. <https://ijrpr.com/uploads/V3ISSUE11/IJRPR8037.pdf>
16. Fierer, N., & Jackson, R. B. (2006). The diversity and biogeography of soil bacterial communities. *Proceedings of the National Academy of Sciences*, 103(3), 626-631.
17. Jones, D. L., & Willett, V. B. (2019). Experimental evaluation of methods to quantify dissolved organic nitrogen (DON) and dissolved organic carbon (DOC) in soil. *Soil Biology and Biochemistry*, 131, 1-12.
18. Kabata-Pendias, A., & Mukherjee, A. B. (2007). *Trace elements from soil to human*. Springer.
19. Kabata-Pendias, A., & Pendias, H. (2001). *Trace Elements in Soils and Plants*. CRC Press.



20. Khan, S., Cao, Q., Zheng, Y. M., Huang, Y. Z., & Zhu, Y. G. (2019). Health Risks of Heavy Metals in Contaminated Soils and Food Crops Irrigated with Wastewater in Beijing, China. *Environmental Pollution*, 248, 1028-1037.
21. Lal, R. (2004). Soil Carbon Sequestration Impacts on Global Climate Change and Food Security. *Science*, 304(5677), 1623-1627.
22. Lehmann, J., & Kleber, M. (2015). The contentious nature of soil organic matter. *Nature*, 528(7580), 60-68.
23. Liu, Y., Liu, X., Li, Y., & Huang, X. (2014). Effects of electrical conductivity on soil microbial biomass, enzyme activity, and community composition in a rice paddy soil. *Pedosphere*, 24(1), 78-86.
24. Marschner, P. (2012). *Marschner's Mineral Nutrition of Higher Plants* (3rd ed.). Academic Press.
25. Nable, R. O., Bañuelos, G. S., & Paull, J. G. (1997). Boron toxicity. *Plant and Soil*, 193(1-2), 181-198.
26. Naveed, M., Moldrup, P., Arthur, E., de Jonge, L. W., & Vogel, H. J. (2018). Soil organic carbon content effects on soil water retention on the Loess Plateau, China: A review. *Journal of Hydrology*, 565, 607-617.
27. Qadir, M., Tubeileh, A., Akhtar, J., Larbi, A., & Minhas, P. S. (2008). Productivity enhancement of salt-affected environments through crop diversification. *Land Degradation & Development*, 19(4), 429-453.
28. Rhoades, J. D. (1996). Salinity: Electrical conductivity and total dissolved solids. *Methods of Soil Analysis: Part 3 Chemical Methods*, 417-435.
29. Rhoades, J. D., Chanduvi, F., & Lesch, S. M. (1999). *Soil salinity assessment: methods and interpretation of electrical conductivity measurements*. Food and Agriculture Organization of the United Nations.
30. Rhoades, J. D., Kandiah, A., & Mashali, A. M. (1992). *The Use of Saline Waters for Crop Production*. Food and Agriculture Organization of the United Nations.
31. Rillig, M. C., Aguilar-Trigueros, C. A., Bergmann, J., Verbruggen, E., Veresoglou, S. D., & Lehmann, A. (2015). Plant root and mycorrhizal fungal traits for understanding soil aggregation. *New Phytologist*, 205(4), 1385-1388.
32. Ryals, R., Hartman, M. D., Wooliver, R., Givens, K. P., Norris, C. E., & Paul, E. A. (2019). Long-term climate change mitigation potential with organic matter management on grasslands. *Global Change Biology*, 25(6), 1879-1892.
33. Shainberg, I., Sumner, M. E., & Miller, W. P. (1989). Cation exchange properties of irrigated soils: Weathered micaceous clays. *Soil Science Society of America Journal*, 53(6), 1616-1621.
34. Singh, N., Maurya, B. R., & Tripathi, R. (2019). Effect of different levels of soil salinity on growth, yield, and quality of tomato (*Solanum lycopersicum* L.). *Journal of Plant Nutrition*, 42(11-12), 1437-1446.
35. Sinsabaugh, R. L., Manzoni, S., Moorhead, D. L., & Richter, A. (2020). Carbon use efficiency of microbial communities: stoichiometry, methodology, and modelling. *Ecology Letters*, 23(10), 1482-1498.
36. Six, J., Elliott, E. T., Paustian, K., & Doran, J. W. (2002). Aggregation and soil organic matter accumulation in cultivated and native grassland soils. *Soil Science Society of America Journal*, 66(2), 193-203.



HISTORICAL FICTION FILMS IN UZBEK CINEMA ART

Nasimov Fotih Hilol o'g'li

Uzbekistan State Institute of Arts and Culture "Film Art, Television Specialization" Researcher

ABSTRACT

In Uzbek cinematography, attention is focused on the issues of studying and analyzing the processes of creating historical films, deeply understanding the essence of historical genres and reality, and reflecting them in the film.

KEYWORDS: *cinematography, cinematographer, director, aesthetic, artistic, technical.*

The art of cinema has developed over the years and passed through many stages. During the past period, many literature and sources related to the history of the development of cinema were created by the world and Uzbek film scholars. Beginning with the creation of cinema, early silent, later sound, non-color, and color films have been sufficiently studied. Cinema has a special place in the cultural life of society and has become an integral part of life. The artistic, aesthetic pleasure and thinking of the viewer watching the film is the achievement of every film. Therefore, with the help of high-quality cinema, it is possible to form a person in the right direction.

In world cinema, historical films are shown not only as an artistic and aesthetic heritage, but also as an exemplary experience of the past. Films on this topic are a unique direction of cinematography and interpret historical events on the screen. The director achieves this thanks to his unique artistic features, which he recreates based on his experience. Initially, great attention is paid to historical facts, working with primary sources, allowing the viewer to evaluate historical events from an artistic point of view and give them a certain figurative and expressive color. That is, working with historical documents is the main principle in making a film. After all, the director's study of the historical reality allows him to more accurately reflect the artistic reality on the screen and thereby bring the viewer closer to the historical reality. Artistic and expressive tools of cinematography are a large technical and creative arsenal, with the help of which the filmmaker recreates a historical picture and transports the viewer to a certain space and time. It should also be noted that due to the possibility of using all the artistic and expressive means of cinematographic art, the original image nature of the historical film will be restored and the film will take the form of a historical film fact or a film document.

"Historical films are feature films depicting specific historical periods, events and lives of individuals in the past. In this regard, historical films are often adventure and action-oriented, because often dramatic events, wars, coups and similar realities become the subject of the film. [1.]

Films about a historical period - by themselves, in this type of films, the characteristics of a certain period, the way of life and historical facts are revealed in a general way.

Films about historical events - in this type of films, some event from a certain period takes center stage. In essence, it is similar to the first type, but the drama is based on a historical event.

Films about historical figures - in this type of films, the main focus is on the people who lived in a certain historical period and their life path. In all of these types listed above, the approach of the authors is threefold.

History is recorded on film; Important historical facts are preserved and enriched with artistic textures; Historical events are fictionalized;

In Uzbek cinema, the school and experience of historical films also play an important role.

During the past period, historical films mainly referred to historical literary works, the life path of national heroes, historical figures, and motifs in historical tales. Films about human biography have always attracted the attention of the audience. The stories about the feelings, interests, inner world and drama of successful people are also interesting because they are based on real events.



"Forty-fifty years ago, some works were created by our mentor filmmakers on these topics, and they have not been released from the screens until now. We are grateful to them for creating such films under the harsh conditions of the Mustabid regime. But one cannot ignore the fact that these works are influenced by the ideology of their time, and the historical truth is distorted in some of them." [2.]

Feature films made during the former Soviet Union served the ideas and ideology of that time. In this place "Furqat" (1959, Y. Azamov), "Hamza" (1960, director: Z. Sabitov), "Ulugbek Star" (1964, director: L. Fayziev), "Abu Rayhon Beruni" (1974, director: Sh. Abbasov) can be included. Despite the high performance of the cinematographer, director, and actors, it is difficult to say that historical truth and the image of our ancestors are impartially interpreted in them. Get the movie "The Star of Ulugbek". In it, Khoja Ahror Vali kicks the globe as a symbol of ignorance, and it is shown that he is involved in the murder of Ulugbek. According to historical sources, they never met in life. Importantly, Khoja Ahror Vali is one of the generous and great figures who built madrasas at his own expense, allocated funds to students and teachers from the profits of the waqf lands. Therefore, it is necessary to be extremely careful when creating a historical film. It is impossible to study and compare historical sources for personal or political interests. If a filmmaker takes this into account in the process of shooting a historical film and looks from above, he can see the event from all sides." [3.]

In the early period of independence, there were difficulties in creating historical films. Nevertheless, the film "Great Amir Temur" (1996, directors I. Ergashev, B. Sodikov) was made. The film is dedicated to the military campaigns and political activity of Amir Temur in establishing a new state. The film "The Great Amir Temur", which was given hope and confidence and spent a lot of money, was a failure. In the film, one can see artistic and technical shortcomings, a number of serious mistakes made in creating the atmosphere of the period. This, in turn, influenced the creation of other historical films. Two years later, the film "Fields left by my father" (1998, directed by Sh. Abbasov) was made. This film is based on Togay Murad's novel of the same name, the hundred-year period from the occupation of Turkestan by the troops of Tsarist Russia to the first years of independence is shown. The focus of this epic film is on the fate of four generations of one Uzbek family, the preservation of human dignity in the politics of the past, and the protection of deep national interests of one's people. The invasion of the territories of Uzbekistan and the Russification policy carried out are indicated. This film was warmly received by film critics and film lovers and paved the way for subsequent historical films. After that, the historical feature film "Preacher" (1998, directed by Y. Rozikov) was filmed. The events of the film show the events that took place in 1917-1937, and the life of a hero who, under the influence of political changes in society, became a powerful preacher is described. The writer turns to Abdulla Qadiri's work "The Past Days" for the second time and films the film "The Past Days" (1998, directed by M. Abzalov) in a new interpretation. The film describes the love of Otabek and Kumush, the misfortunes that befell them, and the political turmoil of that time, with a love story that ended in tragedy. Based on the writer Gafur Ghulam's work "Yodgor" (2003, directed by H. Nasimov), he is filming a feature film on a historical theme. These films, shot in the early years of independence, are distinguished by the fact that, unlike the films shot in the former Soviet era, they are based on historical facts and are not adapted to the ideology of the time. Each historical film was a great experience for the director and creative team.

"Uzbek film art began its life after independence, but now it is entering the next stage of its development." [4.] The number and quality of historical feature films have changed significantly in recent years. For example; "Abu Rayhan Beruni" (2018, director Sh. Abbasov), "Islamkhoja" (2018, director J. Ahmedov), "Berlin Oqqorgon" (2018, director J. Musakov), "Avloni" (2019, director M. Erkinov), "Imam Abu Isa Muhammad Termizi" (2019, director A. Mingnarov), "Said with Saida" (2019, director N. Abbasov), "Kokan Wind" 2019, director D. Masaidov), "Elparvar" (2019, director A. Ganiyev), "Ishaqkhan Ibrat" (2020, director J. Kasimov), "Mahmudhoja Behbudi" (2020, director B. Sodikov), "Ilhaq" (2020, director J. Ahmedov), "101" (2020, director H. Hasanov), "Two Thousand Songs of Farida" (2020, director Y. Toychiyev), "Heritage" (2021, director H. Nasimov), "Mukumiy" (2021, director F. Jalolov), "Spring of Love" (2021, director I. Rasulov) movies can be accessed. Most of these films took part in prestigious international film festivals and won prizes in various categories.

Today, making films on historical subjects is still profitable. None of the above-mentioned films, world-famous historical films such as "Gladiator", "Troy", "Lion Heart", "Alexander", "King Arthur" were included. Now, it is possible to see cases where filmmakers of other countries make films about Uzbek history, the lives and activities of our ancestors, misrepresent historical facts and appropriate history. It was filmed here by German filmmakers. The film "The Doctor: Avicenna's Disciple" (2013, directed by Philip Stoltz) can be mentioned. The film describes how Ibn Sina, the king of medicine, was cured of a disease that his Anguilla disciple Roba Koula could not cure. Even Ibn Sina is shown as a Persian scientist. The film "Tomaris" (2019, directed by Akan Satayev) was shot by Kazakh filmmakers. In fact, historical information and epics about the heroism and life of Tomaris, his battles for the enemies are the eternal heritage of the Uzbek people. Currently, a film dedicated to the life and work of Amir Temur, the founder of the Timurid dynasty, is being filmed by the Netflix film company of the United States of America with the working name "Tamerlan". The director of the film is Jacob Schwarz, and the main part of the film is expected to be filmed in Kazakhstan. The role of Amir Temur is played by English actor Christian Mortensen. It is a tragedy to see this film misrepresent or misappropriate our history when it is made and released to the big screen. In this place, historical films are the spiritual archive of every nation. It



is the honorable duty of every nation to learn the life and work of the leader who left an indelible mark in the history of every nation, the scientists and scholars who contributed to the development of world science, and pass it on to the next generation "If we want to glorify the memory of our ancestors, on this basis we want to glorify the Uzbek name, the name of Uzbekistan to the whole world, we should do this first of all through the art of cinema. It is through the art of cinema that we can conquer the world's screens and in this way win the attention of the people of the world." [2.] At this point, the importance of film art as a tool that affects the human mind and soul is incomparable.

REFERENCES

1. (https://ru.wikipedia.org/wiki/Istoricheskiy_film)
2. O'zbekiston Respublikasi Prezidenti Sh.M.Mirziyoyevning 2017 yil 3-avgust kuni mamlakatimiz ijodkor ziyoli vakillari bilan uchrashuvdagi ma'ruzasidan.
3. Kino san'ati. // 2018. 56 b.
4. Kino san'ati. // 2018. 15-b.
5. Abdusamatov H. Drama nazariyasi. -T.: G'afur G'ulom, 2000.
6. Akbarov H. Kino san'ati tarixi. -T.: 2002
7. Muhammedov M. Rejissura asoslari. -T.: 2007
8. Abulqosimova H. "Kinoteleradio tarixi va nazariyasi, darslik. -T.: 2008.
9. Rizayev Sh. Iztirob san'ati. -T.: Yangi asr avlodi, 2013.
10. X.Абулқасимова. Рождение узбекского кино. -T.: 1965.



INTERNATIONAL RATING AND INDEX AND STRENGTHENING OF UZBEKISTAN'S POSITION IN THE GLOBAL SCALE

Usmanova Rano Mirjalilovna

PhD in Economics, Associate Professor, Alfraganus University

ORCID ID: 0009-0008-7594-7983

ANNOTATION

This article discusses the development of a model of sustainable democracy, the mutual influence of external and internal factors contributing to the development of a civil-type political culture. The article examines the problems of promoting a sustainable model of democracy and the possibility of developing mechanisms of effective public administration in Uzbekistan in cooperation with international rating agencies and the organization "Open government partnership".

KEY WORDS: *open government, the place of the Republic of Uzbekistan in international rankings, opportunities to participate in the OGP organization.*

Аннотация: В данной статье рассматриваются развитие модели устойчивой демократии, взаимовлиянию внешних и внутренних факторов, способствующих развитию политической культуры гражданского типа. В статье изучены проблемы продвижения устойчивой модели демократии и возможности развития механизмов эффективного государственного управления в Узбекистане во взаимодействии с международными рейтинговыми агентствами и организацией «Open government partnership».

Ключевые слова: открытое правительство, место Республики Узбекистан в международных рейтингах, возможности участия в организации «OGP».

INTRODUCTION

In modern conditions, the effects of time and space compression are manifested. Events that take place in the world are highly dynamic, which is facilitated by globalization, which serves the rapid spread of technology, including political. The effects of globalization, informatization require, of course, thoughtful, effective, but at the same time prompt decisions in accordance with the development of domestic and international political environment. In many countries, the shift from democracy to authoritarianism causes the effect of radicalization of protest movements.

The effects mentioned above are also relevant for our country. Interaction with international rating platforms brings tangible results and is an incentive to promote a comprehensive approach to achieving a higher level of socio-economic development defined by the commitments of the UN SDGs until 2030.

Participation in rating platforms and international organizations creates a competitive environment, their recommendations and analysis of indicators creates a certain kind of pressure on the government, and the attention of civil society contributes to the focus on results.

Dialogue and participation of our country in the organization "OGP", participation in the dialogue with international experts will raise the image of our state will give the opportunity to make comprehensive thoughtful management decisions. An important measurement of the waiting effect in Uzbekistan is the perception of youth, as this social group is the most mobile and responsive to global content, and it is they who study the ratings. They believe that effective progressive changes are needed. And this is what should be the incentive to develop sustainable democracy. At the current stage of reforms, a comprehensive analysis of Uzbekistan's efforts to promote a sustainable model of development by both government agencies and independent think tanks remains in demand.

I would like to note that Uzbekistan is part of the international political, economic and legal system. Uzbekistan's indicators for 2022 in international rankings show that reforms in the country need to be continued. As in many Asian countries, in our country the emphasis in reforms of the political system is on reforming the system of public administration, improving the work of state



institutions, which should improve the quality of life of citizens. It is also known that many international organizations in assessing the quality of functions of state institutions are based on the UN methodology "Good governance", which has 8 characteristics: 1) Participatory (balance of participants in the political process, including gender), 2) Consensus oriented, 3) Accountable, 4) Transparent, 5) Responsive, 6) Effective, 7) Equitable, 8) Inclusive. Good governance should be based on the rule of law.

The processes of globalization, development of mankind, is an actual phenomenon in all spheres. As a consequence, structural changes raise not only economic and international cooperation to a new level, but also encourage the countries of the world to move forward. And this determines Uzbekistan's place in the global scale, its position in international ratings and indicators. The international rating is a reflection of such important aspects as the quality of public administration, living standards of the population, protection of human rights, human entrepreneurship and favorable environment for foreign investors, sustainable economic growth and competitiveness. Today, Uzbekistan is rapidly carrying out innovative and creative work, the result of which is to ensure the well-being of the people.

This reform was the Decree of the President of the Republic of Uzbekistan "On improving the position of the Republic of Uzbekistan in international ratings and indices, as well as the introduction of a new mechanism of systematic work with them in state bodies and organizations" dated June 2, 2020.

The adoption of this Decree implies the realization of the importance of participation of the Republic of Uzbekistan in the International Ranking and Index, as it is a tool or indicator of economic development in assessing the quality of the institutional environment in the world. This index is used not only at the level of world experts, but also by states as a criterion for reforms and socio-economic policy. The main objective of the reforms undertaken by Uzbekistan is to improve the welfare of the people, which is reflected in all laws and regulations and the efforts of civil society.

The reforms carried out in the Republic are aimed at reducing the role of state intervention in the economy, ensuring macroeconomic stability and improving economic growth.

For example, the United Nations (UN) Global E-Government Development Index is a comprehensive indicator that assesses the readiness and capabilities of national government structures in using information and communication technologies to provide public services to citizens.

This research is conducted in order to study the development of both the institution of e-government itself and innovative trends in the socio-political systems of states in general.

The study covers UN member countries (193 member states), which provides data on the level of e-government development in the surveyed states, as well as a systematic assessment of trends in the use of information and communication technologies by government structures. All countries covered by this study are ranked in a ranking based on a weighted index of scores on three main components:

1. Extent of coverage and quality of Internet services.
2. Level of ICT infrastructure development.
3. Human capital.

This research and surveys reveal the fact that there is no single ideal model of e-government. Another purpose of these surveys is to determine the degree to which citizens legitimize e-government as a new socio-political institution. The data with the results of the latest survey is published in September 2022. Index -Uzbekistan-0.7265. Index-Denmark-0.9717. Index-Kazakhstan -0.8660. Index-Russia-0.8165.

One of the following indicators is The Open Data Inventory ODIN, which shows how complete the country's statistical data are and whether they meet international standards of openness. According to the results of the study Uzbekistan ranks 30th in the Open Data Integration for 2022 with an overall score of 70.

The Basel Anti-Money Laundering Index is a composite indicator adopted to measure and assess country risks associated with money laundering and terrorist financing. The survey results are used by international, government, financial and commercial institutions as an independent benchmarking tool for assessing country risks. The Basel Institute Index does not assess the level of corruption and criminal activity in a country related to money laundering and terrorist financing, but the risks of their emergence and development. The study aims to provide a comprehensive and holistic picture of country risks in this area. Therefore, the Index includes a wide range of risk indicators, each with a different focus and scope. The indicators used to calculate the rating are grouped into five basic categories with different weightings:

Quality of the system for combating money laundering and terrorist financing (65%).



- Risks of corruption and bribery (10%).
- Financial transparency and standards (10%).
- Public transparency and accountability (5%).
- Political and legal risks (10%).

The data used in the ranking is based on information from reports of international institutions, including the International Monetary Fund, the World Bank, the Organization for Economic Cooperation and Development, the Financial Action Task Force on Money Laundering, Interpol, the Egmont Group, the specialized committees of the United Nations and the European Union, the Office of Foreign Assets Control of the United States, as well as on research materials of the World Economic Forum. Data with the results of the latest study published in September 2022, where the index -Switzerland-3.12; index -Italy-4.55; index -Japan-4.70; index -Uzbekistan-5.20; index -Russia-5.24; index -Turkey-5.54; index -Tajikistan-5.83.

Uzbekistan's place in ratings reflecting the level of social management

1. Sustainable development index (Sustainable development Index) 2022- It means how the achievement of 17 goals on the implementation of the UN SDG program until 2030 is carried out. Uzbekistan ranks 77th out of 163 countries.
2. Human Development Index (Human Development takes into account life expectancy, average length of education, gross national product per capita Uzbekistan ranks 101 out of 191 countries. The gross national product per capita in 2021 was 1,800 USD. THE VOLUME OF GROSS NATIONAL PRODUCT PER CAPITA IN 2021 WAS 1.800 USD.
3. Social Progress Index 2022. A composite indicator that measures the achievements of the world's countries in terms of their social development Uzbekistan 91st place out of 97 countries²⁵ The percentage of poor people in Uzbekistan for 2020. - 12-15%, or 4-5 million ²⁶. As of April 2022, Uzbekistan has 2.2 million people in need of social assistance.
4. Human Capital Index The index measures the level of development of human capital of the next generation, which is defined as the amount of human capital that a child born in a country can expect to accumulate by adulthood. Uzbekistan ranks 57th out of 174 countries in 2020. UNDP welcomes that, as a result of reforms over the past five years, the enrollment rate in higher education has increased from 9% to 29%, and the number of higher education institutions has doubled from 72 to 141 in 2022.
5. World Bank Statistical Capacity Index. This index reflects the statistical capacity of the country, its achievements and the results of ongoing reforms to develop the National Statistical System. In 2021 - Uzbekistan rose to 67th place among 154 countries. Since March 2015, the open data portal <https://data.egov.uz/rus/> new has been opened.
6. Open Data International (ODI), Assesses the coverage and openness of official statistics to identify gaps, promote open data policies, improve access and encourage dialog between national statistical offices (NSOs) and data users. In 2020/21, Uzbekistan ranked 45th in the register. out of 187 countries.
7. Electronic Government Development Index (EGovernment Development Index). Assesses the readiness and capacity of national government structures in 190 countries to use information and communication technologies (ICT) to provide public services to citizens. In 2022. Uzbekistan is ranked 69th out of 193 countries³⁰. (87th place -2020).
8. Transparency International's Corruption Perceptions Index. A global survey and accompanying ranking of the world's countries in terms of the prevalence of corruption in the public sector. In 2021. Uzbekistan ranks 140th - 180 countries. In 2021. Uzbekistan ranks 140th - 180 countries³¹. (157th place (2017), 158th place (2018), 159th place (2019), 146th place (2020)).
9. World Democracy Index Ranking of the world's countries according to their level of democracy. Electoral process and pluralism; government performance; political participation; political culture; civil liberties. In 2020. Uzbekistan - 150th place out of 167 (+2 positions).

It should be noted that international rating organizations rely on the results of surveys conducted among entrepreneurs and population, on the data of non-profit organizations. As well as the conclusions of domestic and foreign experts. This shows how much the local population and entrepreneurs are aware of the reforms in the economic, political and social sphere and their results in the Republic of Uzbekistan.

REFERENCES

1. *What is good governance?* <https://www.unescap.org>. Consideration of the basic parameters of "good governance" is provided by the IMF, the World Bank, the European Bank for Reconstruction and Development, which promote the principles of good governance, and are guided by them in providing development loans to a country.
2. *The United Nations: E-Government Development Index 2022.*
3. <https://odin.opendatawatch.com/Report/countryProfileUpdated/UIZB?year=2022>
4. <https://gtmarket.ru/ratings/basel-aml-index>
5. <https://www.socialprogress.org/global-index-2022-results>
6. *The Center for Economic Research was transformed into the Center for Economic Research and Reform under the Administration of the President of the Republic of Uzbekistan.*
7. <https://www.cer.uz/ru/post/publication/bednost-vuzbekistane-2>
8. *The number of citizens in need of social assistance is named.* <https://upl.uz> <https://gtmarket.ru/ratings/human-capital-index>



THE USE OF ONE SABAB AN-NUZUL NARRATIONS FOR ONE VERSE IN “TAWILAT AL-QUR’AN”

Yakhshilikov Abdulaziz Mominovich

Researcher of the Imam Maturidi International Scientific Research Center, Uzbekistan

ABSTRACT

This article is about Imam Maturidi’s work “Ta’wilat al-Qur’an”, in which the narrations of reason used in the interpretation of the verses, in particular, the places where one narration of the reason for a verse is given, are identified and described. Also, the information in it is compared with the works of commentators such as Tabari, Muqatil, Abu al-Laith Samarkandi, and Wahidi.

KEY WORDS: *Maturidi, Ta’wilat, Qur’an, surah, verse, reason of revelation (sabab an-nuzul), narration, lafzan.*

Imam Maturidi’s work “Ta’wilat Ahl as-Sunna” (also called “Ta’wilat al-Maturidiyya”, “Ta’wilat li-Abi Mansur al-Maturidi”) is not only a tafsir, rather, it is considered an important source for all Qur’anic sciences. In this work, it can be seen that the narrations of reason of revelation (sabab an-nuzul) have an important place. In many places of the work, one reason is cited for each verse. Sometimes there are two or more narrations. It should also be mentioned that although in most cases the narrations cover an entire verse, in some places there are also narrations that refer to the revelation of only a part of the verse.

It is known that all the verses in the Holy Qur’an do not have a reason of revelation. Accordingly, in the process of analyzing the verses, Maturidi sometimes did not mention any reason of revelation, and in some cases he mentioned one or more narrations. He often cited a single reason related to the verses. There are few places where two or more narrations are cited for one verse. Maturidi, in “Ta’wilat”, cited one reason of revelation in connection with 168 verses¹. For example, Maturidi gave the following narration about the verse: “Say, ‘O Prophet,’ “Whether you` donate willingly or unwillingly, it will never be accepted from you, for you have been a rebellious people”². According to him, some people said that this verse is about jihad, in particular, hypocrites like believers are commanded to Jihad and fight against the infidels. After this order, some of them started jihad. Some of them prepared another one and went back by themselves. Some of them went to jihad unwillingly. Then this verse was revealed³.

Another example is that according to him, the Prophet (pbuh) lived in danger in Makkah for about ten years, calling people to believe in Allah secretly and openly, together with his companions. Then Allah orders to emigrate to Madinah. The Prophet was not free from danger there either, he slept with a weapon at night and woke up with a weapon in the morning. Then one of the Companions said: “O Messenger of Allah, will the day come when we will lay down our weapons without danger?” said. Rasulullah said: “You will stay in this situation for a while longer. One of you will sit with his knees bent and his hands holding his knees in a large congregation without weapon.” Then Allah, the Exalted, revealed the following verse⁴: “Allah has promised those of you

¹ Abu Mansur Muhammad ibn Muhammad Maturidi. *Ta’wilat al-Qur’an. – Istanbul: Dar al-Mizan, 2005–2011. I - XVIII vol. Surah Al-Baqarah verses 1, 102, 115, 119, 125, 133, 139, 168, 178, 186, 187, 196, 198, 207, 214, 215, 219, 220, 231, 232, 245, 256, 274; Surah Ali Imran verses 65, 69, 85, 89, 169, 179, 196; Surah al-Nisa verses 11, 23, 24, 32, 34, 37, 58, 60, 77, 80, 81, 84, 92, 93, 94, 95, 105, 113, 115, 123, 128, 164, 166, 176; Surah al-Maida, verses 4, 6, 11, 38, 45, 48, 83, 87, 91, 93, 101, 106; Surah al-An’am, verses 13, 19, 26, 35, 50, 52, 91, 108; Surah al-A’raf verses 175, 180; Surah al-Anfal, verses 19, 26, 35, 36, 67, 68, 70, 72; Surah al-Tawba, verses 17, 37, 53, 107, 113; Surah Hud verses 5, 113, 114; Surah al-Ra’d, verses 30, 43; Surah al-Nahl, verses 92, 110; Surah al-Isra, verses 28, 45, 73, 76, 80, 85; Surah al-Kahf, verses 23-24, 28; Surah Toha, verses 114, 131; Surah al-Anbiyya, verse 101; Surah al-Hajj, verses 19, 37, 60, 75; Surah al-Noor, verses 3, 22, 29, 33, 55; Surah al-Furqan, verses 20, 27; Surah al-Naml, verse 80; Surah al-Qasas, verse 56; Surah al-Ankabut, verses 2, 10; Surah al-Rum, verse 1; Surah Luqman, verses 27, 34; Surah al-Sajdah, verse 18; Surah Al-Ahzab, verses 5, 35, 36, 43, 51, 53, 57, 58, 59; Sura Saba’, verse 46; Surah Yasin, verse 12; Surah Saffat, verses 50, 64-65; Surah Fussilat, verse 44; Surah Shuram verses 27, 38; Surah Jasiah, verse 21; Surah al-Fath, verses 4, 5; Surah Hujurat, verse 6; Surah al-Rahman, verse 29; Surah Al-Waqia, verses 39-40; Surah Hadid, verse 24; Surah Mujadala, verses 8, 11, 22; Surah al-Saf verses 4, 10; Surah Mumtahanah, verse 10; Surah Munafiqun verses 5, 6; Surah Muddaththir, verse 5; Surah Infitar, verse 6; Surah Inshiqaq, verse 1; Surah Ghashiya, verse 17; Surah al-Lail, verses 1-4; Surah al-Kawthar, verse 3; Surah Kafirun, verse 6; Surah Tabbat, verse 1; Surah al-Falaq, verse 1.*

² Surah al-Tawba, verse 53.

³ Ta’wilat al-Qur’an. - Vol. VI. - P. 376-377.

⁴ Ta’wilat al-Qur’an. - Vol. H. - P. 192; Tabari cited this narration in the same context, with only a few verbal differences from Abul Ali. See: Abu Ja’far Muhammad ibn Jarir Tabari. *Jami’ al-Bayan ‘an Ta’wili Ayat al-Qur’an. – Beirut: Dar al-Fikr, 1415/1995. – Vol.*



who believe and do good that He will certainly make them successors in the land, as He did with those before them; and will surely establish for them their faith which He has chosen for them.”⁵

Maturidi sometimes mentioned one narration of revelation in several places in “Ta’wilat”. But although the content of the narrations is the same, the words are different from each other. For example, the reason of revelation related to the 10th verse of Surah al-Ankabut, he narrated it in two places. He used both narrations in the context of “fitnah” in the verses. One of them comes in the interpretation of the second verse of this surah: **“Do people think once they say, “We believe,” that they will be left without being put to the test?”**. The author gave the following narration about the reason of this verse. According to him, this verse was revealed about a group of people who believed in Allah and His Messenger, but then lost faith and became unbelievers because of various sufferings. Maturidi cited this narration and emphasized that it was the reason for the revelation of the 10th verse of Surah Ankabut, and he repeated it in this verse⁶, although not verbatim, but in very close words⁷.

In the same way, the reason related to the verse of Surah al-Ra’d, **“We have certainly sent messengers before you ‘O Prophet’ and blessed them with wives and offspring”⁸** is also mentioned twice in different places. In his interpretation of this verse, Maturidi narrates the reason as follows. According to him, the Jews criticized the Prophet (pbuh) for having many wives and children and said, “If he had been a prophet as he claimed, he would not have used women or wanted children like others. Prophethood did not allow these things.” Then Allah revealed this verse⁹. Maturidi repeated this narration again in explaining what envy is in the verse **“Or do they envy the people for Allah’s bounties?”¹⁰**. He commented that the Prophet (pbuh) had many wives as an object of envy, but he did not agree with this comment. According to him, the fact that the Prophet (pbuh) had many wives at that time is not a reason for envy, but a reason for condemnation and accusation. Because at that time, anyone could have many wives. To support this point of view, Maturidi quoted the reason of the above verse as follows: “They (Jews) said: “If he was a prophet, prophethood excluded him from women. He married nine to ten women and forbade people to marry more than four women.” In response to them, Allah revealed the verse¹¹: **“We have certainly sent messengers before you ‘O Prophet’ and blessed them with wives and offspring.”**

When Maturidi mentions the same narration for the second time, it is often in a form that attracts attention, that is, he presents only the part related to the topic as a conclusion. He does not follow the path of giving the narrations in the same form. For example, Maturidi gave the reason for verse 79 of Surah Tawba in two different places. He recorded the first of this narration in the interpretation of this verse. According to him, it is mentioned in some stories that Abdurrahman ibn Awwaf (r.a.) gave half of his wealth in order to gain God’s approval in Tabuk Ghazat and said, “O Messenger of God! This is half of my wealth, I brought it to you. I left the other half to my family.” Then the Prophet (pbuh) prayed to God to bless both the wealth he brought and the wealth he left behind. The hypocrites accused Abdurrahman and said: “He gave his wealth only to show off.” After him, a poor Muslim brought one sa’ of dates and put them among the zakat dates. The Prophet (pbuh) also prayed for him. Then the hypocrites said: “Allah has no need for one sa’ of dates.” On this incident, Allah revealed the verse¹²: **“There are those who slander ‘some of’ the believers for donating liberally and mock others for giving only the little they can afford. Allah will throw their mockery back at them, and they will suffer a painful punishment.”¹³**

XVIII. - P. 212; Abu al-Laith Samarkandi and Wahidi also gave a similar narration with similar words. See: Abu al-Laith Samarkandi. *Tafsir al-Samarkandi (Bahr al-Ulum)*. - Beirut: Dar al-Fikr, 1416/1996. - Vol. II. - P. 544; Abul Hasan Ali ibn Ahmad Wahidi. *Asbabu Nuzul al-Qur’an*. - Beirut: Dar al-Kutub al-Ilmiyya, 1411/1991. - P. 338-339.

⁵ Surah al-Nur, verse 55.

⁶ Ta’wilat al-Qur’an. - Vol. XI. - P. 94.

⁷ Ta’wilat al-Qur’an. - Vol. XI. - P. 100; Tabari narrated similar expressions related to the revelation of this verse from Dahhak. See: Jami’ al-Bayan ‘an Ta’wili Ayat al-Qur’an. - Vol. XX. - P. 162. A similar narration was recorded by Ibn al-Jawzi. See: Ibn al-Jawzi. *Zad al-Masir fi Ilm at-Tafsir*. - Beirut: Maktab al-Islami, 1384-1388/1964-1968. - Vol. VI. - P. 259.

⁸ Surah al-Ra’d, verse 38.

⁹ Ta’wilat al-Qur’an. - Vol. VII. - P. 444; This narration is contained in the collection of narrations attributed to Ibn Abbas called “Tanwir al-Miqbas”. See: Abu Tahir Muhammad ibn Yaqub Feruzabadi. *Tanwir al-Miqbas min Tafsir Ibn Abbas*. - Beirut: Dar al-Kutub al-Ilmiyya, 1412/1992. - P. 267; A similar narration was recorded by Abu al-Laith Samarkandi in a shorter form. See *Tafsir al-Samarkandi (Bahr al-Ulum)*. - Vol. II. - P. 241 (Vol. I - III); Wahidi also narrated from Kalbi a similar reason of the revelation. See: *Asbabu Nuzul al-Qur’an*. - P. 280.

¹⁰ Surah al-Nisa, verse 54.

¹¹ Ta’wilat al-Qur’an. - Vol. III. - B. 267.

¹² Ta’wilat al-Qur’an. - Vol. VI. - P. 418-419; Muqatil narrated this reason in a broader form. See: Muqatil ibn Sulaiman. *Tafsir Muqatil ibn Sulaiman*. - Beirut: Muassat al-Tarikh al-Arabi, 1423/2002. - Vol. II. - P. 185-186; Tabari mentioned it in many ways. See: Jami’ al-Bayan an Ta’wili Ayat al-Qur’an. - Vol. X. - P. 247-252; Also, Abu al-Laith Samarkandi and Wahidi gave place to similar narratives in their works. See *Tafsir al-Samarkandi (Bahr al-Ulum)*. - Vol. II. - B. 78; *Asbabu Nuzul al-Qur’an*. - P. 259-260.

¹³ Surah al-Tawba, verse 79.



Maturidi also repeated a narration similar to the above regarding voluntary donations in verse 103 of this sura and noted the following as a conclusion. According to him, the Prophet (pbuh) called people for help for the ghazat of Tabuk. Then Abdurrahman ibn Awf brought so much, and so and so brought some more, and the Prophet (pbuh) accepted them. As a result, Allah revealed the verse¹⁴ about these people: **“There are those who slander ‘some of’ the believers for donating liberally and mock others for giving only the little they can afford. Allah will throw their mockery back at them, and they will suffer a painful punishment.”** It can be seen that in this second narration, the information is not given in detail as in the first narration. So, Maturidi tried to emphasize the subject of voluntary donations and followed this method.

In conclusion, it can be said that Maturidi recorded 298 different narrations of revelation reasons for 222 verses. He gave one narration for 168 of these verses. The result shows that Maturidi cited one narration of revelation for one verse in many places.

REFERENCES

1. Abu Ja'far Muhammad ibn Jarir Tabari. *Jami' al-Bayan 'an Ta'wili Ayat al-Qur'an*. - Beirut: Dar al-Fikr, 1415/1995. I-XXX vol.
2. Abu al-Laith Samarkandi. *Tafsir al-Samarkandi (Bahr al-Ulum)*. - Beirut: Dar al-Fikr, 1416/1996. I-III vol.
3. Abu Mansur Muhammad ibn Muhammad Maturidi. *Ta'wilat al-Qur'an*. - Istanbul: Dar al-Mizan, 2005-2011. I - XVIII vol.
4. Abu Tahir Muhammad ibn Ya'qub Feruzabadi. *Tanwir al-Miqbas min Tafsir Ibn Abbas*. - Beirut: Dar al-Kutub al-Ilmiyya, 1412/1992.
5. Abulhasan Ali ibn Ahmad Wahidi. *Asbabu Nuzul al-Qur'an*. - Beirut: Dar al-Kutub al-Ilmiyya, 1411/1991. - 568 p.
6. Ibn al-Jawzi. *Zad al-Masir fi Ilm at-Tafsir*. - Beirut: Maktab al-Islami, 1384-1388/1964-1968. I-IX vol.
7. Muqatil ibn Sulaiman. *Tafsir Muqatil ibn Sulaiman*. - Beirut: Muassa al-Tarikh al-Arabi, 1423/2002. I-V vol.

¹⁴ *Ta'wilat al-Qur'an*. - Vol. III. - P. 445.



THE RESEARCH OF HISTORY OF LAND IRRIGATION IN CENTRAL FERGANA

Mamajanov Azizbek Alisher ugli

Assistant Professor, Andijan State University

ABSTRACT

The author of the article, on the basis of archival documents and scientific and historical sources, studies the history of the beginning of irrigation and land development in Central Fergana in the 40-50s of the 20th century. In the studied period, the Fergana Valley was the main cotton-growing base and the developed territory in historical sources was called "Karakalpak Steppe". The article also lists the reasons for a sharp deterioration in the land reclamation state of the Fergana Valley due to an increase in salinity, since the extensive path of development of the agricultural sector by the Soviet government during the study period was based on quantitative results.

KEY WORDS: *Fergana Valley, irrigation, reclamation, groundwater, canal, drainage, ketmen, soil, irrigated agriculture, spillway, collective farm, brigade, aqueduct, desert, irrigation, reed, sand dune, collector, salt marsh.*

1. INTRODUCTION

In the 40s and 50s of the 20th century, the history of the irrigation of the central desert region of the valley, which is considered the main supplier of cotton raw materials in the historical and geographical sources, is referred to as "Korakalpoq desert", based on archival documents and scientific historical sources, which were not previously used for scientific consumption. Ferghana valley is of urgent importance in studying the history of irrigated agriculture.

2. METHODS

The article is written on the basis of generally accepted historical methods - historicity, comparative-logical analysis, sequence, objectivity, critical approach to sources, evaluation of processes from the point of view of the period, and the history of irrigation of central Fergana lands is covered. Also, because the basis of the extensive development in the agrarian sphere by the Soviet government was focused on quantitative results, the reasons for the sharp deterioration of the land reclamation condition of the Fergana Valley land salinity were indicated.

3. RESULTS, AND DISCUSSION

In the central part of the Fergana Valley, there is an area called "Karakalpok Desert" in historical-geographical sources, as well as on old maps, which geographically forms the present Central Fergana. Geographically, Central Fergana is bordered by Syrdarya in the north, Big Fergana canal in the south, Kokan in the west, and Andijan oases in the east. Its territory stretches 90 km from east to west and 50 km from north to south. Central Ferghana is the lowest region of the valley [1.10].

The Fergana Valley has long been one of the agriculturally developed regions of Central Asia, and in the first half of the 20th century it was considered one of the main centers supplying cotton raw materials for the light industry of the former Soviet Union. Since the agrarian policy of the former Union government was implemented on the basis of extensive development, the main attention in the field of irrigated agriculture was aimed at increasing the quantity of cotton raw materials in the region due to the development of new lands. Due to the fact that the veer irrigation method, which has its own characteristics, has been used in Ferghana Valley irrigation farming for a long time, this irrigation method was rudely rejected in the 30s of the XX century, and instead of it, "laborless irrigation" was widely used. was observed [2.65].

Therefore, based on the instructions of the Soviet government, in 1933, the main working plan for irrigation of the Fergana Valley was drawn up. According to this working plan, large-scale project exploration and construction work has been started in the valley. To regulate the waters of the rivers originating from the mountains of the valley and to develop the technical aspects of using them for agriculture as much as possible, to lower the level of the Big Fergana Canal and underground seepage waters in this area for irrigating the lands in the central part of the valley, and to drain the excess water in agriculture back to natural water sources. for Sariqjoga, Yozyovon, Faizabad, Baghdad, etc., it was necessary to achieve the development of 200,000 hectares of reserve land in central Fergana [3.163].



According to this adopted plan, the first task that must be performed is to drain the excess water of Shahrikhanso into the Karadarya in the winter season, thereby reducing the level of seepage water that accumulates in the desert in the winter season, and in order to prevent water overflows in the summer season, the Asaka water discharge was built and put into operation in 1934-1936. With the launch of water discharge, it was possible to drain excess water from Shahrikhansoy, Akbora, Aravon irrigation networks during the rainy season in winter, autumn and spring to Karadarya and to reduce the level of underground water in the northeastern region of Central Fergana.

The scientific classification of historical sources indicates that in the second half of the 19th century, the territories of villages such as Nasriddinbek and Solimakhsum, located in the eastern part of the territory of the current Boz district, located at the foot of Shakhrikhansoi, were appropriated by the local population, and the villagers were engaged in agriculture, cattle breeding, and kidney farming in these areas. In order to supply these villages with water, Mazgilsoy and Khanariq irrigation networks were built by the residents of Ko'kan khanate by means of "hashar". [4.4].

In this area, in 1935-1936, an artel of merchants belonging to the national industry was formed. The carpet weavers, who were members of the artel, were engaged in weaving carpets on the eastern edges of the desert during the summer months. In 1939, the construction of the Shahrikhansoy-Sariqjoga fortress began. The creation of this settlement would have improved the opportunity to develop the lands of Central Fergana.

In May 1939, a meeting was held in the city of Fergana, the center of Fergana region, with the participation of regional water management, agricultural specialists, and brigadiers, where the measures to develop the lands of Central Fergana were discussed. In the decision taken at this meeting, each district in the valley was assigned the task of developing a certain amount of desert land and turning it into arable land. In August 1940, a meeting was held in Boz district with the participation of the leaders of Andijan, Kurgantepa, Shahrikhan, Oltinkol, and Izboskan districts and the chairmen of collective farms, in which, depending on the size of the collective farm in each district, labor force and financial capabilities, from 20 to 150 hectares of reserve land was distributed on the basis of development rea. . In particular, 350 hectares of land were measured in Izboskan district[5.119].

In the spring of 1940, mobile brigades from 33 collective farms from Andijan district, 23 from Kurgantepa district, and 17 collective farms from Oltinkol district entered the Central Fergana steppe, irrigating and cultivating the protected lands in the desert. But for the kolkhozes, taking over the desert and farming on these lands was carried out in very difficult conditions. The main reasons for this were the low capacity of the collective farms, the involvement of the main labor force in the construction of large irrigation facilities, the proximity of the seepage waters on the appropriated lands to the surface, the excessive salinity of the lands, and the difficult working conditions of the appropriators of the lands.

1941 war Due to the start of the war between Fascist Germany and the Soviet Union, the development of Central Fergana lands became more difficult. However, in return for the use of available opportunities, mainly women, elderly people. Thanks to the work of teenage children, in 1942-1943, the Yaipan and Ayridin canals were paved and cleared of mud. By 1944, irrigation networks were allowed to be drawn from these ditches to irrigate collective farm lands.

After the end of the Second World War with victory, the decision of the government of Uzbekistan on March 15, 1947 to accelerate the development of Central Fergana lands became important [6.277-280].

In this adopted decision, the population forcibly relocated to the desert should be exempted from agricultural taxes and other payments for up to 5 years, preferential loans and non-refundable aid money for the purchase of livestock and household goods, and the construction of housing for displaced farmers. shown. In addition, 200 soums were given to heads of families who moved to the desert, 150 soums to each family member, 2,000 soums to buy a pet, and 5,000 soums to buy household items. In addition, 150 kilograms of wheat were allocated to each household, and 40 acres of land were allocated to each family for homestead [4.11].

This government decision was the first government-level decision on the irrigation of Central Fergana lands, and it served as a basis for further measures for irrigation development of Central Fergana lands.

In the five-year period after the war, the construction of the water discharge (collector) to Sariqjo, which was started in 1939 to improve the melioration of 120,000 hectares of irrigated land, was built and put into use in 1947. As a result of these measures, in 1946-1948, a total of 21.4 thousand hectares were planted in Andijan region. A total of 52,000 hectares of new land was developed in the regions of the Fergana Valley[7.25].4.

4. CONCLUSIONS

In conclusion, it should be noted that the issue of land acquisition of Central Ferghana was put on the agenda in the 40s and 50s of the 20th century in order to increase the supply of cotton raw materials necessary for the light industry of the center during the authoritarian regime.



REFERENCES

1. Akramov Z.M. *Ferghana Valley*. -Tashkent: "Fan", 1957. – P.88.
2. Nasritdinov Q.M. *Irrigation method without drainage*. // *Society and Management*.-Tashkent: 2005.No 4. –P.65-67.
3. Mamedov A.M. *Development of irrigation in Uzbekistan*.-Tashkent: "Fan", 1967. – P.298.
4. Vahobov A. *Bozim (Excerpts from the history of Boz), which lasted for half a century*. - Andizhan: "Life", 2000. – P. 32.
5. Tillaboev A. *Letters to the future*.-Tashkent: "Sharq", 2004. –P.158.
6. *The Communist Party of Uzbekistan in resolutions and decisions of congresses and plenums of the Central Committee. T. II. 1938-1959*.-Tashkent: "Uzbekistan", 1988. –P. 912.
7. *Archive of the Office of the President of the Republic of Uzbekistan*. 58-f., 49-r., 21-ish, 9-ovarax



LOGICAL TEACHING IN THE INTERPRETATION OF AL-KINDI PHILOSOPHY

Baratova Makhbuba Mubinjanovna

Candidate of Philosophical Sciences, Associate Professor, State University of world languages of Uzbekistan

ANNOTATION

In this article, the philosophical views of Eastern scientists, the analysis of the spiritual and worldview values of the Middle Ages, the essence of the logical teaching of the great encyclopedist Al-Kindi, an important task in the study of the scholar's legacy is the logical-philosophical relationship of language thinking - knowledge detailed information on the basis of the close relationship of the position.

KEY WORDS: *philosophical views, idea, socio-economic, spirituality, period, attitude, value, Islamic religion, world view, scientist, logic, doctrine, field.*

The study of the philosophical heritage of scientists of the Arab-Muslim East today is determined by the content of the conceptual ideas "New Uzbekistan - Third Renaissance", "New Uzbekistan - an enlightened society", reflected in the Development Strategy of New Uzbekistan for 2022-2026 [1; p.-12]. The relevance of the study of medieval Arab-Muslim philosophy is caused by the need to understand the complex socio-political relations directly related to modern events in the world, which requires turning to the spiritual and worldview values of the medieval era of the Muslim environment. The learned philosopher and encyclopedist Abu Yusuf Yakub al-Kindi (801-873), as the first Peripatetic, a follower of Aristotelian teaching, is recognized as the first scientist who laid the foundation for the tradition of the philosophy of Eastern Aristotelianism, developed the trend of Eastern Peripateticism, turning it into one of the progressive scientific ideas of Europe and Asia.

The influence and perception of ancient Greek science, especially the philosophical heritage of Aristotle and Plato, became the factors that determined the formation of the philosophical movement in Islam, falsafa. From the history of philosophical thought it is known that important mathematical research was carried out in Plato's school of idealistic philosophy. Aristotle, creating his systematized teaching, became the father of empirical philosophy, which was based on the encyclopedia he had previously collected of all contemporary science. In the field of philosophy, Plato developed issues of dialectics, theory of knowledge, aesthetics, pedagogy, Aristotle created the foundations of logic, explored problems of the theory of art, ethics, political economy, and psychology. All these ideological and philosophical origins of scientific thought became the basis for the emergence of the First Eastern Renaissance. In the first half of the 9th century. ancient Greek philosophical systems were considered the highest achievement of all philosophy, thanks to which an interesting, educational and complex phenomenon was reflected in the Arabic-speaking intellectual environment - the emergence of Arab-Muslim philosophy, which called falsafa (Arabized translation of the Greek "philosophy") [2; p.-216]. Therefore, for three centuries in the Middle East there has been a "huge influx of constant and productive Greek ideas and theories" [3; p.391].

Here it is necessary to take into account the peculiarities of Arab-Muslim philosophy, which were determined in the Middle Ages by the exceptional conditions of its development and socio-political factors. In the Arab East and in the part of Spain conquered by the Arabs, philosophical thought was much less influenced by religion than in Europe and East Asia. The unification of disparate Arab tribes into a single huge state (Caliphate) contributed to the concentration of the best minds in its scientific centers and the achievement of the highest level of development of philosophical thought. It was formed by representatives of numerous peoples inhabiting this state: arabs, tajiks, turks, uzbeks, etc. But all teachings were presented only in Arabic. Therefore, the philosophy of many eastern peoples is usually called Arabic-language.

Al-Kindi is the founder of the Hellenizing philosophy of Islam; it is believed that Al-Kindi's work served as a kind of "bridge" between the Mutazilite kalam and falsafah itself - as Muslim Aristotelianism.

The study of the process of formation and content of falsafa of Arab-Muslim progressive thought is today an important factor in reflecting in the human mind the harmonious combination of the unity of secular knowledge and religious belief, the harmonious combination of religion and secularism. Identification of their interdependence as a factor in the philosophical principle of determinism allows us to reveal the characteristics of such concepts as "knowledge", "cognition", "truth", "thinking", "reason", "religion", "faith", "piety", "tolerance" through patterns of development of spirituality in modern conditions of globalization,



information and post-industrial society, where knowledge and intellectual potential are the main production resources. It is this relationship, which is expressed in the harmonious combination of ethno-confessional diversity and secular, democratic civil society, that shows the full extent of the relevance of the chosen topic. Its significance becomes most noticeable in the processes of education and upbringing, in the formation of a person as an individual.

The fifth direction of the Development Strategy of New Uzbekistan, defined as Ensuring spiritual development and raising this area to a new level, requires the implementation of the conceptual idea “New Uzbekistan - an enlightened society” and Ensuring the implementation of the idea “New Uzbekistan - Third Renaissance” under the motto “Youth are the creators of New Uzbekistan. In order to deeply study and widely promote the rich scientific heritage of our great ancestors, support is provided for the activities of the International Islamic Academy of Uzbekistan, the Center for Islamic Civilization, and the international research centers of Imam Bukhari, Imam Termizi, and Imam Moturidi. [1; p.-5]

The relevance of studying the scientific heritage is also due to the implementation of the Concept for the development of the spiritual and moral consciousness of student youth, aimed at developing intellectual potential, thinking and worldview, strengthening the ideological immunity of youth as a harmoniously developed generation, living with a sense of patriotism, serving the interests of the people [5; p.-3], reflected in the Concept for the development of the higher education system of the Republic of Uzbekistan until 2030.

The interdependence of the thematic sequence of tasks of the course “Philosophy” as a modular academic discipline allows us to consider the methodological aspects of the study of the problems of historical and philosophical analysis of the formation and formation of logic as a science of thinking, the forms through which it realizes itself and the laws to which thinking is subject.

The traditional model of education, aimed at transferring to a future specialist the necessary knowledge, skills and abilities, is losing its prospects in our time. In the country, as a priority direction of state policy, special attention is paid to the development of forms of higher education activities in the “University 3.0.” format, which provides for a close connection between education, science, innovation and activities for the commercialization of scientific research results in higher educational institutions, where the ability and skill to develop logical reasoning takes center stage. It is this factor that contributes to the practical applicability of students’ acquired knowledge in the competitive environment of the modern labor market and their demand as a specialist.

Consequently, there is a need to change the strategic, global goals of education, requiring a shift in emphasis from assessing the knowledge of a specialist to his human, spiritual, moral and personal qualities, which arise simultaneously both as a goal and as a means of preparing him for future professional activity and the commercialization of acquired knowledge in format “University 3.0”.

An important task in studying the heritage of Al-Kindi is determined by the substantiation of the close relationship of the logical-philosophical position of the relationship between language - thinking - cognition. This allows us to reveal the essence of the logical teachings of the great scientist and encyclopedist Al-Kindi as a holistic process of the emergence of linguophilosophy in the Middle East in the Middle Ages. This requires a philosophical interpretation of important aspects of the formation of a linguistic-philosophical approach to the study of language, such as Al-Kindi’s emphasis on semantics, the structuralization of linguistic science, and the emergence of various directions in linguistics. This shows a tendency to reveal a connection between the emergence of linguistic philosophy and the growing need for understanding the language in the intellectual environment of the Arab Caliphate at that historical period, which was caused by the Islamization of the conquered regions, the study of new languages, the development of translation activities, the active development of the ancient heritage and teaching activities;

The logical doctrine in the interpretation of Al-Kindi substantiates the content of the central issue for the medieval worldview about the relationship between divine revelation, religion and reason, the process of knowing the world in the trend of “philosophy”, a relationship that is resolved in the monotheistic Abrahamic religions - Judaism, Christianity and Islam, expressing their fundamental unity.

The logical-philosophical teaching of the great philosopher encyclopedist “philosopher of the Arabs” Al-Kindi in its content represents an aspect of logical-comparative hermeneutics, expressed in the comparison of the concepts “Philosophy”, “Khikma”. This position is taken as the basis for the study by 2 nd year students of the Uzbek State University of World Languages of theoretical issues and practical tasks of the academic discipline “Philosophy” according to a modular system of interconnection of such topics as “Cognition”, “Formal Logic”, the section “Religious Studies” in understanding the activities of mutakallims , Mutafakkirs, Eastern Peripatetism, Sufism and Kalam philosophy in their Mu’tazili, Ash’ari and Maturidi content. Finding answers to these questions will make it possible for students of Uzbekistan state language university to develop an independent methodological approach in the study of problems of philosophy of language, analytical philosophy, hermeneutics, as well as to identify continuity between ancient philosophy and progressive intellectual Arab-Muslim thought. The linguo-philosophical and hermeneutical aspects



of the systems of classroom and independent work of students in the credit-module format of education contribute to the formation of religious competence in the integral system of state secular education, which indicates the initial reasons for the need to include knowledge about religion and philosophy in the curricula of higher educational institutions of Uzbekistan, as well as characterizes the characteristics of the impact of religious diversity of ideas and beliefs on the formation of a modern language, for example, Arabic is the language of worship in the world religion of Islam, or, in Christianity, if we study the influence of the characteristics of the church language on the formation of the modern Russian language [6; p.-19], or on the problems of textual criticism, hermeneutics as a theory of interpretation of sacred texts - Taurat (Torah), Zabur (Psalter), Injil (Bible) and Koran, as ideological sources of the doctrine of the entire integral system of Abrahamic religions.

A study of the peculiarities of the development of logical ideas in Arab-Muslim philosophy and “theology” based on the philosophical teachings of Al-Kindi shows that the first Muslim thinker who wrote on philosophical topics, the first Peripatetic, was Abu Yusuf Yakub al-Kindi. The study of methodological problems in the study of logical teaching in the interpretation of Al-Kindi reveals the content of al-Kindi’s philosophy about the three degrees of scientific knowledge, which he divides into three stages: the first stage is logic and mathematics, the second is natural science. the third is metaphysics, which is opposed to kalam.

Disclosure of the essence of not only formal, but also substantive logic in the interpretation of Al-Kindi, gives an interpretation of ten Aristotelian logical categories, showing their ontological and epistemological aspects.

Commenting on the works of Aristotle and other ancient Greek philosophers, al-Kindi brought Greek philosophy into Islamic thinking, and Muslim thinkers began to study and research it. But when it came to questions about the existence of God, they tried to introduce the question of the essence of God into the philosophy of the Peripatetics and explain it in such a way that there was no room for doubt. Muslim philosophers believed that Allah is the true cause of existence of all beings, free from partnership, equality, similarity and contradiction, the root cause - Allah Ta’ala Wahid (One), Kadir (Mighty), Khaliq (Creator), Hayy (Living), Khakim (Wise), Sami (Hearer), Basir (Seer).

The substantiation of the philosophical principles of determinism and continuity in identifying the significance of the initial factors that determine logic in the interpretation of Al-Kindi, as well as the identification of the connection of his logic with the Mutazilite movement of kalam, on the one hand, and with Greek philosophy, on the other, testifies to the aspects of Al-Kindi’s philosophy according to relation to the concepts of the Almighty. God and the world, different from the views of Aristotle, Plato, Plotinus, which makes it possible to understand the similarities and differences in the views of Al-Kindi and the Mutazilites on the issue of the origin of the world, the soul and the problem of knowledge.

In this position of historical and philosophical analysis, Al-Kindi’s philosophy is determined by worldview and inter-confessional neutrality as a criterion of logical-philosophical and religious competence, understanding of the Arab-Muslim philosophy of language, which performs the functions of obtaining secular knowledge and the functions of the language of worship in Islam. This is indicated by developing the foundations for the formation of independent, problem-solving, creative and critical thinking among students, increasing interest in historical and fundamental knowledge, stimulating the need for philosophical assessments of events and facts of reality, developing skills, abilities and competencies in the system of problems of philosophy of language, analytical philosophy, hermeneutics as a theory of interpretation, interpretation of texts, as well as self-determination of life beliefs and understanding of one’s civic position, as a synthesis of the philosophical and professional thinking of a future linguist.

REFERENCES

1. Decree of the President of the Republic of Uzbekistan “On the development strategy of New Uzbekistan for 2022 - 2026” - <https://lex.uz/ru/docs/5841077>
2. Khalidov A. B. Book culture // *Essays on the history of Arab culture of the V-XV centuries*. M., 1982. pp. 215–310
3. Goitein S. D. *Studies in Islamic history and Institutions*. Leiden: Brill, 1966. -P. 391.
4. Decree of the President of the Republic of Uzbekistan “On the development strategy of New Uzbekistan for 2022 - 2026” - <https://lex.uz/ru/docs/5841077>
5. Decree of the President of the Republic of Uzbekistan “On approval of the concept of development of the higher education system of the Republic of Uzbekistan until 2030” - <https://lex.uz/ru/docs/4545887>
6. Svetlana Borisovna IM. Significance of morphophonological elements in a nominal word formation as a manifestation of the fusion of the Russian language - <http://jcreview.com/fulltext/197-1586180887.pdf?1586342171>



УДК.: 618.19-006.6.

ASSESSMENT OF LONG - TERM RESULTS OF TREATMENT PAGET'S BREAST CANCER

Urmanbaeva Dilbaroy Abdulkosimovna

*Candidate of Medical Sciences, Associate Professor of the Department of Oncology
Andijan State Medical Institute*

SUMMARY

Information is presented about Paget's breast cancer, its long-term results of treatment of those who received complex treatment at the Andijan branch of the Republican Scientific and Practical Medical Center of Oncology and Radiology from 2011 to 2022. 71 patients – first group. Tis Paget's cancer in 46 (64.8%) patients, stage I - II A. – in 17 (23.9%), II B – III A st. in 8 (11.3%). Comparison group (second), 64 patients who received complex treatment for breast cancer Tis in 11 (17.2%) patients, I - II A stage. – in 49 (76.5%), II B – III A st. in 4 (6.3%). The incidence of Paget's cancer was 1.4%.

KEY WORDS: *Paget's cancer, breast cancer, relevance, histogenesis, morphology, clinical symptoms, treatment, prognosis.*

RELEVANCE

Paget's breast cancer (BCBC) is a type of breast cancer that manifests as an eczema-like lesion of the nipple. The incidence of breast cancer is 1–2% of cases in the structure of breast cancer. The predominant age is 40 – 75 years. In the structure of the incidence of malignant neoplasms in the female population of the Republic of Uzbekistan, breast cancer ranks first. At the same time, statistics from recent years indicate a steady, intensive increase in morbidity and mortality from this pathology in many other countries as well. Every year, more than 1 million new cases of breast cancer are detected worldwide, which in Western Europe and North America is the leading cause of death in women aged 35-54 years and the second after cardiovascular diseases in women aged 55 years and older [1, 5, 6]. Among the various manifestations of breast cancer, a unique rare form is noted - Paget's cancer, which occurs in 0.5-5% of cases of breast neoplasia and usually occurs in the form of damage to the nipple and areola. As a rule, this pathology, the clinical picture and mechanism of development of which were first described by James Paget in 1874, is diagnosed in postmenopause, with a peak incidence observed between 50 and 60 years of life [7].

The main theories of Paget's cancer development are epidermotropic and in situ transforming theories. The epidermotropic theory states that Paget cells are cells of intraductal breast carcinoma (present in most patients with Paget cancer) that, over time, migrate along the basement membranes of the ducts into the epidermis of the nipple and areola. In turn, Paget's in situ transformative theory of the histogenesis of cancer assumes the malignancy of existing cells and defines Paget's cells as malignant keratinocytes [1, 7]. Under microscopy, Paget's cells are visualized as large intra-epidermal cells that do not form intercellular bridges with neighboring spinous cells, round or oval in shape, with cleared cytoplasm, an enlarged pleomorphic hyperchromatic nucleus and dimly stained nucleoli. Paget cells can be located either singly along the epidermal cells of the basal layer, or with the formation of small nests of cells similar to ductal or glandular structures. Their number varies significantly from a small number of isolated malignant cells to complete replacement of the epidermal layer [2, 7].

Most patients with Paget's cancer note changes in sensitivity, itching, burning in the area of the nipple and areola. Peeling and maceration are also often observed, which over time leads to pronounced eczematous changes in both the nipple and areola and the surrounding skin of the mammary gland. As a rule, the area of eczematous lesion is slightly raised above the level of unaffected skin and has clear boundaries. In later stages of the disease, ulceration and destruction of the nipple-areolar complex are observed with possible profuse bleeding from the affected areas. In addition, flattening of the nipple and then its retraction are noted [2, 6].

PURPOSE OF THE STUDY

To evaluate the long-term results of treatment for breast cancer.

MATERIALS AND METHODS

In Andijan branch of the Republican Scientific and Practical Medical Center of Oncology and Radiology from 2011 to 2022. 71 patients received complex treatment for breast cancer - the first group. Tis Paget's cancer in 46 (64.8%) patients, stage I - II A. – 17



(23.9%), II B – III A st. in 8 (11.3%). Comparison group (second), 64 patients who received complex treatment for breast cancer Tis in 11 (17.2%) patients, I - II A stage. – in 49 (76.5%), II B – III A st. in 4 (6.3%). The incidence of Paget's cancer was 1.4%. The average age of patients in the first group was 54.7 years, in the second – 58.6 years. Ovarian-menstrual function was preserved in 39 (54.9%) patients of the first group, in the second group - 33 (51.6%). 32 (45.1%) patients of the first group, 31 (48.4%) of the second group were in menopause of various periods. In the first group, operations were performed: Madden mastectomy in 68 (95.7%) patients, Patey mastectomy in 3 (4.3%) patients. In the second group, the following was performed: Madden mastectomy in 47 (73.4%) patients, Paty mastectomy in 3 (4.7%), radical resection in 14 (21.9%). In the postoperative period, patients in both groups received radiation therapy, adjuvant courses of drug therapy (chemotherapy, hormonal therapy) were carried out according to generally accepted recommendations.

RESULTS

In 7 (9.9%) patients of the first group, metastasis occurred before 3 years of observation, in 9 (12.7%) before 5 years. In the second group of patients - in 8 (12.5%) up to 3 years, in 14 (21.9%) up to 5 years. Relapse in the surgical area occurred in 3 (4.2%) patients of the first group before 3 years, in 5 (7.0%) before 5 years. In the second group, 5 (7.8%) patients were under 3 years of age and 9 (14.1%) patients were under 5 years of age. In the first group, 6 (8.5%) patients died from generalization of the process before 3 years of age, and 11 (15.4%) before 5 years of age. In the second group, patients died: 7 (10.9%) before 3 years, 11 (17.2%) before 5 years.

CONCLUSIONS

Thus, overall and relapse-free survival for breast cancer does not differ from the average statistical indicators for breast cancer, since all currently known factors influencing the prognosis for typical morphological variants of breast cancer are, to one degree or another, also important for breast cancer .

LITERATURA

1. Ermachenkova A.M. // *Issues of oncology*. -2013. - No. 59(3). - P.299-301.
2. Pogodina EM, Vysotskaya I.V., Sosnovskikh I.A., Ziki-ryakhodzhaev AD // *Mammology*. - 2006. - No. 1. - P.65-70.
3. Semiglazov V.F. // *Issues of oncology*. - 2013. -№59(3). - P.288.
4. Sosnovskikh I.A. *Paget's cancer of the breast: treatment, prognosis / Abstract. dis. ...cand. honey. Sci.* - M., 2005.
5. Caliskan M, Gatti G, Sosnovskikh I. // *Breast Cancer Research and Treatment*. - 2008. - Vol.112, N3. -P.513-521.
6. Chen CY., Sun LM, Anderson BO // *Cancer*. -2006. - Vol.107, N7. - P.1448-1458.
7. Seetharam S, Fentiman IS // *Women's Health*. -2009. - Vol.5. - P.397-402.



THE ISSUES OF THE LANGUAGE OF THE INHABITANTS OF THE QOVUNCHI CULTURE

Inomov Odiljon Ulug'khoja ugli

Tashkent State Pedagogical University named after Nizomi, Independent Researcher

Article DOI: <https://doi.org/10.36713/epra15137>

DOI No: 10.36713/epra15137

ABSTRACT

This article highlights entering the different ethnic components into the regions of the Central Asian and the influence of these ethnic groups on the formation of the language of the population of the Qovunchi culture.

KEY WORDS: *Choch dialect, Sugdian language, Turkic toponyms, bilingualism, migration processes, ethnoses, anthropology, Turkic-speaking ethnic groups, Eurasian steppes.*

INTRODUCTION

Central Asia, including the middle and lower basins of the Syr Darya, has a special place as a region where the cultures of Turkic and Iranian-speaking tribes and peoples have been actively intermingled since ancient times. This region is considered to be a region that has attracted diverse ethnic groups in terms of its geographical location. This is confirmed by ancient written sources and archaeological finds. Avesta narratives, folk memoirs presented in Beruni's works, and their comparative analysis with archaeological monuments testify to the active participation of Turkic and Iranian-speaking ethnic groups in the ethno-cultural and ethno-political processes that took place in the region since the Bronze Age[1:382].

It is known from history that in some regions of Central Asia, one of these ethnic groups was widespread and participated relatively more actively in ethno-cultural and ethno-political processes, while the other played the same role in the rest of the region[2:72]. For example, in the past, in the northeastern parts of the Central Asian region, Turkic-speaking ethnic groups made up a very large part of the total population, while in the southwestern regions of the region, Iranian-speaking ethnic groups made up the majority of the population. Both parts of Central Asia are meeting zones where these ethnic groups are mixed. Such conflict zones are the regions of Northeast Khorasan, between Amudarya and Syrdarya, Yettisuv and oases in Eastern Turkestan, which have long been the areas of regular ethnocultural contact and intermingling of Iranian and Turkic peoples[2:72].

RESEARCH METHODS

The research was carried out using objectivity, analysis, synthesis, comparative analysis, generalization and historical chronological methods.

MAIN PART

As we know, in historical linguistic studies, there is an idea that the native inhabitants of the middle basin of the Syrdarya were clans and communities speaking Iranian languages. However, according to the archaeological research carried out in the regions of Central Asia and the analysis of ancient Chinese written sources, a Turkic ethnic group appeared in the oasis as a result of the arrival of many Turkic ethnic groups from its northeastern regions in the late Bronze Age. Especially during the Early Iron Age and Antiquity, their regular penetration into Central Asia led to an increase in the weight of the existing Turkic layer there. The increase of Turkish influence in the middle basin of Syr Darya and the influx of Turkic people into the region in groups caused the Turkic ethnoses to become more and more dense in the oasis.

During the ancient and early Middle Ages, the weight of the Turkic ethnic group was so high in the middle basins of the Syrdarya that a Turkic-Sugdian ethnocultural political field was formed on this land, and the Kangar people were formed on the basis of the Turkic ethnicity. Its appearance in the form of archaeological monuments led to the formation of the Qovunchi culture and the establishment of the Kang State in the historical-political front [20:3-158]. The entry of ancient Turkic tribes into the Choch oasis, that is, from the northeastern regions of Central Asia, took on a permanent character during the Kang state (III BC-III centuries AD), and this process reached its highest peak especially during the Turkic Khanate.



One of the factors that show the growth of Turkish influence in the oasis during the Khaganate period is the emergence of dozens of places, cities and villages with Turkish names, and their obvious appearance in the pictures of the local rulers, which are reflected in the objects, works of art, and coins of the late antiquity and early middle ages. For example, in the coins minted in Choch in the VI-VIII centuries, the appearance typical of Eastern Turks begins to appear: a man with narrow eyes, a wide round face, beardless, and long hair. There are signs specific to Turks in the works of art, figurines, and images on seals. An example of this can be seen in the belt buckles with equestrian images found in the ruins of Qanga and Sigirtepa. Another factor that ensures the existence of the ancient Turkic language in the oasis is the Turkic origin of the word "Choch", the main name of the oasis [8:8-9, 13:2003-2005]. The name of the Ohangaron river, which is an integral part of the Tashkent oasis, and Tunkat, the capital of Ilaq, can also be interpreted as a Turkish name.

In the early Middle Ages, Abridg, Arpalig, Soyliq, Itliq, Khotunkat, Barskat, Jabgukat, Arslonkat, Namudlig, Yaguzlig, Yaqaliq, Achig, Jadg'al (Chatqol) and dozens of other towns and villages with Turkic-Sugdian origins stood in the Choch oasis, and the names of these places were Choch. It testifies that a large part of its population is made up of Turks. However, the toponym Choch has been known in the oasis since ancient times. Perhaps this name is related to the arrival of a large group of Turkic-speaking Andronovo culture owners from the Enisei steppes to this land in the Late Bronze Age. Because in the economic life of cattle-breeding tribes of Andronovo, not only animal husbandry, but also mining, metallurgy, and the artistic art of making various jewelry from precious stones are important. If we take into account that the mountains surrounding the oasis are rich in valuable turquoise stone deposits, then the Tashkent oasis, which is famous throughout the East for its turquoise stones, and the term Choch (stone) attributed to it, according to its historical roots, go back to the Late Bronze Age.

According to linguistic analysis, one of the ancient names of Syrdarya, which flows through a large part of the oasis, is mentioned as Sil (is) in the work of the Roman historian Pliny (1st century AD)[9:85]. Perhaps "Silis" is the old proto-Turkic name of Sirdarya. Its other name is Yaksard, which means "true pearl, pearl" in Iranian. Taking into account the presence of Turkic and Sugdian-speaking communities in the middle basins of the Syrdarya in ancient times, its Turkic-speaking inhabitants may have called the Syrdarya Silis, and the Sugdian inhabitants called it Yaksard.

Muslim written sources also confirm that a large part of the population of the Tashkent oasis is Turkic-speaking. Tabari, in his work "Tarikh ar-rusul wa-l muluk" (9th century), speaking about the Choch people who came to the aid of the uprising of Rafe ibn Lays in Samarkand in 806, uses the phrase "Shosh ruler and his Turks" among them [11: 143 (1253), 217 (1525)]. Xuan Qian, a Chinese monk who passed through the Zhe-shi (Choch) region in 630 AD, writing about the inhabitants of the village settlements where the Chinese had merchant caravan palaces in the northern regions of Choch, notes that although they retained their language, their dress and other customs resembled those of the Turks. [25:117]. This shows that in the early Middle Ages, the political and ethnocultural dominance of Choch was on the side of the Turkic-speaking tribes.

Mahmud Kashgari also states that among the Turkic population of the regions from Isfijab (Sayram) to Taroz and Balosogun in the north of Choch, there are also Sugdians who migrated from Samarkand and Bukhara[14:30,66]. The Turkification process of the Sogdians accelerated in the early Middle Ages, especially during the Khionids, Kidaris, Ephtalians, and the Turkish Khaganate. The process of Turkification of the Sugdians was so accelerated that in the chronicles of the early Middle Ages, the Sugdians were sometimes mentioned as a tribe of the Turks[18:40-43, 19:52-61].

The Chinese traveler Hoi Chao, who traveled to the western lands in 723-726, notes that nomadic Turks lived in the areas from the "Hu" people to the "North Sea" (Aral Sea) in the north, to the "Western Sea" (Caspian Sea) in the west, and to China in the east [6:194]. According to Tabari, the ruler of Khorezm fled to the north in 712, sought refuge from the Turks, and fought against the Muslims with their help in 728-729 [11: 143 (1253), 217 (1525)]. In these phrases, Tabari points out that the north of Khorezm, that is, the lower basins of the Syr Darya, is the land of the Turks. As a matter of fact, not only the population of the northern borders of the middle basin of the Syrdarya, i.e. Otror and its surroundings, but also the majority of the population of the regions to the west were composed of Turks[2:77]. Ethnotoponyms also testify to this. In particular, the following place names can be added to Turkish toponyms: Mingbuloq, Otror, Yangikent, Sutkand, Sayram, Karachuk, Atlakh, Khurlug, Jumishlagu, Signoq, Talos, and others.

However, K. Akishev, a supporter of the views of the Soviet Union era, interprets the settlements of people living in the middle basin of the Syrdarya in the early Middle Ages as the product of the activities of Iranian-speaking ethnic groups, and K. Baypakov, following the footsteps of S.G. Klyashtorni, "misconceived that these places were the homeland of the Turks." criticizes [4:39-42]. K. Akishev's criticism is therefore unfounded, even in the 2nd and 1st millennia, the middle basin of the Syrdarya and even in its northwestern regions have been inhabited by Turkic ethnic groups for a long time. V.V. Bartold, who sided with Iranian languages in this matter, also decided the historical truth in favor of the Turks and wrote that the river "Daix"



(Daiks) recorded in the Greek sources of the 2nd century AD is related to the hydronym "Yaiq" used in the Turkish language in the Middle Ages [22: 29].

In fact, in the IV-VI centuries AD, Turkic tribes such as Utigur (thirty Oghuz), Kutrigur (nine Oghuz), Hun, Barsil, Savir, Bulgar, Khazar lived in the steppes between the Caspian and the Black seas, and their languages formed the corresponding dialects of the ancient Turkic languages [26 :81-86, 12:100-101].

M.I. Filanovich clarified his previous views in the following years and noted that although the official language of the oasis was one of the Sugdian dialects in ancient times, at the same time, the Turkish language was also spoken in the oasis, and its influence was increasing [17:22-26, 15:33]. The oasis is also characterized by the presence of bilingualism and the strong ethnocultural influence of the southern regions. The use of the Sugdian language in Choch as an official written language (even in the Bugut and Ili inscriptions of the Turkish Khanate) was related to the position of the Sugdian language as the "language of international trade" and "the language of international transactions" in the networks of the "Great Silk Road". In this regard, the service of the Sughd trade factories was incomparably great. Therefore, the position of this language in the Choch oasis at the state level can be explained by the same factors [2:84].

Some historian-archaeologists and ancient numismatists and Sogdians, academicians N. Negmatov, Yu. Yakubov, A. Muhammadjonov, E. Rtveladze, candidate of historical sciences M. Filanovich, etc., formed in the imagination of pro-Iranianism, the language of the inhabitants of the Choch oasis in the ancient and early Middle Ages was Sogdian. They believe that the word "choch" means "stone" and "mountain" in the Sogdian language. As a matter of fact, there is no indication in any of the Sugdian studies that the word "Choch" means "stone" in the Sugdian language [2:85]. On the contrary, there is evidence that the ancient Choch language is different from the Sugdian language of Samarkand and Bukhara. Arab geographer Muqaddasiy (10th century) notes that the language of the people of Choch is the most beautiful among the Hailat languages [21:333]. Also, Xuan Tsian and Khoi Chao say that the language of the Ferghana people, who are historically and culturally closest to the Choch region, is different from the language of the neighboring population [5:16-17]. This situation makes it possible to explain the leadership of the Turkic language in the Ferghana Valley in the VII century [16:13].

In the Chinese annals, the language of Yeda (Hephthalites) was recorded as a separate language, not similar to Zhujan, Gaogyu (Uighur), Hu (Turkic) [7:268]. However, there are disputes among scholars regarding the language of the Ephthalites. One group of scholars includes the Ephthalian language in the family of Iranian languages (Enoki, Litvinsky, Negmatov, Livshchits, etc.), while another group of scholars includes it in the family of Turkic languages (Bernshtam, Shaniyozov, Askarov, Boboyorov, etc.). It is also known that most scholars consider the Halaj Turks who lived in Afghanistan in the Middle Ages as the next generations of the Ephthalites [27:10-16]. The linguist G.Dörfer scientifically proved that the language of a small number of Halajs living in Iran is an archaic version of the Turkic language of the time of the Turkish khanate [24:410-420]. Nowadays, there are many people who include the language of Choch people in the family of Iranian languages, but a word pattern that clearly confirms it is still abstract. The few preserved names and toponyms do not allow us to make a specific conclusion about it [2:87]. Because the place names clarifying this issue are found in both languages (Turkish and Sugdian).

The names Gan, Mohedu, Kyule, Inye Chabishi mentioned in the Chinese chronicles as the names of Choch rulers (belonging to the VII-VIII centuries) were restored by the researchers in the form of Tun, Bahadur, Kulug, Inal, Chabish on a Turkic basis and considered them as epithets or titles [23:140, 28:103, 3:59-60]. Even Yu.A. Zuev restores the name Nye, the ruler of Choch in 605, in the form of Inal on a Turkish basis [10:94].

The above-mentioned scientific views, hypotheses and their scientific analysis show that the native inhabitants of the Choch oasis, who lived until the Bronze Age, spoke the Sughd dialect of ancient Iranian languages. Since the Late Bronze Age, Turkic-speaking ethnic groups from the Eurasian steppes began to enter the whole of Central Asia, including the Choch oasis. Due to this, the Turkic ethnos appeared in Central Asia, especially in the districts of the middle basins of the Syrdarya. According to the analysis of archaeological and anthropological materials, the wave of their entry into this region was not limited to one or two stages. The migration of ethnic groups from the north-east of the region to its south-west takes on a permanent character. This is evidenced by the meeting of "South Siberian type" anthropological materials from the early Iron Age in the northern regions of Central Asia. Migration processes especially in antiquity, that is, BC. During the 3rd and 5th centuries AD, it became so strong that, on the one hand, the Sarmatians entered this land, and on the other hand, the Huns entered the region from the north-east, even in ancient written sources.

Their confirmation on the basis of archaeological materials left its bright ethnocultural traces in the composition of Qovunchi culture in the Choch oasis. By the time of Antiquity, the influence of the Turkic ethnic group increased not only in the lower basins of the Syrdarya (Jetiasar culture), but also in its middle basin, that is, in the Tashkent oasis and South Kazakhstan regions,



as a result of which the Choch dialect of the ancient Sogdian language was formed [15:33]. Its roots were formed on the basis of mutual mixing and syncretization of the Turkic and Sogdian languages. As an ethno-cultural product of this ethnic mixture, the Kangar people, and the Kangar state as its ethno-political state union, emerged in the Choch oasis. This state is called Kanguy in Chinese chronicles, and based on its etymological meaning, the Turkic term "Choch" means "stone", "precious stone", "turquoise stone" has found its scientific confirmation.

CONCLUSION

In ancient times, the appearance of the Turkic ethnic group in the Tashkent oasis dates back to the Late Bronze Age, and its rise to the top position in terms of ethno-economic, ethno-cultural and ethno-political aspects took place in antiquity. Contrary to the spirit of historiography of the Former Soviet Union period, the term Choch, which gave an ethnic attribute to the oasis, is the ancient Turkic "tas", as its translation, the name of the oasis, which was first mentioned as Kanguy, Yuni, Zheshi, Shi in Chinese hieroglyphs, from the 5th century AD, meant stone, turquoise stone. This land, known in ancient written sources throughout the Eastern world for its turquoise stone deposits and precious stone reserves, was called "Choch country" in the language of its inhabitants.

From the 11th century AD, in the works of Beruni and Mahmud Kashgari, Choch oasis and the name of its capital city were mentioned as Tashkent oasis, Tashkent city, according to its originality. So, in ancient times, its people were Sogdian and Turkic-speaking, and since ancient times, the process of linguistic Turkification among the Sogdian layer of the oasis population has been accelerating. As a result, in the early Middle Ages, the Turkic-Sogdian ethno-cultural and ethno-political space was formed in the middle basins of the Syrdarya, and the fundamental basis of the Uzbek people was built in the image of the settled Kangar people [1:393]. It is the middle basins of the Syrdarya, based on the mixture of its Turkic and Sogdian-speaking inhabitants, that the anthropological type of the Uzbek people "Type between the two rivers of Central Asia" is formed, and the Kang state union is formed based on the ancient local statehood that has entered the path of development in the Turkic spirit.

REFERENCES

1. Асқаров А. *Ўзбек халқининг келиб чиқиши тарихи*. – Т.: "Ўзбекистон", 2019.
2. Бобоёрров Ғ. *Чоч тарихидан лавҳалар*. – Т.: 2010.
3. Бабаяров Г. *Древнетюркские монеты Чачского оазиса (VI-VIII вв.)* – Т.: 2007.
4. Байпаков К.М. *Средневековые города Казахстана на Шёлковом пути*. – Алма-Аты, 1998.
5. Бернштам А.Н. *Древняя Фергана (научно-популярный очерк)*. АН УЗССР, – Т.: 1951.
6. Бернштам А.Н. *Тюрки и Средняя Азия в описании Хой Чао (726) // ВДИ*. – М., 1952. – № 1.
7. Бичурин Н.Я. *Собрание сведений о народах, обитавших в Средней Азии в древние времена. В трёх томах. Том II*. – М., – Л., 1950.
8. Бурыков Ю.Ф. *К динамике развития городской культуры древнего и средневекового Чача. «Материалы научной конференции «Чач-Бинкет-Ташкент (историческое прошлое и современность)»* – Т.: 2007.
9. *Древние авторы о Средней Азии*. – Т.: 1940.
10. Зуев Б.А. *Ранние тюрки: очерки истории и идеологии*. – Алма-аты, 2002.
11. *История ат-Табари. Избранные отрывки (Перевод с арабского В.И. Беляева. Дополнение к переводу О.Г. Большакова и А.Б. Халилова*. –Т.: Фан, 1987.
12. Комар А. *Наследие тюркских каганатов в Восточной Европе // Культурное наследие*. – Астана, 2009. – № 1.
13. Максудов Ф., Бабаяров Г. *К этимологии топонима Чач. "Столице Узбекистана Ташкенту 2200 лет" Труды международной научной конференции*. – Т.: 2009.
14. Махмуд Қошғарий. *Девону луғотит турк. (Таржимон ва наишра тайёрловчи С.М. Муталлибов)*. Том 1. – Т.: 1960.
15. Мукминова Р.Г. *Филанович М.И. Ташкент на перекрёстке истории (Очерки древней и средневековой истории города)*. – Т.: Фан, 2001.
16. Отахўжаев А. *Илк ўрта асрлар Марказий Осиё цивилизациясида турк-суғд муносабатлари*. – Т.: 2010.
17. Филанович М.И. *Древняя и средневековая история Ташкента в археологических источниках*. – Т.: 2010.
18. Хўжаев А. *Суғдийларнинг Хитойга бориб қолиши // Мозийдан садо*. –Т.: 2002. – № 2.
19. Хўжаев А. *Хитой манбаларида суғдларга оид айрим маълумотлар // Ozbekiston tarixi*. – Т.: 2004. – № 1.
20. Шониёзов К.Ш. *Қанғ давлати ва қанғлилар*. – Т.: Фан, 1990.
21. *Al-Moqaddasi. Descriptio Imperii moslemici, ed. M.J. de Goeje, BGA, pars 3. Lugduni Batavorum*, 1967.
22. *Barthold V.V. Orta Asya Türk Tarihi Dersleri*. – Ankara, 2004.
23. *Chavannes E. Documents sur les Tou-Kiue(turks) occidentaux. Сборник трудов Орхонской экспедиции. Вып. 6. СПб. 1903.*
24. *Doerfer G. Lexik und Sprachgeographie des Chaladsch*. – Wiesbaden, 1987.
25. *Ekmekçi E. Hsiian-Tsang Seyahetnamesi'ne göre Türkistan. Basilmamiş doctora tezi. Hacettepe Üniversitesi, Sosyal Bilimler Enstitüsü*. – Ankara, 2003.
26. *Golden P.B. Türk halkları tarihine Giriş. Çev. O. Karatay*. – Ankara, 2002.
27. *Inaba M. The Identity of the Turkish Rulersto the South of Hindukush from the 7 th to the 9 th Centuries A.D.* – Zinbun, 2005. – № 38.
28. *Skaff K.J. Western Turk Rule of Turkestans Oases in the Sixth through Eighth Centuries "The Turks", 2*, – Ankara, 2002. – № 23.



INHERITANCE OF THE TRAIT OF THE WEIGHT OF 1000 SEEDS IN ORIGINAL SOURCES AND F₁ HYBRIDS OF BEANS BELONGING TO *PHASEOLUS VULGARIS* L. TYPE

Tursunova Nilufar Moydinovna¹, Amanov Bakhtiyar Khushbakovich

¹Doctoral Student, Chirchik State Pedagogical University

²Chirchik State Pedagogical University, Doctor of biological sciences

ABSTRACT

This article presents the performances obtained on the weight of 1000 seeds of original sources and F₁ hybrids of common bean. According to the results of the study, the highest performance for the weight of 1000 seeds was found in the foreign "Vir" variety and in the combination F₁ Ravot x Solnyshko obtained on the basis of hybridization in positive superdominant inheritance, while the lowest performance was observed in the Solnyshko and Belaya fasol varieties, and in the combination F₁ Solnyshko x Baby Lima in negative superdominant inheritance.

KEY WORDS: bean, *Phaseolus vulgaris*, yield, inheritance, genotype, dominant, biomass, hybrid, grain weight.

Кириш

Common bean (*Phaseolus vulgaris* L.) is one of valuable protein-rich food crops. In order to obtain high yield of this plant, creation of high-yielding varieties, disease-resistant genotypes will serve to satisfy the population's need for protein deficiency.

Among the legume crops, beans are the most nutritious and are called "the poor's meat" because they compensate for the lack of protein found in low-income families [9].

As a result of the studies conducted on the physiology and biochemistry of the bean plant, it was determined that the supply of substances necessary for plant development, the correct application of element K, determining the application rate of fertilizers are important for obtaining a high yield from the common bean plant [6]. Treatments with N fertilizers helps to increase the yield of bean plant too [5].

The effect of water with different electrical conductivity on the biomass and productivity of bean plants was studied. As a result, it was known from the experiments that the height of the stem of the plant and the number of green leaves decreased in 35 days [8].

Also, genetic [2, 3] and physiological studies are being carried out in our country on local and foreign bean plant varieties [4, 10].

THE OBJECT AND THE METHODS OF RESEARCH

The research experiments were carried out in the experimental area of the Faculty of Natural Sciences of the Chirchik State Pedagogical University and in the scientific laboratory "Molecular Biology and Bioinformatics". Parental sources such as Solnyshko, Kalipso krasnaya, Baby Lima, Vir, Belaya fasol and Ravot and F₁ hybrids of bean plant belonging to *Phaseolus vulgaris* L. type were used as the research object.

From valuable economic traits – the weight of 1000 seeds was determined by generally accepted methods [1]

The degree of dominance of the traits in the studied hybrids of the first subgroup was calculated according to the formula of S. Wright presented in the works of G. E. Beil and R. E. Atkins [5]:

$$hp = \frac{F_1 - MP}{P - MP}$$

hp – dominance coefficient;

F₁ – the arithmetic mean of the hybrid;

MP – the arithmetic mean of both parent forms traits;

P – the arithmetic mean of the best parental or maternal form trait.



hp = 0 – no dominance;
 0 < hp < ±1,0 – intermediate dominance;
 hp = ±1,0 – complete dominance;
 hp > ±1,0 – super-dominance.

THE RESULTS OF THE RESEARCH

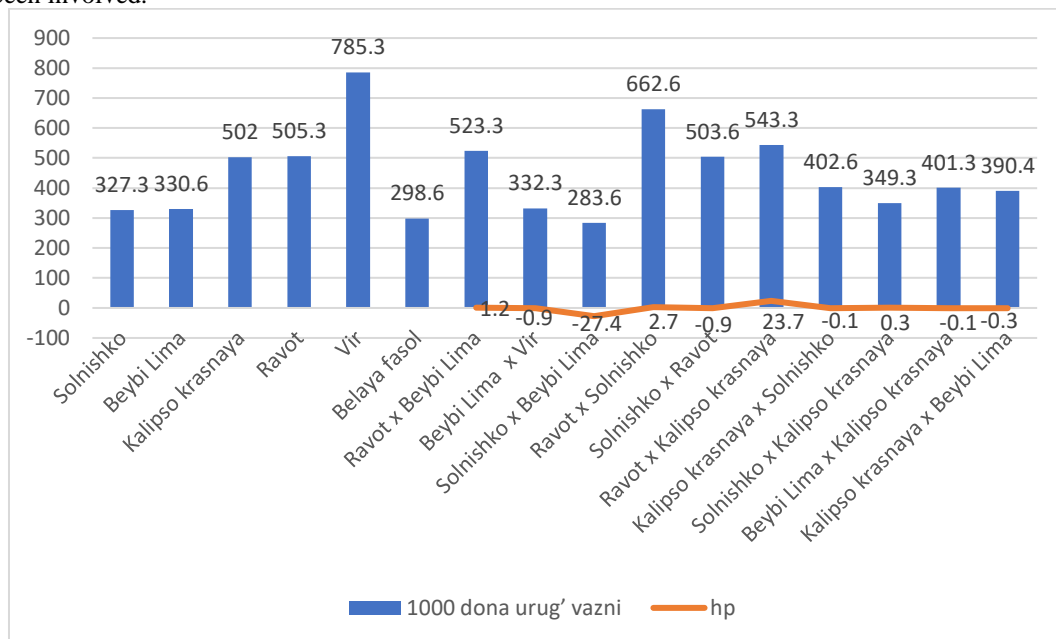
During the study, the inheritance of the trait of the weight of 1000 seeds was investigated in the original forms and F₁ plants of *Phaseolus vulgaris* L.type grown in a field experiment site.

When the experimental data were analyzed, it was observed that the parameters of the original forms involved in the hybridization were different from each other according to the trait of 1000 seeds weight. Relatively similar indicators (327.3 g, 330.6 g, 298.6 g, respectively) were recorded in the foreign Solnyshko, Baby Lima and Belaya fasol varieties. In the local Ravot variety the indicator was 505.3 g, and a similar figure was observed in the foreign Kalipso krasnaya variety, which was 502.0 g. The highest rate for the weight of 1000 seeds was found in the foreign Vir variety (785.3 g) from the parental forms.

In F₁ plants obtained by hybridization of domestic and foreign varieties belonging to *Phaseolus vulgaris* L.type, the highest result on the 1000 seeds weight trait was 662.6 g in the F₁ Ravot x Solnyshko combination, and the lowest result was 283.6 g in the F₁ Solnyshko x Baby Lima combination. F₁ Kalipso krasnaya x Solnyshko and F₁ Baby Lima x Kalipso krasnaya combinations showed no significant difference and were recorded as 402.6 g and 401.3 g, respectively.

Also, in the three F₁ combinations Solnyshko x Ravot, F₁ Ravot x Baby Lima, F₁ Ravot x Calipso krasnaya, where the local Ravot variety involved, the results were not significantly different from each other, and it can be seen that it was in the range of 503-543 g. From mathematical analysis, it was found that the coefficient of variation of F₁ plants was 0.46-2.38%.

In F₁ plants obtained as a result of crossing the original sources, the trait of 1000 seeds weight was observed to be inherited in negative and positive intermediate state, negative super dominant and positive super dominant states. For example, in F₁ Ravot x Kalipso krasnaya combination a positive superdominant condition (hp=23.7) was noted, while in F₁ Solnyshko x Baby Lima combination it was found to be inherited in super negative dominant condition (hp= -27.4). Positive intermediate inheritance was observed only in F₁ Solnyshko x Kalipso krasnaya combination (hp=0.3), and negative intermediate inheritance was observed in 5 F₁ combinations. A positive dominant inheritance (hp=1.2) was noted in the F₁ Ravot x Baby Lima combination where the local Ravot variety had been involved.



1-Diagram 1. Inheritance of the trait of 1000-seeds weight in original sources and F₁ plants of bean belonging to *Phaseolus vulgaris* L. type.

The analysis of the conducted studies showed that the highest indicator of the weight of 1000 seeds of the plants of *Phaseolus vulgaris* L.type was noted in the foreign variety Vir (785 g), and also in the combination Ravot x Solnyshko of F₁ hybrids, that is 662.6 grams, the inheritance in a positive super-dominant (hp=2.7) state was determined. Also, during the study, it was observed



that the Belaya fasol variety (298.6 grams) from the parental sources had a low result, this trait had a lower performance in the F₁ Solnyshko x Baby Lima combination (283.6 grams) and was inherited in super negative dominant (hp= -27, 4) condition.

REFERENCES USED

1. *Methods of conducting field experiments.* UzCGRI. Tashkent. 2007. – Pp. 48-52.
2. Murotov, O. O', Tuvganbaeva, J. K., Amanov, B. Kh., & Tursunova, N. M. (2022). Seed germination in samples of *Fagopyrum esculentum*, *Phaseolus vulgaris* L. belonging to leguminous family. *Academic research in educational sciences*, 3(2), 566-571.
3. Tursunova, N. M., Amanov, B. Kh., & Zakirov, D. U. (2021). HYBRIDIZATION OF LOCAL AND FOREIGN SPECIMENS OF *PHASEOLUS VULGARIS* L. SPECIES AND DETERMINATION OF GERMINABILITY OF THEIR ORIGINAL SOURCES IN LABORATORY CONDITIONS. *Academic research in educational sciences*, 2(8), 506-511.
4. Tursunova, N. M., Usmanov, R. M., & Amanov, B. Kh. (2023). INHERITANCE OF THE QUANTITY OF PHOTOSYNTHETIC PIGMENTS IN F₁ PLANTS OBTAINED FROM *PHASEOLUS VULGARIS*.L SPECIES AND THEIR HYBRIDS. *Modern biology and genetics*, 2(4), 22-32
5. Beil G.E., Atkins R.E. Inheritance of quantitative characters sorghum.// *Jow State Journal of Science*. 1965. - № 3. - P.35-37.
6. Escalante E. J., Alberto y J., Kohashi Shibata. 2015b. El Rendimiento y Crecimiento del Frijol. *Manual paratoma de datos.* Centro de Botánica. Colegio de Postgraduados. Montecillo, Edo. De México. 84 páginas.
7. Gobeze Loha, Merkinah Silas, and Gifole Gidago. Effect of Common Bean (*Phaseolus vulgaris* L.) Varieties and Variable Rates of Potassium Fertilizer on Yield and Yield-Related Traits at Areka, Southern Ethiopia// *Applied and Environmental Soil Science* Volume 2023 | Article ID 5996945.
8. Gustavo da S. Viera, Carlos R. and Samara S. Biomass Accumulation and Growth of Common Bean Plants Under Water and Salt Stress // *Journal of Agricultural Science* Vol.11, № 3, 2019.
9. Legese D., Gure K., and Teshale A. "Production and marketing of white pea beans in rift valley Ethiopia," A Sub-sector Analysis CRS-Ethiopia Program Addis Ababa, vol. 12, no. 8, 2006.
10. Usmanov, R. M., Amanov, B. Kh., & Tursunova, N. M. (2023). OBSERVATION OF VEGETATION PERIOD IN VARIETIES AND HYBRIDS BELONGING TO *PHASEOLUS VULGARIS* L. SPECIES. *Educational Research in Universal Sciences*, 2(4), 770-774.



COCOON PRODUCTIVITY AND YIELD IN LATEST-STAGE IMPROVEMENT OF Z LETHAL GENES BALANCED BREED OF MULBERRY SILKWORM

Murodkhuja ABDIKODIROV

Teacher of Chirchik State Pedagogical University, PhD.Bio.Sci.

ABSTRACT

This article presents the results of the analysis of the cocoon productivity and the yield of the progeny obtained with participation of simple silkworm lines but with high silk quality of the C-8 ngl strain, balanced for the l_1 and l_2 lethal genes located on the Z-chromosome of the mulberry silkworm.

KEY WORDS: *silkworm, hybrid, cocoon, silkiness, lethal gene.*

INTRODUCTION

The sericulture branch is one of the important areas of the agricultural sector not only in Uzbekistan, but also worldwide [3]. Currently, more than 22 thousand tons of cocoons are produced in our country per year. Increasing the quality indicators of the silk and cocoon yield to the level of international demand is one of the priority and urgent tasks of genetic-selection research in today's sericulture industry [5, 6, 7, 8].

Although it has been many years since this branch was founded [1, 2, 4, 9], it still has not lost its relevance in agrarian sector. Today, in this regard, the PRC is considered as a country where first-generation male hybrids are widely used in successful genetic-breeding practices [15].

Currently, in our republic also at the Scientific Research Institute of Sericulture, scientific research is being carried out on the creation of new hybrid combinations by maintaining, monitoring and improving the translocation in the genotype of Z-lethal genes balanced breeds [10, 11, 12, 13, 14].

The purpose of our research work is to investigate the effect of lethal genes on cocoon productivity of the third generation obtained during improvement of the C-8 ngl breed.

RESEARCH MATERIALS AND METHODS

The experiments for the research work were carried out in the "Mulberry Silkworm Breeding" laboratory of the Research Institute of Sericulture, and the C-8 ngl breed of silkworm and new lines created on the basis of this breed were developed. For the experiment, the newly created strains and as a control C-8 ngl breed were taken. Experimental silkworms were reared under optimal hygrothermal conditions.

Breeds (strains) used as parents and hybrid generation worms obtained with this parental participation were reared for determining cocoon productivity traits. Populations of 45 of each breed (strain) and hybrid within healthy cocoons were randomly sampled.

Cocoon and silk productivity of parent and maternal breeds and F_1 hybrids is an indicator calculated on the basis of eggs hatching, their viability and weight of 1 piece of cocoon.

RESEARCH RESULTS AND THEIR DISCUSSION

A number of sex-limited breeding strains of the mulberry silkworm have been created, which, as a result of crossbreeding with breeds and strains with high technological performance, embody the high technological performance obtained as a mother in male hybrids of the F_1 generation. Therefore, new hybrids have thin and high silkiness performance.



Cocoon weight of mulberry silkworm hybrids. Cocoon shell weight and silkiness are the main indicators in determining productivity. According to the results of some studies, male cocoons are lighter in weight. For this reason, male hybrids have not received much attention.

By the third stage of improvement, the alternative strains of the new C-8 ngl breed were considered to be equal to the control option in terms of productivity. (Table 1)

Table-1

Cocoon productivity performances in third stage improvement of C-8 ngl breed of mulberry silkworm (in 2022)

Number of experimented cocoons, pcs	Mean weight				Cocoon silkiness, $\bar{X} \pm S_x$, %	Pd
	Cocoon $\bar{X} \pm S_x$, g	Pd	Cocoon shell $\bar{X} \pm S_x$, g	Pd		
C-8 ngl						
45	1,96±0,01	-	455±0,003	-	23,1±0,13	-
Improvement F₃ grey (♀ $l_2 \times \text{♂ } l_1$)						
45	1,74±0,01	0,999	403±0,005	0,987	23,1±0,15	0,151
Improvement F₃ light yellow (♀ $l_1 \times \text{♂ } l_2$)						
45	1,6±0,02	0,999	405±44,4	0,076	25,4±1,44	0,806

It can be said based on Table 1 which shows the cocoon productivity performances in the third stage of improvement, a significant increase was achieved in terms of cocoon caliber, shell weight and silkiness in two main directions. Indeed, as a result of enlargement of cocoons of the C-8 ngl breed and softening of cocoon shell and poles than usual of the C-8 ngl breed taken as a comparator, the acceleration of the process of silkiness decrease and serious change of yield once again manifested in the numbers. In particular, the silkiness of the C-8 ngl breed was 23.1%, while in the improvement F₃ generation, the highest level of silkiness was shown in the first grey group - 25.4%

CONCLUSION

Depending on the obtained cocoon productivity, it can be concluded that in the second stage of improvement, there was an increase in cocoon productivity performances compared to the comparator. It fell short of demand. However, this result can be considered satisfactory, given that it was recorded at an intermediate stage of improvement. The reason for such a decrease is the disturbance of the double lethal balance and the heterozygosity of the l_1 or l_2 lethal genes each individually in the genotype, albeit partially. This was demonstrated by the example of worms wrapped in cocoons after hatching the yellow seeds of the male generation improvement.

USED REFERENCES

1. Lejenko S.S. Tut ipak qurtida jins bilan bog'liq resessiv embriona l letallarni aniqlashning genetik va matematik usuli. O'zbekiston ipakchiligi rivojlanishining ilmiy asoslari (in Uzbek). [A genetic and mathematical way to identify recessive embryonic lethals associated with sex in the mulberry silkworm] Scientific foundations of the development of silk production of Uzbekistan - T., 2011. - Pp.38-46.
2. Strunnikov V.A., Lejenko S.S. Искусственная регуляция пола у тутового шелкопряда (in Russian). [Artificial sex regulation in mulberry silkworms] Soob.4. Genetics. -1979. -15. № 6. - Pp. 1096-1114.
3. Chen J.N., Niu B.L., Wang Y., Liu Y., Liu P.G., Meng Z.Q. Proteome analysis on lethal effect of l_2 in the sex-linked balanced lethal strains of silkworm, *Bombyx mori*. // Biotechnol .Bioproc. E. - 2012. - 17(2). - Pp. 298-308.
4. Kerong H., Xinrong Z., Hui H. Silkworm sex chain balance lethal line sex research on methods of controlled gene transfer // J. Chinese Agricultural Sciences, 2002, 35 (2): Pp. 213-217
5. Marec F., Neven L.G., Robinson A.S., Vreysen M., Goldsmith M.R. Development of genetic sexing strains in Lepidoptera: From traditional to transgenic approaches // J. Econ. Entomol. - 2005. № (98). - Pp. 248-259.
6. Ohnuma A. Establishment of the practical male-rearing technology by a balance sex-linked lethal // J. Sric. Sci. Jpn. 2005. - 74 (2-3), Pp. 81-87.
7. Ohnuma A. The history of the development of male-rearing silkworm strain, *Bombyx mori* (in Japanese) // Rep. J. Dainippon. Silk Found. - 2006. - № (54). - Pp. 1-10.
8. Ohnuma, A. Establishment and verification of the balanced sex-linked lethal theory for genetic sexing of the silkworm, *Bombyx mori*. (in Japanese) //SANSI-KONCHU BIOTEC. - 2010, 79, Pp.13-20.
9. Xin-rong Z., Ke-Rong H., Jianguo X., Jianhui H. Analysis for the sex-controlled ability of the sex-linked and balanced lethal lines S-8 and S-14 on the *Bombyx Mori* // Silkworm mulberry through Report. - 1997. (28), 1.Pp. 15-17.



10. Abdikodirov, M. (2021, November). Vitality indicators of f₂ generation in improving balanced C-8 ngl breed of silkworm by double lethal. *In International Scientific and Current Research Conferences* (pp. 32-35).
11. Nasirillaev, B. U., Abdikodirov, M. A., & Khalilova, M. F. Development of a new genetic method of improving the Mulberry Silkworm *Bombyx Mori L.* breed balanced on Embryonic Z-Lethal. *International Journal of Health Sciences*, (1), 4454-4470.
12. Nasirillaev, B. U., Abdikodirov, M. A., & Khalilova, M. F. Development of a new genetic method of improving the Mulberry Silkworm *Bombyx Mori L.* breed balanced on Embryonic Z-Lethal. *International Journal of Health Sciences*, (1), 4454-4470.
13. Svetlana Semyonovna, Lejenko | Bakhtiyar Ubaydullayevich Nasirillayev | Murodkhoja Alisher oqli Abdikodirov "Development of a Method for Detecting Embryonic Sex Linked Lethals of the Silkworm *Bombyx Moril*" Published in *International Journal of Trend in Scientific Research and Development (ijtsrd)*, ISSN: 2456-6470, Volume-4 | Issue-5, August 2020, Pp.1532-1538.
14. Абдикодиров, М. А., & Насириллаев, Б. У. (2023). Разработка метода получения генетических линий, сбалансированных по двум неаллельным Z-леталям, с повышенными качественными показателями коконов тутового шелкопряда *Bombyx Mori L.* Современная биология и генетика, 1(3), 27-39 (in Russian). [Abdikodirov, M. A., & Nasirillaev, B. U. (2023). Development of a method for obtaining genetic lines balanced by two non-allelic Z-lethals with increased quality indicators of silkworm cocoons *Bombyx Mori L.* *Modern biology and genetics*, 1(3), 27-39].
15. FAO. 2022. *World Food and Agriculture – Statistical Year book 2022*. Rome. <https://doi.org/10.4060/cc2211en>



DESIGN DEVELOPMENT OF PHOSPHOLIPID COMPLEX OF SMILAX CHINA EXTRACT FOR EFFECTIVE TREATMENT OF DIABETES

Mr. Mayank Singh*, Dr. Arun Patel, Mr. Shailendra Patel, Mr. Vijay Pratap Ahirwar

Shri Ram Group of Institutions, Faculty of Pharmacy, Jabalpur, M.P.

ABSTRACT

Phytoconstituents have been utilized as medicines for thousands of years, yet their application is limited owing to major hurdles like deficit lipid solubility, large molecular size and degradation in the gastric environment of gut. Recently, phospholipid-complex technique has unveiled in addressing these stumbling blocks either by enhancing the solubilizing capacity or its potentiating ability to pass through the biological membranes and it also protects the active herbal components from degradation.

A majority of the plant constituents, specifically phenolic compounds, are hydrophilic and possesses major hurdles like poor lipid solubility, large molecular size, and degradation in the gut owing to their liable nature to acidic and enzymatic environment which limits their application in the therapeutic usage. To improve the bioavailability of these water soluble molecules in the body, phospholipids based drug delivery system has been found to be promising. Owing to their better biocompatibility and biodegradability, natural materials like polysaccharides, proteins and phospholipids have gained much attention.

Phospholipid complex-technique, can serve as a potent drug delivery system for increasing therapeutic index which encapsulates, plant actives. In fact, these complexed actives are safer than its original form and can even serve as a better targeting agents to deliver these encapsulated agents at specific sites there by proving promising candidates in various medical fields for improving health aspects. This technique can be applied for herbal dosage forms and are often known as phytosomes. Present investigation deals with formulate phospholipid complex of hydroalcoholic extract of Smilax china for effective anti-diabetic effect.

KEYWORDS-*Phytoconstituents, Phospholipids, Phospholipid-complex technique, Bioavailability, Phytosomes, Smilax china.*

INTRODUCTION

Diabetes is a disease that occurs when your blood glucose, also called blood sugar, is too high. Glucose is your body's main source of energy. Your body can make glucose, but glucose also comes from the food you eat. The most common types of diabetes are type-1, type-2, and gestational diabetes. If you have type-1 diabetes, your body makes little or no insulin. Your immune system attacks and destroys the cells in your pancreas that make insulin. Type-1 diabetes is usually diagnosed in children and young adults, although it can appear at any age. People with type-1 diabetes need to take insulin every day to stay alive. If you have type-2 diabetes, the cells in your body don't use insulin properly. The pancreas may be making insulin but is not making enough insulin to keep your blood glucose level in the normal range. Type-2 diabetes is the most common type of diabetes. You are more likely to develop type-2 diabetes if you have risk factors, such as overweight or obesity, and a family history of the disease. You can develop type 2 diabetes at any age, even during childhood.

At current situation, human survival is largely dependent on the ecological resources on this planet. Plant-based drugs have been used globally for human healthcare. Innumerable zone of total population of world's remains relies upon (grown plants) herbal plants medicinal for their essential/primary health care needs especially where present day medicines are not available in their areas.

Phospholipid complex-technique, can serve as a potent drug delivery system for increasing therapeutic index which encapsulates, plant actives. In fact, these complexed actives are safer than its original form and can even serve as a better targeting agents to deliver these encapsulated agents at specific sites there by proving promising candidates in various medical fields for improving health aspects. This technique can be applied for herbal dosage form and are often known as phytosomes. Present investigation deals with formulate phospholipid complex of hydroalcoholic extract of Smilax china for effective anti-diabetic effect.



MATERIAL AND INGREDIENTS

Root of *Smilax china* L. was collected from local market of Bhopal the month of February, 2021. After the plant was collected they have been processed for cleaning in order to prevent the deterioration of phytochemicals present in plant.

QUALITATIVE AND QUANTITATIVE PHYTOCHEMICAL ANALYSIS

Preliminary phytochemical screening is primarily an important aspect for establishing profile of given extract for its chemical compounds produced by plant. Phytochemical examinations were carried out extracts as per the standard methods such as Detection of alkaloids, carbohydrate, glycosides, saponins, phenols, flavanoids, proteins, diterpenes.

RESULTS AND DISCUSSION

Table 1: Different Formulations of Phospholipids Complex

Formulation	Ratio of Phospholipids and Cholesterol	Extract Concentration (%)	Dichloromethane Concentration
F1	1:1	1	25
F2	1:2	1	25
F3	1:3	1	25
F4	2:1	1	25
F5	2:2	1	25
F6	2:3	2	25

Table 2: Interpretation of Diffusional Release Mechanisms

Release exponent(n)	Drug transport mechanism	Rate as a function of time
0.5	Fickian diffusion	$t^{-0.5}$
$0.5 < n < 1.0$	Anomalous transport	t^{n-1}
1.0	Case-II transport	Zero-order release
Higher than 1.0	Super Case-II transport	t^{n-1}

Table 3: Extractive values of extracts of *Smilax china*

S.No.	Solvents	% Yield (W/W)
1	Pet. ether	2.58%
2	Hydroalcoholic	5.76%

Table 4: Result of Phytochemical screening of *Smilax china*

S. No.	Constituents	Hydroalcoholic Extract
1.	Alkaloids Hager's Test:	+ve
2.	Glycosides Legal's Test:	-ve
3.	Flavonoids Leadacetate Test:	-ve
4.	Diterpenes Copperacetate Test:	+ve
5.	Phenol Ferric Chloride Test:	+ve
6.	Proteins Xantho proteic Test:	+ve
7.	Carbohydrate Fehling's Test:	+ve
8.	Saponins Froth Test:	-ve

Figure 1: Phytochemical screening of *Smilax china* of extract Result of estimation of total phenol and alkaloid content



Table 5: Preparation of Calibration curve of Gallic Acid

S. No.	Concentration (µg/ml)	Mean Absorbance
1	10	0.226
2	20	0.412
3	30	0.614
4	40	0.803
5	50	0.966

Figure 2: Graph of Calibration curve of Gallic acid

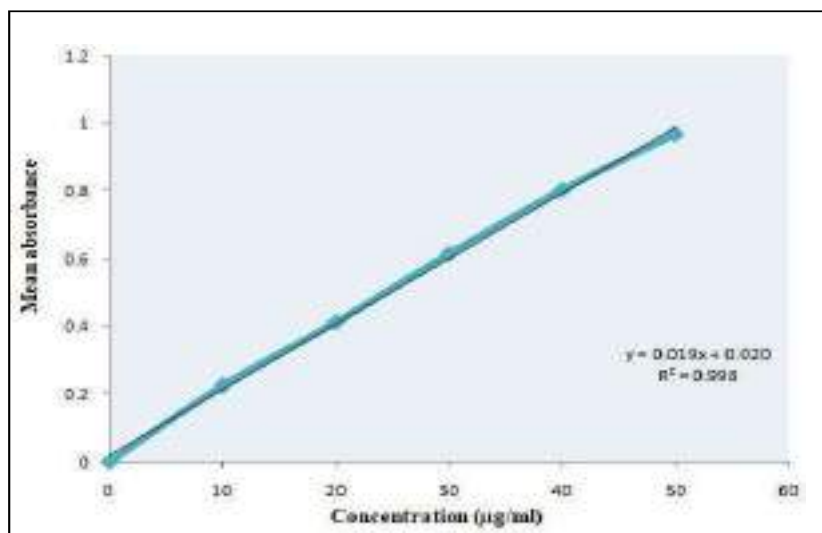


Table 6: Estimation of total phenolic and alkaloid content of *Smilax china*

S.No.	Extract	Totalphenolcontent (mg/100mg of dried extract)	Totalalkaloidcontent (mg/100mgofdried extract)
1.	Hydroalcoholic	0.756	0.632

Figure 3: FT-IR spectra of hydroalcoholic extract

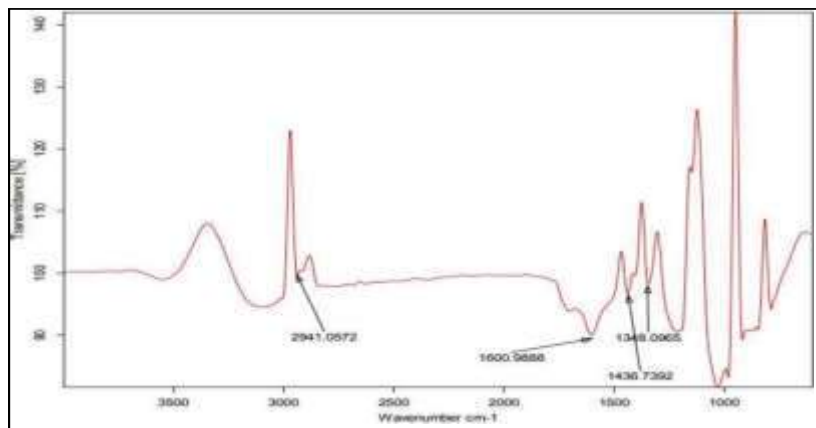


Table 7: Particle size and entrapment efficiency of drug loaded phospholipid complex

FormulationCode	Particlename(nm)	EntrapmentEfficiency(%)
F1	355.25±0.32	45.65±0.25
F2	325.58±0.45	48.85±0.45
F3	345.65±0.25	53.32±0.22
F4	245.23±0.63	69.98±0.14
F5	305.65±0.54	57.74±0.32
F6	298.85±0.47	55.65±0.65

Average of three determinations (n=3)

Figure 4: Graph of Particle size and entrapment efficiency

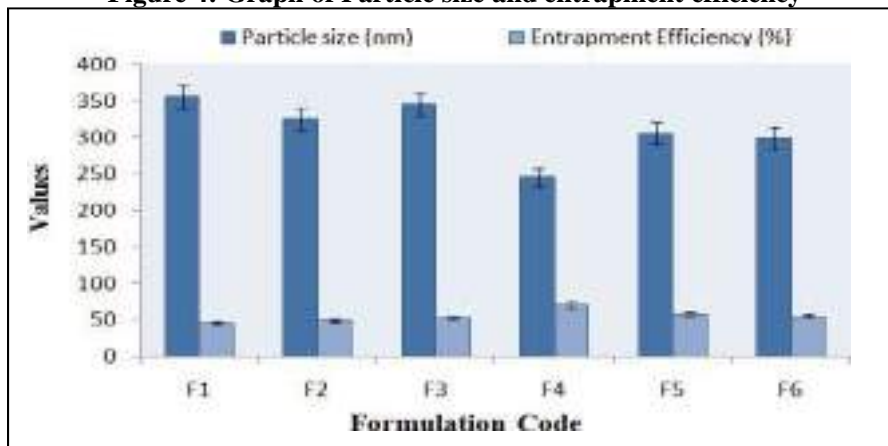


Table 8: In-vitro drug release data for optimized formulation F4

Time(h)	Square Root of Time(h) ^{1/2}	Log Time	Cumulative % Drug Release	Log Cumulative % Drug Release	Cumulative % Drug Remaining	Log Cumulative % Drug Remaining
0.5	0.707	-0.301	18.85	1.275	81.15	1.909
1	1	0	32.25	1.509	67.75	1.831
2	1.414	0.301	43.32	1.637	56.68	1.753
4	2	0.602	58.85	1.770	41.15	1.614
6	2.449	0.778	71.12	1.852	28.88	1.461
8	2.828	0.903	86.65	1.938	13.35	1.125
12	3.464	1.079	99.45	1.998	0.55	-0.260

**Table 9: % Inhibition of a carbose and Phospholipids complex F4**

S.No.	Concentration (µg/ml)	%Inhibition	
		Acarbose	Phospholipids complex
1	100	51.19	27.54
2	200	70.10	33.65
3	300	74.20	39.14
4	400	85.18	42.88
5	500	88.75	57.69
IC50(µg/ml)		35.33	444.63

SUMMARY AND CONCLUSION

The powdered plant material (crude drug) contains active chemical constituents which are responsible for its biological activity. Extractive value determines the approximate measure of their chemical constituents in a given amount of plant material. % Yield of Pet. ether and Hydroalcoholic extract of *Smilax china* were found 2.58 and 5.76% respectively.

Alkaloids, diterpenes proteins, carbohydrate, phenol, and saponins are essential secondary metabolites which are present in hydroalcoholic extract of *Smilax china* plant. Except Flavonoids, glycosides, saponins.

Results of stability studies clearly indicates that optimized batches of phospholipids complex were stable over the chosen temperature and humidity conditions up to 3 months as were found no significant variation in physical appearance and % drug content. It can be concluded that the phospholipids complex containing *Smilax china* can provide a convenient and safe alternative to dosage form.

REFERENCES

1. Bisby, F. A. (2000). *The quiet revolution: biodiversity informatics and the internet*. Science, 289(5488):2309-2312.
2. Edwards, J. L., Lane, M. A., and Nielsen, E. S. (2000). *Interoperability of biodiversity databases: biodiversity information on every desktop*. Science, 289(5488):2312-2314.
3. Farnsworth NR. 1988. *Screening plants for new medicines*. In: Wilson, E.O.(Ed.), *Biodiversity*. National Academic Press, Washington, DC. p. 83- 97.
4. Etkin NL. 1993. *Anthropological methods in Ethnopharmacology*. J Ethnopharmacol. 38: 93-104.
5. Rabe T and Van SJ. 1997. *Antibacterial activity of South African plants used for medicinal purposes*. J. Ethnopharmacol., 56: 810-87.
6. Nishteshvar K and Vidyanath R. 2006. *Sahasrayogam – Text with English translation*, Chowkhamba Sanskrit Series, Varanasi.
7. Dewick, P.M. (2002). *Medicinal Natural Products: A Biosynthetic Approach*, 2nd edn., JohnWiley and Sons, Chichester.
8. Dragovicuzelac, V.; Levaj, B.; Mrkic, V.; Bursac, D.; Boras, M. *The Content of Polyphenols and Carotenoids in Three Apricot Cultivars Depending on Stage of Maturity and Geographical Region*. Food Chemistry 2007, 102, 966–975.
9. N. Balasundram, K. Sundram, and S. Samman, "Phenolic compounds in plants and agri-industrial by-products: Antioxidant activity, occurrence, and potential uses," Food Chemistry, vol. 99, pp. 191-203, 2006.



UDK :633.511:575.

GENETICS AND BREEDING POTENTIAL OF INTRASPECIFIC POLYMORPHISM IN TETRAPLOID SPECIES OF GOSSYPIUM L

Bakhtiyar Khushbakovich Amanov

Head of the Department of Genetics and Evolutionary Biology of Chirchik State Pedagogical University,
Uzbekistan

ANNOTATION

In this article, the character of the inheritance of the fiber length and yield characteristic, the mass of raw cotton of one box, 1000 seeds in reciprocal interspecific hybrids of the first generation, obtained by crossing intraspecies varieties and forms of *G.barbadense* L. with *G.darwinii* Watt. New data have been obtained that determine the degree of dominance of the studied hozjajstvenno valuable signs at interspecific hybrids of the first generation.

KEYWORDS: cotton, species, variety, variety, hybrid, hybridization, polymorphism, inheritance, dominance factor.

INTRODUCTION

The success of applied research, and hence the acquisition of promising lines, varieties, is possible without the creation of a source material with valuable germ-plasma, with a unique potential of wild and cultivated species, encompassing the rich polymorphism of features and properties of the genus *Gossypium* L.

Currently, the use of the entire biomorphological diversity, in particular the rich and valuable intraspecific potential, such notable representatives as *G.hirsutum* L. and *G.barbadense* L. species as a starting material for improving cultivated varieties and creating but the ones that meet the requirements of the time are very limited.

Indicators of heritability of the trait are the main criteria for the effectiveness of selection and are of great importance for breeding. The coefficient of self-consistency reflects that share of phenotypic variability, which is caused by the genotypic heterogeneity of the population [2].

The aim and objective of the research is to study the biological and morphological features, the nature of the inheritance of economically valuable traits of interspecific hybrids, F₁ obtained through cross-breeding of wild-growing, ruderal, cultured-tropical and cultivated representatives of *G.barbadense* L. and *G.darwinii* Watt.

MATERIAL AND METHODS OF RESEARCH

Intraspecies varieties, forms of the species *G.barbadense* L. and species *G.darwinii* Watt., As well as their interspecific hybrids F₁ served as the object of research.

Hybrids of the first generation studied the inheritance of such morphobiological features as fertility (the mass of raw cotton of one box, 1000 seeds), the quality of the fiber (length, yield). The obtained actual data were subjected to statistical processing on a personal computer (MS-Excel program) according to the method of BA Dospekhov [1]. To determine the coefficient of dominance of economically valuable traits in hybrids of the first generation, the Wright formula was used, cited in G.M.Beil and R.E. Atkins [5].

RESEARCH RESULTS AND DISCUSSION

Fiber length - an important indicator of the technological quality of fiber is its length, yield and index. The study of the features of inheritance and variability of the noted properties of fiber is of great importance in the selection of cotton.

When the length of the fiber is inherited, as noted by many authors [3, 4], dominance of long-fiber or heterosis is observed in intraspecific hybrids, intermediate inheritance when crossing non-contrast forms by this feature.

The original parental forms of the intraspecies variety *G.barbadense* did not differ in their high fiber length. In ruderal -growing forms, the length of the fiber varied in the range in 16,8-23,3 mm, in the cultured-tropical subsp.*vitifolium f.brasiliense* 28,7 mm,



the cultivated Karshi-8 variety is characterized relatively high fiber length, 37,0 mm. Length of fiber of Peruvian, wild species *G.darwinii* Watt. was -30,5 mm.

We traced the character of the inheritance of the fiber length feature of interspecific hybrids of the first generation, obtained by crossing intraspecies varieties and forms of *G.barbadense* L. with *G.darwinii* Watt.

In hybrid combinations obtained by crossing wild, ruderal, cultured-tropical and subtropical forms with *G.darwinii* Watt. intermediate, dominant and super-dominant inheritance of the trait with the effect of positive heterosis was revealed. When crossing wild and cultivated forms of *G.barbadense* L. with *G.darwinii* Watt. there is an intermediate and dominant inheritance of fiber length with the effect of positive heterosis with a bias towards the best parent. The coefficient of dominance is $h_p = 0,73$; $h_p = 6,1$. The greatest effect of positive heterosis, i.e. super dominant inheritance of the trait is observed in the crossing groups of the ruderal form x *G.darwinii* Watt .; cultural-tropical form x *G.darwinii* Watt. The dominance factor is $h_p = 5,2$; $6,1$; $2,7$. In a hybrid combination of the ruderal form x ssp obtained by crossing. *f.ishan nigeria* x *G.darwinii* Watt with *G.darwinii* Watt. lack of dominance effect.

Thus, studies have shown that the nature of the inheritance of fiber length in interspecies hybridization is different and varies depending on the genetic nature of the original forms and the combination of crosses.

The yield of fiber is one of the main economically valuable signs of cotton. We studied the inheritance of the fiber yield of interspecies hybrids obtained by crossing wild, ruderal and cultured-tropical forms of the species *G.barbadense* L. with *G.darwinii* Watt.

Among the ruderal-growing representatives, the highest fiber yield is observed in subsp.*ruderales f.ishan nigeria* (30,4%), the smallest in subsp.*ruderales f.pisco* – 20,5%. In ruderal forms, this feature varies within the limits of 18,0-24,0%. In the cultural-tropical form subsp.*vitifolium f.brasiliense*, the yield of fiber was 29,5%. *G. darwinii* Watt. The yield in the window is 26,0% .

An analysis of the obtained data showed that in interspecific F_1 hybrids obtained by crossing varieties and forms of *G.barbadense* L. with *G. darwinii* Watt., The yield of the fiber is mainly inherited in an intermediate manner and with the effect of negative heterosis, with a partial dominance of the forms with low yield of water. In hybrid combinations involving wild and ruderal forms, a dominant and superdominant inheritance of the trait is observed. In the group of hybrid combinations obtained by hybridizing cultured-tropical forms with *G. darwinii* Watt. the effect of negative heterosis is observed. For example, in a hybrid combination of *f.pisco* x *G.darwinii* Watt, the fiber yield is inherited with the effect of negative heterosis, dominantly, respectively, the dominance factor is $h_p = -0,89$. In the reciprocal hybrid combination *G.darwinii* Watt x *f.pisco* sign, also inherited with the effect of negative heterosis, the dominance factor is equal to $h_p = 0,78$.

Similar results of studies are observed, in groups of crosses between *G. darwinii* Watt. and cultivated varieties. Thus, the results of the studies showed that in interspecific F_1 hybrids obtained by crossing varieties and forms of *G.barbadense* L. with *G. darwinii* Watt., the outflow of the fiber is mainly inherited intermediate and with the effect of negative heterosis, with partial domination of forms with low fiber yield.

The weight of raw cotton in a single box - in the intraspecies varieties *G.barbadense* L., the largest mass of raw cotton in one box was found in sub-tropical forms (subsp.*eubarbadense* (Karshi-8-3,3 g), comparatively average in cultured tropical forms (subsp.*vitifolium f.brasiliense* – 2,2 g), and the lowest values were found in ruderal (1.6-1,8 g) forms. *G.darwinii* Watt. The mass of raw cotton one capsule is 1.9 g.

A study of the nature of the inheritance of a sign of the mass of raw cotton in a single box in interspecific hybrids of the first generation obtained by intersection of intraspecies varieties and forms of *G.barbadense* L. with *G. darwinii* Watt. showed that the trait is inherited mainly dominantly and super-dominantly, in some cases intermittently or with the effect of negative heterosis. The interspecific reciprocal hybrid F_1 *G.darwinii* Watt x *f.ishan nigeria* marked the highest result, the trait is inherited super-dominantly with the effect of positive heterosis. The weight of cotton-cotton of one box in the hybrid was 3,7 g, while in parent forms this figure is 2,6-2,7 g, the dominance factor, respectively, $h_p = 15,0$. The lowest results were observed in the hybrid F_1 *G.darwinii* Watt x *f.parnat* The symptom is inherited with a negative effect of heterosis, with a bias towards the worst parent. Accordingly, the dominance factor is $h_p = - 1,2$.

Thus, as a result of the research, it was revealed that in F_1 interspecies hybrids (*G.barbadense* L. x *G.darwinii* Watt.), The mass of raw cotton in one corona is different. In hybrid combinations obtained by crossing wild-growing, ruderal and cultured tropical forms with *G.darwinii* Watt., A dominant and super dominant, in some cases intermediate inheritance of the trait or the effect of negative



heterosis was revealed. In hybrid combinations obtained by crossing subtropical forms with *G.darwinii* Watt., An intermediate inheritance of the trait was revealed, which may be explained by an alternative expression of the mass of raw cotton in one capsule in parental forms.

The mass of 1000 seeds - since wild forms of *G.barbadense* L. L. have small seeds in comparison with the central ones, the mass of 1000 seeds in them varied in the range 86,1125,0- g. It was also found that ruderal forms, the mass of 1000 seeds was a higher mass (86,1-118,0 g). The largest mass of 1000 seeds in the cultivated Karshi-8 variety is 114,0 g. In *G.darwinii* Watt., The indices of this feature were 112,3 g.

The nature of the inheritance of the 1000-seed mass feature in interspecies hybrids of the first generation obtained by crossing intraspecies varieties and tetraploid cultured species *G.barbadense* L. with *G. darwinii* Watt was studied.

As a result of the research it was revealed that in F_1 species the mass of 1000 seeds is inherited differently, mainly dominantly, super dominantly or intermittently, larvae in individual cases intermediate with the effect of negative heterocrosis with a bias toward the worst parent.

The best results of the inheritance of the mass of 1000 seeds are observed in the group of hybrid combinations obtained in the cross between cultured tropical and subtropical forms with *G.darwinii* Watt. The weight of 1000 seeds in hybrid forms was 90,0-123,4 g.

Thus, the results of studies on the nature of the inheritance of the mass of 1000 seeds showed that this feature is mainly inherited mainly dominantly, superdominantly or intermittently, larvae in isolated cases with the effect of negative heterosis with a bias toward the worst parent.

CONCLUSIONS

Thus, the study and evaluation of morphobiological and economically valuable characteristics of intraspecies species *G.barbadense* L. and *G.darwinii* Watt. revealed that, in the main, the representatives studied are characterized by low indicators of the mass of raw cotton in one box, the length and length of the fiber. Low indicators of components of fertility, indicate their wild nature. But many wild species of cotton are of interest for genetically-selection works, as they possess genes bearing extremely valuable features that are not found in cultural forms: high fiber quality, adaptive potential to abiotic and biotic factors of the environment.

Involving these forms in hybridization, in the future, will allow combining valuable properties and attributes that are far apart in the course of evolution and create a wide variety of valuable hybrid generations.

REFERENCES

1. Armor of B.A. *Methodology of field experience.* // Moscow: Agropromizdat, 1985.- 351 p.
2. Abdurakhmonov I., Buriev Z., Rizaeva S., Ernazarova Z., Abdullaev A. and Abdukarimov A. *Evaluation of fiber quality and other agronomic traits of G.hirsutum accessions from Uzbek cotton germplasm.* // International Cotton Genome Initiative ICGI-2004 Workshop. Book of Abstracts. Hyderabad, Andhra Pradesh, India. October 10-13, 2004. p.7
3. Beil G.E., Atkins R.E. *Inheritance of quantitative characters sorgum* // Jow
4. *State Journal of Science.* 1965. - № 3. - P.35-37.
5. Egamberdiev A.E. *Wild cotton species are fiber quality and vitreous fiber donors.* // Dokl. Academy of Sciences of Uzbekistan. Tashkent, 1979. - No. 8. - P. 66-68.
6. Simongulyan N.G., Mukhamedkhanov S., Shafrin A. *Genetics, selection and seed production of cotton.* - Tashkent: Mehnat, 1987. - C. 3-317.



BRAKE RESISTOR TEMPERATURE ESTIMATION IN POWERED-OFF RAILWAY CONTROLLER

Lalit G. Patil

Technical Specialist, Technology Centre India

ABSTRACT

There are many different parts that make up the railway electrical propulsion system, including the pantograph, transformer, rectification, DC link, inverter, auxiliary supply, induction motor and other sections. To dissipate braking energy into the railway, a brake resistor is attached to the DC Link. When energy is being lost in the brake resistor, its temperature rises. We need to continuously estimate the temperature on board using the internal clock, especially when the control system is out for some reason and the temperature sensor is not providing us with actual data. This projected temperature at system startup enables us to immediately act to manage the system. In this Paper, I've covered an algorithm for precise temperature estimation that takes into account thermal resistance, thermal capacitance, ambient temperature, initial temperature and the real amount of time it takes for a system to turn down.

Estimating the temperature of the brake resistor is an important aspect for ensuring correct operation and safety in the event of control system malfunctions and power outages. By using cutting-edge sensors and algorithms, it is possible to estimate the brake resistor's temperature correctly and take the necessary steps to avoid overheating, fire dangers and system failure in general.

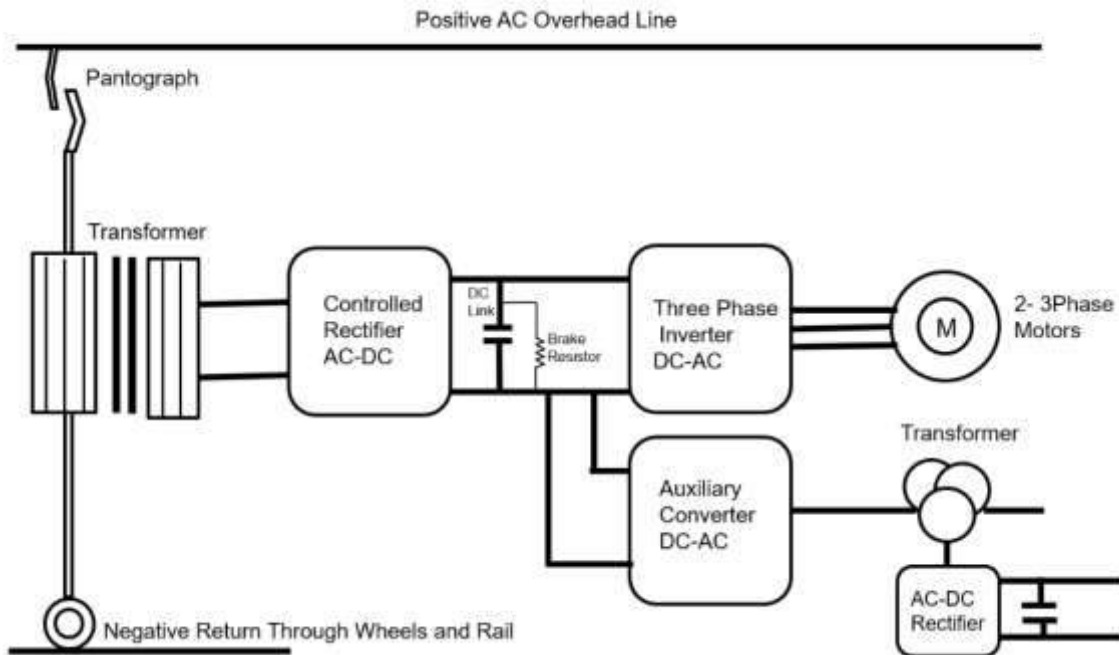
KEYWORDS- Brake Resistor, Temperature Estimation, Control System, Railway, DC Link

I. INTRODUCTION

- Estimating the temperature of the brake resistors is important for maintaining the secure operation of railway systems in the case of a power outage. The brake resistor is important in the process of releasing extra electrical energy produced during braking. However, in the absence of a power source, the control system malfunctions, which can result in uncontrolled braking and a possibly hazardous rise in the brake resistor's temperature.
- To avoid overheating and potential harm to the resistor itself, it is crucial to estimate the temperature of the brake resistor. High temperatures might cause electrical problems or fire risks, endangering the overall safety and dependability of the railway system.
- A reliable temperature estimation system is added to railway control systems to overcome this issue. When the power supply is off, this system continuously measures and estimates the temperature of the brake resistor using a variety of sensors and algorithms. These sensors, which collect information on the brake resistor's operational circumstances and electrical energy dissipation, may be heat sensors, current sensors, or a combination of the two.
- The advanced algorithms used by the temperature estimation system take into account real-time data such the resistor's thermal conductivity, ambient temperature and the rate of energy dissipation. These algorithms are made to precisely forecast temperature increases, issue prompt alerts, or start the necessary countermeasures to reduce the risk of overheating.
- Corrective actions are promptly initiated when the temperature estimate system identifies a probable increase in temperature above predefined criteria. To disperse excess heat, these methods may entail turning on a cooling system, such as a fan or liquid cooling system. In order to stop additional temperature rise, the system may also lower the electrical energy input to the brake resistor or even start emergency braking procedures.
- A dependable safety feature, the brake resistor temperature estimate system ensures the protection of railway systems in the event of control system failures and power outages. By measuring and tracking the brake resistor's temperature, it is possible to reduce the dangers of overheating, averting emergencies and preserving the general functionality and integrity of the railway system.

II. RAILWAY PROPULSION SYSTEM

The electrical traction system in railways plays an Important role in powering and controlling induction motors, which are commonly used for train propulsion. Several key components make up this system, each serving a specific function in supplying power to the motors and ensuring efficient operation.



Below are the main components of a railway electrical traction system for powering induction motors:

<p>Overhead Lines or Third Rail</p> <p>The power supply for the traction system typically comes from overhead lines or a third rail. Overhead lines consist of a network of wires suspended above the tracks, while a third rail is an additional rail installed alongside the running rails at ground level. These power supply methods deliver the necessary electrical energy to the trains to power the induction motors.</p>
<p>Pantograph/Catenary System</p> <p>In the case of an overhead line configuration, the pantograph is the device mounted on top of the train that collects electrical power from the overhead lines. It uses a sliding contact to establish a connection and transmit power to the train's traction system. The catenary system consists of the continuous overhead wires supported by masts or other structures.</p>
<p>Transformer</p> <p>The power received from the overhead lines or third rail is typically at a very high voltage. A transformer is used to step down this high voltage to a lower, more manageable voltage suitable for the train's traction system. It converts the electrical energy from the power supply to a level that can be efficiently utilized by the induction motors.</p>
<p>Rectifier</p> <p>As induction motors require alternating current (AC) to function, the electrical traction system incorporates rectifiers that convert the incoming AC power to direct current (DC). These rectifiers typically utilize diodes to establish a one-way flow of electrical energy, feeding the following components with DC power.</p>
<p>Inverter</p> <p>Induction motors require AC power to operate and the inverter is responsible for converting the DC power from the rectifier back into a controlled AC waveform. Inverters use power electronic devices, such as Insulated Gate Bipolar Transistors (IGBTs), to generate the desired AC frequency and voltage for the induction motors.</p>
<p>Induction Motors</p> <p>The most common type of motor used in railway traction systems is the three-phase squirrel cage induction motor. Induction motors are rugged, reliable and capable of handling the high power demands of traction applications. These motors convert electrical power into mechanical power, propelling the train.</p>
<p>Motor Control Unit</p> <p>The motor control unit manages the operation of the induction motors, regulating their speed, torque and direction. It consists of various control algorithms and sensing devices that monitor motor performance and adjust the power supplied to achieve the desired operation.</p>
<p>Protection and Safety Systems</p> <p>The electrical traction system incorporates a range of protection and safety systems to prevent damage to the components and ensure safe operation. These include overload protection, short-circuit protection, ground fault detection and emergency stop mechanisms.</p>



a. Mathematical Equations for Brake Resistor Temperature Estimation

- ✓ In a railway system, the brake resistor is utilized to release extra electrical energy produced during regenerative braking. Uncontrolled braking might result from a malfunctioning control system, releasing too much energy into the brake resistor. The resistor's temperature may significantly rise as a result of this.
- ✓ To ensure the brake resistor operates safely, temperature estimation is necessary. If the temperature rises over the maximum permitted level, the resistor may overheat and suffer possible damage. Additionally, the overheating of the resistor may cause electrical problems, fire risks, or even brake system failure.
- ✓ It is possible to prevent the brake resistor from overheating by calculating its temperature. These procedures can involve starting a cooling system, lowering the amount of electrical energy used, or applying emergency braking techniques. This helps to maintain the railway system's dependability and safety, particularly when the control system malfunctions.
- ✓ The temperature coefficient of resistance (TCR) for the resistor material can be used to derive the mathematical equation for resistance estimation depending on temperature. The TCR gauges how much resistance changes with each degree of temperature change.

The general equation for resistance estimation from temperature is as follows:

$$R_2 = R_1 * (1 + \alpha * (T_2 - T_1))$$

Where:

R1 is the initial resistance at temperature T1

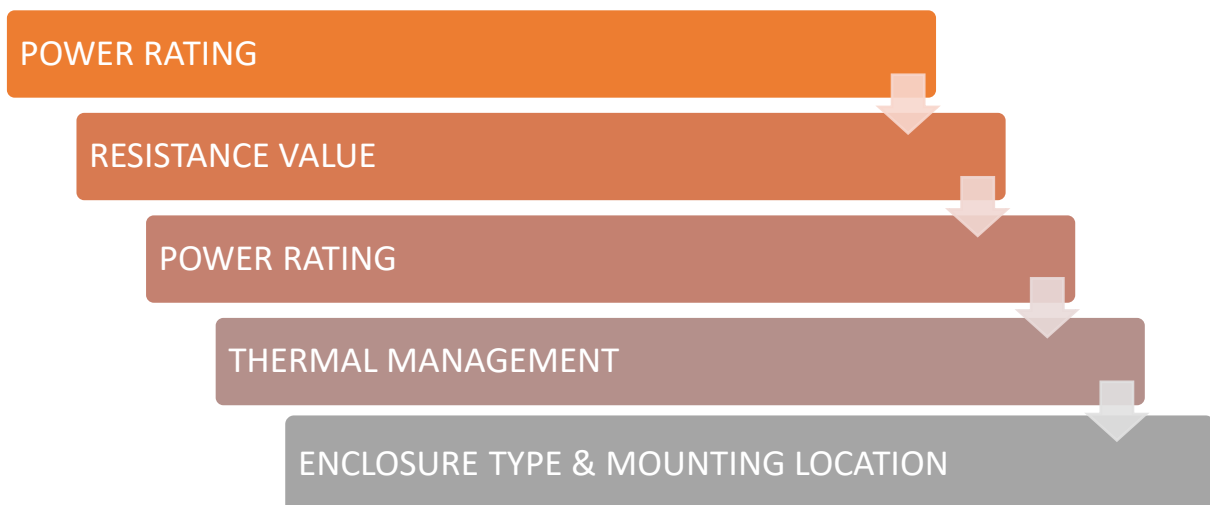
R2 is the estimated resistance at temperature T2

α is the temperature coefficient of resistance for the material of the resistor

- ✓ This equation makes the assumption that temperature and resistance have a linear relationship over a narrow temperature range. Since some materials might have nonlinear connections, it's vital to keep in mind that this equation only delivers an approximate result within the bounds of its applicability.
- ✓ Additionally, the resistor manufacturer normally provides the resistance at the reference temperature (R1) and the temperature coefficient of resistance (α). These figures rely on the particular substance that was utilized to make the resistor.
- ✓ The equation provides an estimate of the resistance (R2) at the desired temperature by taking into account the reference resistance (R1), the related temperature (T1) and the target temperature (T2). The resistor's temperature can then be monitored using this estimation to avoid overheating or damage in a variety of applications, such as in train braking systems.

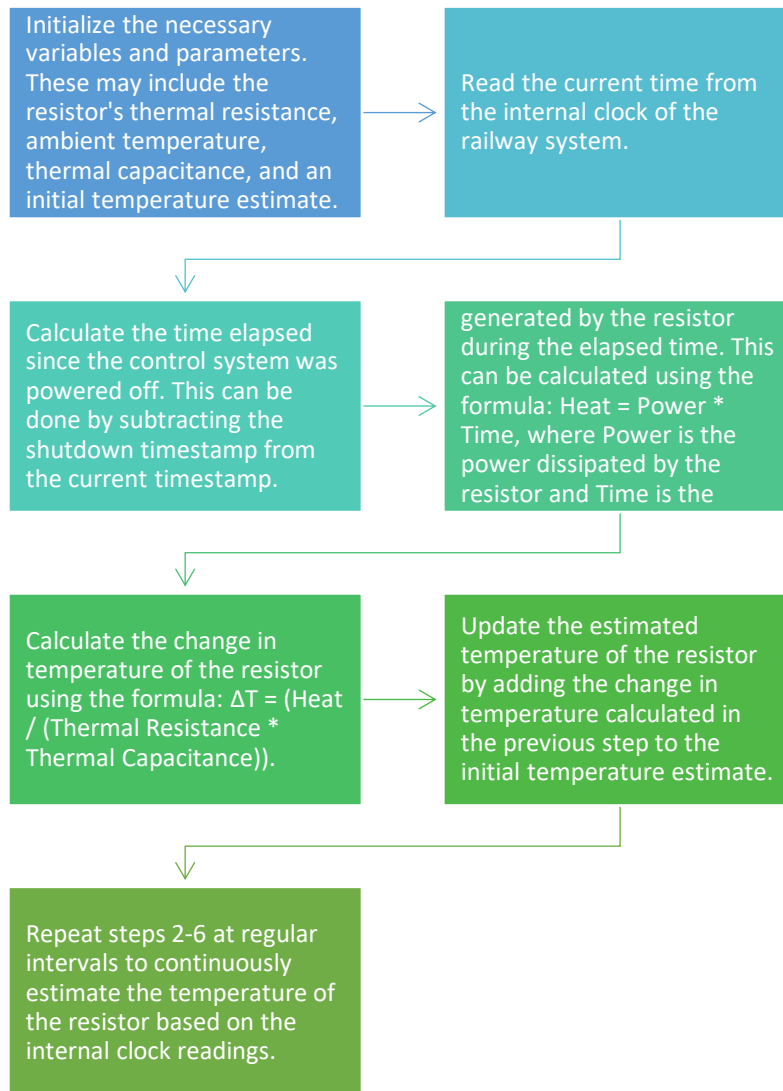
b. Brake resistor Value Selection Criteria

While selecting a brake resistor for efficiently dissipating heat generated during regenerative braking in railways, below factors Can be considered



III. CONTROL ALGORITHM FOR BRAKE RESISTOR TEMPERATURE ESTIMATION

Below general steps we can follow to estimate the temperature of a brake resistor using the internal clock in a railway system when the control system is powered off.



The accuracy of the temperature estimate will depend on the accuracy of the parameters used, such as the thermal resistance and thermal capacitance. Additionally, depending on the specific characteristics of the resistor and the environment, additional factors may need to be considered in the temperature estimation algorithm, such as convection and radiation effects.

a. Software Solution

MATLAB Code for Power Dissipation into Brake Resistor Based on IGBT ON Time

```
R_dc = 3.3; % DC Link Resistance (in Ohms)
V_dc = 1800; % DC Link Voltage (in Volts)
P_dc_excessive = 130; % Excessive Power on DC Link (in Watts)

% Calculate the current on the DC link
I_dc = sqrt(P_dc_excessive / R_dc); % DC Link Current (in Amperes)

% Calculate the power dissipation on the brake resistor
P_brake_resistor = I_dc^2 * R_dc; % Power dissipation on the brake resistor (in Watts)

% Calculate the IGBT ON time for brake resistor
T_IGBT_on = P_brake_resistor / (V_dc * I_dc); % IGBT ON time for brake resistor (in seconds)

% Display the results
```



```
disp(['DC Link Current: ' num2str(I_dc) ' A']);  
disp(['Power Dissipation on the Brake Resistor: ' num2str(P_brake_resistor) ' W']);  
disp(['IGBT ON Time for Brake Resistor: ' num2str(T_IGBT_on) ' s']);
```

Output:

```
DC Link Current: 6.2765 A  
Power Dissipation on the Brake Resistor: 130 W  
IGBT ON Time for Brake Resistor: 0.011507 s
```

MATLAB Code for Brake Resistor Temperature Estimation in case of Powered-Off Controller

```
% Constants  
ambientTemperature = 25; % Ambient temperature in degrees Celsius  
timeStep = 0.1; % Time step in seconds  
offDuration = 20; % Duration of ECU power off in seconds  
powerOnTemperature = 100; % Brake resistor temperature when ECU is powered on in degrees  
Celsius  
initialTemperature = 200; % Temperature before power off in degrees Celsius  
  
% Initialize variables  
time = 0;  
temperature = initialTemperature;  
  
% Power off duration  
while time < offDuration  
    % Calculate temperature change during power off  
    temperatureChange = (ambientTemperature - temperature) / 10;  
  
    % Update temperature  
    temperature = temperature + temperatureChange*timeStep;  
  
    % Update time  
    time = time + timeStep;  
end  
  
% Power on duration  
time = 0;  
  
while time < 5  
    % Calculate temperature change during power on  
    temperatureChange = (powerOnTemperature - temperature) / 5;  
  
    % Update temperature  
    temperature = temperature + temperatureChange*timeStep;  
  
    % Update time  
    time = time + timeStep;  
end  
  
% Output the estimated brake resistor temperature  
disp(['Estimated brake resistor temperature after power on: ', num2str(temperature), ' degrees  
Celsius']);
```

Output:

```
Estimated brake resistor temperature after power on: 73.3837 degrees Celsius
```

Above code consider constant power dissipation by the brake resistor and ignores convection and radiation effects.



IV. CONCLUSION

- ✓ In conclusion, this study has looked at the value of estimating brake resistor temperature in applications, with a focus on how it relates to railway systems. It is possible to apply the same principle to different electric vehicles. When the control system fails or the power supply is cut off, the temperature estimation approach outlined in this work offers a vital tool for guaranteeing the safe and dependable operation of brake resistors.
- ✓ The likelihood of an overheated brake resistor can be reduced by precisely measuring its temperature. Overheating can result in electrical problems, fire risks, resistor degradation and even braking system failure. The safety and integrity of railway systems must therefore be maintained through constant assessment of the brake resistor temperature.
- ✓ The suggested approach for estimating temperature takes into account variables including thermal capacitance, thermal resistance, ambient temperature and the resistor's thermal conductivity. Through the use of sensors and algorithms, these factors are recorded, allowing for the real-time assessment of temperature rise and prompt alerts or the beginning of required actions.
- ✓ The use of a trustworthy temperature estimation technique has various advantages. When necessary, it permits the activation of cooling systems, including fans and liquid cooling methods. It also enables the brake resistor's electrical energy input to be reduced or, if necessary, emergency braking actions to be initiated.
- ✓ Estimating the temperature of the brake resistor has significance outside of the rail systems. It can be used in many different fields and situations where the release of extra electrical energy while braking is necessary. The risk of accidents or system failures can be reduced, equipment damage can be avoided, operational reliability is ensured and safety issues can be addressed by monitoring and predicting the temperature.
- ✓ The technique for estimating brake resistor temperature described in this research study advances techniques and technologies for assuring the secure and effective operation of braking systems. The overall performance, dependability and safety of numerous systems in the railway and other industries are improved as a result, which emphasizes the significance of ongoing monitoring and preventative steps to avoid overheating.
- ✓ Further research and development in this area will continue to refine and optimize temperature estimation methods, contributing to even more effective solutions in the future.

V. REFERENCES

1. S. Xiaoxia, W. Yichun, Meng Lingke, Wang Facheng and Xiang Longyun, "Research on braking resistor of hybrid electric armored vehicle," 2010 International Conference on Information, Networking and Automation (ICINA), Kunming, China, 2010, pp. V2-206-V2-210, doi: 10.1109/ICINA.2010.5636747.
2. Lalit G. Patil, COMPARATIVE STUDY AND ANALYSIS OF SPEED CONTROL OF THREE PHASE INDUCTION MOTOR USING CONVENTIONAL METHOD AND MACHINE LEARNING, Vol. 2 Issue. 4 (April-2017) EPRA International Journal of Research & Development (IJRD)
3. Dae-Dong LEE1 , Jae-Myung SHIM2 , Dong-Seok HYUN1, Temperature Characteristics Analysis of Braking Resistor for High Speed Train, Studies in Informatics and Control, Vol. 22, No. 1, March 2013



ROLE OF WELLNESS SECTOR IN UTTARAKHAND; OPPORTUNITIES AND CHALLENGES

Dr. Asha Kumari*¹, Dr. Chanchal², Dr. O.P Singh³

¹PG Scholar 3rd Year, Department of Kayachikitsa, Rishikul Campus, Haridwar.

²PG Scholar 3rd Year Department of Kayachikitsa, Rishikul Campus, Haridwar.

³Professor and Head, PG Department of Kayachikitsa, Rishikul Campus, Haridwar.

ABSTRACT

The wellness economy is made up of industries that enable consumers to adopt healthy habits into their day to day lives. From exercise and training to food, nutrition, and aesthetics, wellness spans a wide range of activities and goods.

The healthcare industry (also called the medical industry or health economy) is an aggregation and integration of sectors within the economic system that provides goods and services to treat patients with curative, preventive, rehabilitative, and palliative care.

The scope of wellness is directed towards a positive and affirming life. Wellness takes into account multiple components, which involves lifestyle, spiritual well-being, mental well-being and the environment.

Ayurveda has a growing influence on holistic wellness and medical tourism. The global ayurvedic market has been growing at an average annual rate of 16.2 % since 2015, reflecting the rising demand for alternative medicine and wellness experiences.

KEYWORDS: Well-Being, Mental, Spiritual, Activities, Wellness, Intellectual, Financial, Environment

WELLNESS IN AYURVEDA

It translates literally as “**the science of life**” Ayur – life, Veda – knowledge.

Ayurvedic wellness **focuses on the delicate balance between mind, body and spirit**. Our ability to maintain this balance is **the key to Good Health**.

A healthy life necessitates a perfect complementary support of all these factors and thus the concept of health encompasses **Physical, Mental, Sensory and Spiritual** domains.

Wellness is the act of practicing healthy habits on a daily basis to better physical and mental health outcomes, to understand the significance of wellness, it's important to understand how it's linked to health. Taking care to eat right, engage in regular physical activity, and get enough sleep are important aspects of self-care. Maintaining a healthy diet can help reduce symptoms of depression and fatigue, improving a person's overall mood.

CONCEPT OF WELLNESS IN AYURVEDA

Ayurveda says the health and wellness of an individual is the sum of their physical and mental activities. If focuses on how an individual's physical and mental perception reacts to their body. the principal objectives of Ayurveda include maintenance and promotion of health, prevention of disease and cure of sickness.

Overall physical wellness encourages the balance of physical activity, nutrition and mental well-being to keep your body in top condition. Obtaining an optimal level of physical wellness allows you to nature personal responsibility for own health.

CLASSIFICATION OF WELLNESS

समदोषः समअग्निश्च समधातुमलक्रियः |

प्रसन्नात्मेन्द्रियमनाः स्वथ्य इत्यभिधीयते || (SU. S. 15/48)

Wellness encompasses 8 mutually interdependent dimensions of wellness in our lives builds a holistic sense of wellness and fulfillment.

Physical, Emotional, Social, Spiritual, Intellectual, Financial, Environment and Vocational (occupational).



- **Physical wellness** encompasses a variety of healthy behaviors including adequate exercise, proper nutrition and abstaining from harmful habits such as drug use and alcohol abuse, as well as preventing illness and injury or managing chronic health conditions.
- **Emotional wellness** is the ability to successfully handle life's stresses and adapt to change and difficult times. Emotional health refers to how well people are able to accept and manage their emotions and cope with challenges throughout life.
- **Social wellness** refers to the relationships we have and how we interact with others. Our relationships can offer support during difficult times. Social wellness involves building healthy, nurturing, and supportive relationships as well as fostering a genuine connection with those around you.
- **Spiritual wellness** means having personal value and beliefs and acting compassionately in accordance with those values.
- **Intellectual wellness** recognizes creative abilities and encourages us to find ways to expand their knowledge and skills to help them grow their potential. Intellectual wellness can be developed through personal and professional development, community involvement and personal hobbies. Cultural wellness includes accepting, valuing, and even celebrating the different cultural ways people interact in the world.
- **Financial wellness** is a state of financial well-being in which you can manage your bills and expenses, pay your debts, weather unexpected financial emergencies and plan for long-term financial goals such as building college funds and saving for retirement.
- **Environmental wellness** is having good health by occupying pleasant, stimulating environments that support well-being. It promotes interaction with nature and also creating an enjoyable personal environment (both in and out of your workspace). This involves establishing a sustainable lifestyle, protecting natural resources, and eliminating pollutants and excessive waste.
- **Occupational wellness** is the ability to achieve a balance between work and leisure in a way that promotes health, a sense of personal satisfaction and is financially rewarding. Allows you to explore various career options and encourages you to pursue the opportunities you enjoy the most.
- **Economy wellness** means people have their most basic survival needs met and have sustainable income and assets so they can prosper. (examples of economic wellbeing)- present financial security includes the ability of individuals, families, and communities to consistently meet their basic needs (including food, housing, health care, transportation, education, child care, clothing, and paid taxes).

WELLNESS AND AYUSH SECTOR IN UTTARAKHAND

- Wellness sector includes segments such as public health, prevention & personalized medicine, nutrition, fitness, therapies, personal care & beauty, and medical tourism, among others. Of these, rejuvenation services such as spas, alternative therapies, (Ayurveda treatments, homeopathy, Unani etc.) and beauty services are expected to grow at around 30%, while the fitness sector (includes yoga center, gyms and slimming center) is expected to grow by more than 25%.
- The wellness business is projected to grow at a CAGR 30-35% over the next 5 year with the business of leisure (such as sports hall, swimming pool and different facilities) growing in popularity.
- Uttarakhand tourism sector, according to some estimates to be worth 51% to the total gross state domestic product from 2004-05 to 2013-14. Is projected to grow to USD 7-8 bn by 2020.

MEDICINAL & AROMATICS SCENARIO IN UTTARAKHAND

- Uttarakhand is blessed with a variety of soils and agro-climatic conditions, ranging from sub-tropical to alpine which is a mega biodiversity hotspot for wide range of wild and cultivated medicinal & aromatic species.
- Uttarakhand being a Himalayan state enjoys a proven advantage and monopoly over the availability of some valuable medicinal & aromatic plant in the state.
- More than 200 unique plant with medicinal properties are found in state. It has 3.66 lac cultivable waste land which can be utilized for cultivation of aromatic crops.
- More than 600 tone of pure and natural essential oil suitable for aroma therapy, spa, flavor & fragrance and cosmetic industry is being produced by 18000 trained farmers.
- Uttarakhand is the only state which promotes aromatic crops in organized manner with the result of 109 clusters covering an area of more than 7600 ha under aromatic crops.

AROMATIC SECTOR

- Sourcing of authentic & 100% pure natural essential oil from Himalayas.
- Promotion of aroma tourism; detoxification & relaxation of body.

MEDICINAL PLANTS SECTOR

- Sourcing of quality and naturally grown raw herbs



- Ample scope of value addition, processing & herbal product development from Himalayan medicinal plants. Development of hi-tech nursery, production of quality planting material of rare and endangered species.

SOME OF THE KEY CREDENTIALS OF STATE IN THIS SECTOR

- Pilgrimage has traditionally been a major sector of tourism in Uttarakhand, like Haridwar, Rishikesh, Kedarnath, Badrinath, Gangotri, Yamnotri etc.
- There are many yoga centers and ashrams of world fame in the state, like yoga gram Patanjali Haridwar, gurukul kangi Vishwavidyalaya Haridwar, dev Sanskrit university shanti Kunj Haridwar, yoga study Centre Rishikesh, par Marth Niketan Rishikesh, Yoga Niketan Rishikesh etc. the state is focusing on developing few more centers at other tourism places in order to attract tourism from international and domestic markets.
- There are wide range of herbal drug produced in hilly area.
- There are many tourist places in state, which in turn generate scope for the development of enormous resources for cultural, adventure, wildlife, nature(hill stations), leisure, many new places have also been emerged as popular tourist places, employment generation and income for the local youths in the state.
- Under the national AYUSH mission, a government homeopathic medical college and a 50 bed Unani hospital will be established in the state.
- Financial assistance will be provided for setting up 100 AYUSH wellness centers in the state.
- With the help of the national medical plants, board, herbal gardens will be established in 200 schools of the state and thirteen nurseries in thirteen districts.
- An assistance of Rs 15 lakh will be given to each forest panchayat for the establishment of medical plants etc.
- Apart from this, arrangements for Marma therapy would be made in Uttarakhand Ayurveda University and it would become a major center of the country. Uttarakhand is being given assistance by the government of India for the development of the AYUSH sector.
- The mountainous state of Uttarakhand is endowed with a rich variety of medicinal plants, many of which are in great demand in the domestic and export markets (government of India 200).
- A large proportion of this demand is met by collection from the wild. This is particularly true for plant found in high altitude areas, which are generally characterized by fragile ecosystems. As a result of intensive extraction many species of medicinal plants are now seriously depleted.
- The cultivation of medicinal plant is considered to be of great importance for the safeguarding of biodiversity and contribution to rural livelihood in Uttarakhand.
- It is hoped that cultivated medicinal plant material will provide an alternative source of supply to the market, thereby reduce the need for collection of these plants from the wild. Cultivation will also provide an additional source of income for the state's rural poor.
- This is especially important as 80% of Uttarakhand's working population depends on agriculture, but poor land quality and the small size of landholding lead to low rural income.
- Uttarakhand is a hub of Ayurveda medicines and products, with yoga guru Ramdev ji promoted Patanjali Ayurveda Ltd.'s headquarters and manufacturing units present in Haridwar.
- Availability of good infrastructure for Ayurvedic treatment and education in state.
- The state houses 549 Ayurvedic and Unani clinics, two Governments Medical Ayurvedic college Rishikul and Gurukul kangi in Haridwar.
- Also 206 allopathic hospital are established in the AYUSH Wing, out of which 26 AYUSH Wing are from the district hospitals.
- 272 pharmacies have already obtained GMP (Good Manufacturing Practices) certificates with efforts being made to get GMP certificates for the remaining pharmacies.
- the state government's Uttarakhand Ayurveda university ensures effective and systematic instructions, teaching, training research and development in Ayurveda, yoga & naturopathy, Unani, siddha and homeopathy facilitated through the University.

Uttarakhand Has Developed vast Infrastructure for AYUSH

- 272 Ayurvedic and Unani pharmacies
- 549 state Ayurvedic and Unani clinics
- 3638 registered practitioners
- 2463 Ayurvedic pharmacists
- 983 panchakarma therapist & Nurses
- 206 AYUSH Wing established in the allopathic hospital
- 183 AYUSH Wing being operated in (29 CHC & 154 PHC) under National Rural Health Mission



- 90 MOCH at PHC Medical Officer Community Health
- 10 Ayurvedic centers available for development & operation on PPP mode

INVESTMENTS OPPORTUNITIES ACROSS UTTARAKHAND

Key investible projects / activities across wellness & AYUSH sector for private investment are identified and categorized as below; (these include projects to be implemented via PPP mode)

AYUSH Project

- Development of AYUSH Township
- Development of Spiritual Economic Zone (SEZ)
- Development of operation of global wellness city
- Development of center for wellness and AYUSH treatment (AYUSH Gram)
- Development of State-Of-Art Yoga and Meditation centers (Yog Gram)
- Development of AYUSH, Panchakarma, Treatment & Yoga in existing Homestays

Healthcare Projects

- Upgradation, development and operation AYUSH 50 bedded hospital
- Upgradation and transformation of existing hospital into multi-specialty disease based Ayush wellness centers.

Aroma Projects

- Aroma Tourism
- Value addition and fractionation of Japanese mint essential oil

Natural Fibre Projects

- Silk Garment Manufacturing Unit

Tourism Projects

- Upgradation, Operation and Maintenance of Eco huts, koti
- Upgradation, Operation and Maintenance of floating huts and Eco Lodges, Sarai
- Wellness City, Rishikesh
- Development of wellness Resort at Marchula
- World Class Exclusive Luxury Destination Mountain Forest Resort in Mussoorie
- Development of Hill Resort at Ganjana, Tehri
- Development of Lake Side Resort at Goran, Tehri
- Tent city, Tehri
- Development of wellness resort at Madan Negi

CHALLENGES IN WELLNESS SECTORS

- The healthcare system is faced with several challenges, including increased healthcare costs, need for nursing and long-term care for senior's citizens due to the rise of the nuclear family system, high financial burden on the poor, increasing burden of new diseases, and negligence of public health.
- Uttarakhand also witnesses landslides, flash-flooding and forest fires almost every year. Rain shadow areas are prone to droughts.
- Challenges facing tourism include taxations, travel promotions, safety, infrastructure, and cross border set of laws among others. The majority of tourism destinations are not ready for visitors. Facility in the destination. Traffic control, accommodation and other basic amenities and need to properly address. Tourism or travelers might at time implicate travel marketing as overstated.
- The health system in Uttarakhand is ailing and the worst affected are villagers living in the hills. Accessibility to quality health care, beside shortage of doctors and paramedical staff are the main problems the rural people confront in the state.

CONCLUSION

Participation in wellness courses that incorporate a mind-body-spirit approach to health improves multiple domains of psychosocial well-being, which persist even after course participation. The wellness industry in India is rapidly growing, with increasing demand for natural and holistic health products and services. This presents many opportunities for business in the wellness sector to capitalize on this trend and grow their business.



SJIF Impact Factor (2023): 8.574 | ISI I.F. Value: 1.241 | Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)

EPRA International Journal of Research and Development (IJRD)

Volume: 8 | Issue: 12 | December 2023

- Peer Reviewed Journal

REFERENCE

1. *Wellness and Ayush sector in India* (<https://investuttarakhand.uk.gov.in>)
2. *Wellness & Ayush brochure's Uttarakhand*
3. *www.google.in*



UDC 639.3

GROWING AFRICAN IN RESERVOIRS

Atanazarov Kural Maulenovich

Candidate of Biological Sciences, Associate Professor, Samarkand State University of Veterinary Medicine, Animal Husbandry and Biotechnology, Nukus branch, Republic of Uzbekistan

ANNOTATION

The article discusses the features of growing African catfish in reservoirs. African catfish (Clarias) is a family of fish belonging to the Clariidae family. They live in inland waters throughout much of the world and are one of the most common fish species.

KEY WORDS: cage, pond, lake, aquarium, oxygen, mineralization.

African catfish (Clarias) is a family of fish belonging to the Clariida family and its name comes from the Greek word “claros”, which means “living”. They are found in inland waters throughout much of the Old World and are one of the most common fish species.

African catfish is a fish belonging to the catfish family. Bony fish are more difficult to systematize; this category includes 2 families: carp and catfish. Catfish lives in European lakes and rivers, in the waters of Asia Minor, and in the Caspian Sea basin. Distributed in Central Asia from the Atrak River to the Chu River. Also widespread in the rivers of Uzbekistan [1]. Compared to artificially propagated catfish, catfish living in rivers and lakes are much larger; their body length reaches up to 3 m (wild ones - up to 5 m). The meat is tasty and tender, without bones.

African catfish are known to have long dorsal and anal bones. This made him look more like a snake than a fish. These fish have a slender body, a bony head and a wide thermal mouth with four jaws.

It may increase over the course of the year. Fish live from 60 to 80 years. This fish species feeds on barley, wheat, small fish, bran, sorghum, mung beans, beans, sorghum, and more than 500 other protein-rich foods.

It grows and reproduces quickly, in one season the weight of the first fish can reach 5 kilograms; about 7 tons of fish are caught per year. More precisely, it breathes through a special organ on the gill, and within 14-47 hours, the minimum weight of the fish is one kilogram. From one cubic meter of water, you can get up to 300 kilograms of African catfish. African catfish develop rapidly during the summer months. African catfish is a predatory fish that matures at the age of 3–4 years. Spawning occurs in May or June. The optimal water temperature for growth is 26.5-29°C; good growth occurs at a water temperature of 21-35°C. If it is above 35°C and below 21°C, feeding stops and growth slows down, but 18°C is required for reproduction. The more protein in the fish diet, the faster they grow and gain weight [2, 4].

Several species of African catfish are common in countries such as Indonesia, USA, Hong Kong, China, UK, Papua New Guinea, Guam and Taiwan. Fishing is well developed in our country, mainly in Yangiyol, Nukus, Jizzakh, Syrdarya, Tortkol and other places [3].

African catfish meat is of high quality, good taste, and is also suitable for technological processing. Therefore, this type of fish is in great demand. African catfish is grown commercially and is useful for fishing in large natural reservoirs. It can be grown as a polyculture in pond fish farms. In most countries, ponds are intensively fed in canals, sewers and ditches. Catfish farming is widely developed in the United States, including in European countries; in these countries, catfish farming has been carried out since 1964.

African catfish is a heat-loving freshwater fish. Predatory fish become adults in the 3rd and 4th years of life. Spawning occurs in May and June. Spawning occurs at a water temperature of 25-30°C. African catfish live in water with a salinity of 9-10%. Catfish are kept in small ponds (0.3, 0.5, 1.0 ha) and in pens. One-year-old fish are stocked at the rate of 300/m³ per cubic meter of water. African catfish are fed with high-quality feed. The amount of protein in the feed should be 40%.



They feed 5-6 times a day. The daily norm is 20-25% of body weight. Feed ratio 4-6. With this method of transplanting and feeding the fingerlings, the oxygen content in the water is at least 6.5 mg/l, and up to 80 kg of ichthyomas are formed from 1 m² of water (cage). The feeding coefficient of fingerlings is 2.5-3; the weight of 2-year-old African catfish is 300 - 400 g. But the weight of some fish reaches 1.0-2.0 kg. Under favorable conditions, the weight of adult breeds reaches 40 kg. If it is fed in natural conditions, it is mainly fed with fish, as well as other animal products. But for African catfish, a special, full-fledged granulated compound corn has been developed. If the African catfish is fed intensively, it must be fed this type of food.

African catfish are mainly kept in ponds, cages and aquariums. From them it is selected and reproduces naturally. For breeding African catfish in natural pond conditions, a 1:1 sex ratio scheme was chosen. 80-100 pieces are harvested per hectare. To do this, select a ratio of 40x40 or 50x50. That is, 1 male, 1 female with

After spawning, the eggs are removed from the nests, and then the parent fish are separated from the offspring and released into spawning grounds. After 2-3 weeks, the nests can be collected. With the donor method, spawning nests are placed in the nests and nesting is carried out under the supervision of a specialist. The most advanced method - after pituitary injection, the female and male are then released into the aquarium

The volume of the aquarium is 200 liters, where the female African catfish lays eggs in the shape of a grape ear. African catfish eggs are sticky and light yellow in color. Depending on the availability of land and the possibility of water supply in farms and land plots, African catfish can be grown in several ways. For example: closed water supply system, concrete pools, polyethylene pools, earthen pools, etc.

In subsequent years, as in a number of industries, attention was paid to fishing in our country. After all, fish meat, rich in healthy proteins and nutritious, plays an important role in ensuring food security and serving the population. Due to the fact that a large number of fish farms are being created, citizens are beginning to grow fish at home using their internal capabilities, and through the rational use of intensive technologies in fish farming, its cultivation is increasing.

LITERATURE

1. *Gusenov S.G., Niyazov D.S., Sayfullaev Sh.M. Fishing Basics. Bukhara 2010.*
2. *Khakberdiev P.S., Davlatov R.B. Feeding the fish treatment and prevention of diseases. - Samarkand, 2012.*
3. *Atanazarov K.M., Sultanov B.A. /Ichthyological studies of fishery reservoirs of the lower reaches of the Amu Darya. Academica International Interdisciplinary Research Journal Volume 10. October 2020. pp. 481-486.*
4. *Zakhidov T.E. Encyclopedia of Zoology (fishes and benthic chordates). - Uzbekistan, publishing house "Fan", 1979.*



UDC 556.531(571.62)

STUDYING THE HYDROCHEMICAL REGIME OF SURFACE WATER IN THE Aral Sea BASIN

Khozhamuratova Roza Tajimuratovna¹, Reimova Gulzhamal Batyrbaevna², Jangabaev Daniyar Mansurovich³

¹Karakalpak State University Named after. Berdakh, Nukus, Karakalpakstan,

²Research Institute of Irrigation and Water Problems, Tashkent, Uzbekistan

³Research Institute of Irrigation and Water Problems, Tashkent, Uzbekistan

ABSTRACT

The article discusses the problems of studying the assessment of hydroecological monitoring of the hydro chemical regime of surface waters in the Aral Sea basin. Practical and scientific recommendations for solving these problems are proposed.

KEY WORDS: *Aral Sea basin, hydro chemical regime, hydro ecological monitoring, anthropogenic factors.*

Purpose and objectives of research. The purpose of this research is to conduct hydroecological monitoring of irrigation waters and provide scientific and practical proposals for their use. In accordance with the stated goal, the following tasks are considered in the work: a) study of the hydrochemical regime of surface waters in the Aral Sea basin and the current state of their quality; b) hydrochemical problems that need to be solved; c) ways to solve these problems.

Initial data. The work used the database of the Research Institute of Irrigation and Water Problems at TIIMSH, where a lot of time was devoted to studying changes in the water and hydrochemical regime of river and collector-drainage waters of the Aral Sea basin [1-3]. These studies were carried out by employees of the laboratory of hydrometry and metrology based on the complex basin method.

Main part. Many researchers have repeatedly studied the state of studying the hydrochemical regime of surface waters in the Aral Sea basin and their quality. Until 1970, basic information on the hydrochemistry of river waters in the Aral Sea basin was published in the series of Hydrochemical Yearbooks. Since 1938, they regularly contain information on the chemical composition of these waters (earlier data are fragmentary). Since 1975, due to an increase in the number of chemical elements determined (at selected posts), these data began to be published in Hydrochemical Bulletins. Unfortunately, more or less established mechanisms for exchanging them and other hydrological information ceased after the collapse of the Soviet Union and the establishment of new governments in Central Asia (some exchange continued to be carried out only between specialists). Since then, it has become very difficult to provide an objective assessment of the quality of surface waters in this region, even for different river basins. In this regard, it has become very important to objectively evaluate all hydrochemical information taking into account existing standard methods (Fig. 1).

Components of the Hydroecological Monitoring System of the Aral Sea Basin

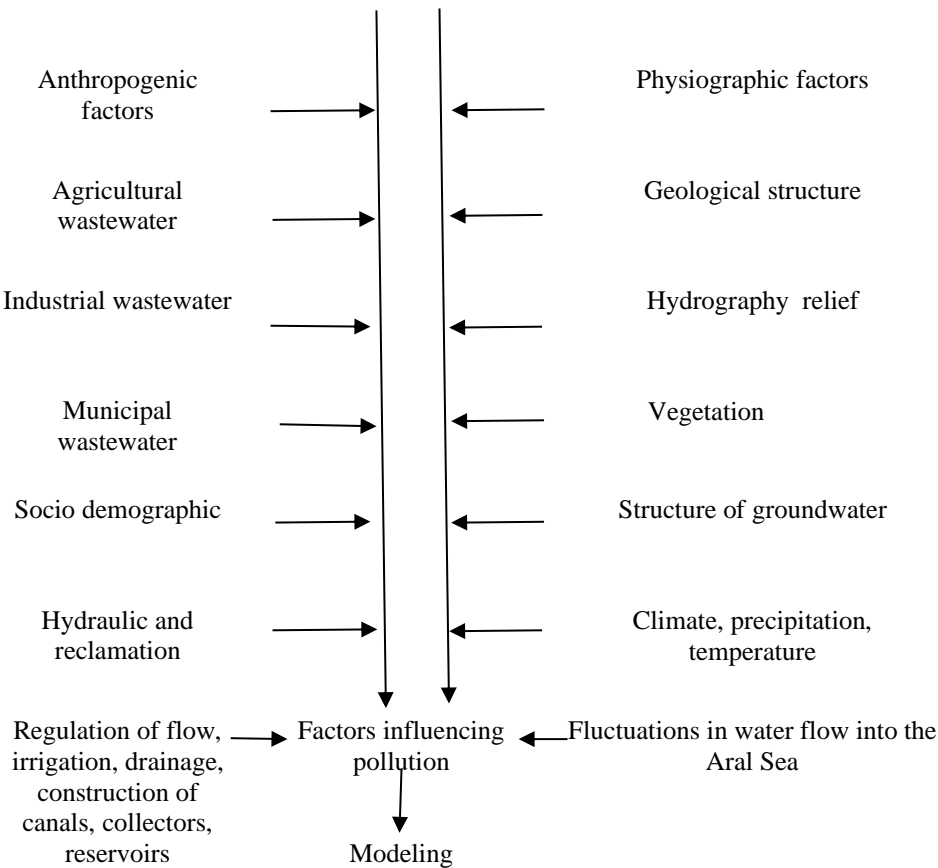


Fig. 1. Main components of the hydroecological monitoring system Aral Sea Basin (ASBMS)

Research into the hydrochemistry of surface waters in the Aral Sea basin continues to decline, especially in Kyrgyzstan, Tajikistan and Turkmenistan and parts of Kazakhstan and Uzbekistan.

According to experimental estimates, the annual volume of water resources in the Aral Sea basin (the salinity of the Aral Sea water was from 9-10 g/l to 115-120 g/l for 1960-2017) is approximately 120 km³. The annual volume of modern runoff of collector-drainage waters, which clearly worsens the hydroecology of the territory, is 33-35 km³, which is 30% of all renewable water resources in the basin. In the Amu Darya basin, which includes the zones of the Karakum Canal along with the Murgab and Tedzhen irrigation districts, the volume of collector waters is 21-22 km³ with an average mineralization of 1.8 to 14.2 g/l. In the Syrdarya basin they include 13-14 km³, with average mineralization from 1.7 to 6.0 g/l. River waters and, especially, collector-drainage waters of the region are heavily polluted.

Analysis of data from hydrochemical bulletins in recent years with the results of our own measurements showed that the waters contain pesticides, heavy metals (cadmium, strontium and others), petroleum products, phenols and other toxic elements. A very alarming hydrochemical situation is developing near the Aral Sea and in the southern Aral region.

Practical solutions to the noted problems require work in the following main areas:

- Development of a scientific research base on all aspects of water quality and water resource protection;
- Adoption of laws and administrative documents on water protection and improvement of their quality;
- Implementation of various engineering, technological and other measures to address the listed problems.

The main conditions for successful implementation of recommendations for hydrochemical studies are as follows:

- Strict implementation of the law “On Water and Water Use”, which was adopted in Uzbekistan and the adoption of similar laws by other governments in the region;



- Creation of a comprehensive monitoring network with timely reporting of changes in water quality and assessment and adoption of measures to eliminate negative processes;
- Creation of water protection zones along the banks and buffer strips for ease of water management for the purposes of protection against river water pollution and land degradation.

Conclusion _ one of the dangers for the irrigated zone of Central Asia is the process of salinization of irrigated lands. According to calculations, 50-55 million tons of various salts are supplied to irrigated fields annually.

Theoretical and practical research on hydrology and hydrochemistry of the Aral Sea basin should be conducted jointly with specialists from other countries. In this regard, it is useful to draw on experience gained in other regions, such as the results of agreements between the United States and Mexico, according to which the United States undertakes not to degrade the water quality of the Colorado and Rio Grande rivers before they enter Mexico.

LITERATURE

1. Chembarisov E.I., Khozhamuratova R.T. *Collector-drainage waters of the Republic of Karakalpakstan* / - Nukus, " Bilim ", 2008. - 56 p.
2. Chembarisov E.I., Khozhamuratova R.T. *Hydrological ecology of Uzbekistan and its tasks* // *Bulletin of KSU named after. Berdaha* . - Nukus, No. 3 - 4, 2010. -S. 27-29.
3. Chembarisov E.I., Lesnik T., Nasrulin A., Khozhamuratova R.T. *Genesis, formation and regime of surface waters in Uzbekistan and their impact on salinization and pollution of agricultural landscapes (on the example of the Amu Darya river basin)* / - Nukus "Karakalpakstan", 2016.-208p.
4. *Report. FA-F5-T126. Genesis, formation and regime of surface waters in Uzbekistan and their impact on pollution and salinization of agricultural landscapes*//-Tashkent, -2012.-91 p.



UDC 633.88

BIOLOGICAL FEATURES OF AMORPHA FRUTICOSA**Kosbaulieva Bayan Zharylkasynovna***Assistant, Department of General Biology and Physiology, Karakalpak State University named after. Berdakha
Republic of Karakalpakstan***ANNOTATION**

*The article discusses the peculiarities of the biology of *Amorpha fruticosa*. The biological characteristics of *Amorpha* shrub-howls have special functions that help them adapt to different conditions in their habitat and withstand climate change. The plants are not only highly decorative, but have medicinal value and are an excellent honey plant.*

KEY WORDS: *function, climate, soil, flowers, honey plant, landscape design, decorativeness.*

The biological features of the genus *Amorpha* have amazing functions that help them adapt to different living conditions in the surrounding habitat and also provide climate control. The wide distribution of the genus *Amorpha* is observed throughout Central and Eastern Europe, East Asia and North America. The most famous representative of this category is *Amorpha fruticosa* or *Amorpha* shrub.

Amorpha fruticosa is a deciduous shrub, a species of the genus *Amorpha* of the Legume family (Fabaceae). *Amorpha* shrub is a representative of the Legume family native to the eastern and central regions of North America with a mild climate and dry soils. Of the 15 species of the genus, the most winter-hardy is *Amorpha* shrub, which can survive in winter under snow cover and is therefore of interest for urban landscaping. *Amorpha* shrubs are found in nature along the edges of forests, in open places, very close to water.

Amorpha shrub is a deciduous shrub up to 1.5-2(3-6) m high with a spreading crown of twig-like shoots covered with alternate pinnate leaves up to 30 cm long. The leaves forming the leaf are dark green or, according to other sources, bright green, ellipsoid in quantities from 11 to 25 pcs. with ciliated edge.

The plant is attractive with pinkish-blue vertically standing apical racemes-inflorescences up to 15 cm long, formed by small (up to 5 mm) fragrant flowers with bright yellow stamens. There are up to 150 flowers in one dense inflorescence.

Amorpha blooms within a month. During the flowering period, the shrub is especially decorative. Flowers develop on the branches of the current year. The fruit is a single-seeded curved bean, gray or brown, indehiscent, ripens in September, but only in warm weather, stays on the bushes until spring. The fruits contain essential oils that have antiseptic properties.

The weight of 1000 seeds in pods is about 10 g. They germinate at +20...+30 °C, so they are sown in late spring after scarification, scalding with boiling water and subsequent daily soaking in water, or treatment with concentrated sulfuric acid for 5-8 minutes . or cold stratification for 2 months.

Amorpha shrub forms a powerful, deep root system, produces abundant root shoots, and can be easily propagated with green cuttings. This is used for vegetative propagation.

The plant thrives on any type of soil, even rocky and sandy. But if it is planted for the purpose of decorating the site, then it is better to choose light sandstones, loams with liming in case of high acidity. The soil should be drained, fresh and loose.

Amorpha shrub is very light-loving and tolerates light shade. In urban environmental conditions, *amorpha* is stable, tolerates drought, heat, dust, gas pollution, soil salinity, and tolerates flooding well. It does not tolerate, like all legumes, heavy clay soils. Optimal soil acidity pH 6.0-7.5.



Amorpha shrub is widely used in steppe afforestation and urban landscaping. Well fixes sandy slopes, soils and slopes, rocky gardens, effectively prevents soil washout. Protects soils from erosion.

Amorpha shrub is widely used in landscape design due to its unique appearance and diverse application possibilities. One of the ways to use amorpha shrubs in landscape design is to create a hedge or fence. Thanks to its dense growth and dense foliage, the amorpha shrub perfectly serves as a natural fence. It also uses amorpha in alpine gardens and rocky gardens. Thanks to its shape and texture, this shrub brings ornamentation and originality to the composition, emphasizing the beauty of stones and other elements of this type of landscape. Combining amorphous shrubs with other plant species and decorative elements allows you to create unique compositions.

Amorpha shrub tolerates shearing well, recommended for hedges, mixborders, groups, requires sanitary pruning, annual growth of more than 1.5 m. Caring for amorpha is not difficult. Listed below are the main agrotechnical measures for caring for shrubs.

□ The crop does not need manual watering, especially in cases where it already grows near water. Only recently planted bushes or those suffering from a long and severe drought are irrigated.

□ If growth occurs on rich soil, there is no need to fertilize the amorpha. However, in soil poor in nutrients, it is necessary to apply dry mineral fertilizer once every 5 years when digging the ground under the bush.

□ In spring, deformed, dry and frozen shoots are cut off, which is quite enough. If the plant begins to wither and slow down in growth, it is cut off to a stump, rejuvenating it.

□ In winter, the roots of the amorpha are densely mulched with organic materials, and the branches are bent to the ground and covered with spruce branches.

Amorpha shrub is not only highly decorative, but also very useful. Its seeds contain many essential oils, microelements, vitamins, and acids necessary for humans. They also contain amorphine, a sedative and neurotropic substance. On its basis, some sedatives are created in pharmacology. In folk medicine, amorpha seeds are also actively used - soothing infusions and decoctions are prepared from them.

In addition to its medical purposes, amorpha shrub is also an excellent honey plant. When it blooms, the bees are only interested in it, paying almost no attention to other crops. The daily bee harvest for one hive is 1.8 kg. In this case, the honey will first have a slight red tint and then become transparent.

Thus, amorpha shrub is light-loving, resistant to drought, heat, dust, gas pollution, soil salinity, and tolerates flooding well. The plants are not only highly decorative, but also have medicinal value and are an excellent honey plant.

LITERATURE

1. *Amorpha shrub* // <https://www.fatra.su/>
2. Bazhenov, Yu.A. *Decorative trees and shrubs. Illustrated reference book.* / Yu.A. Bazhenov, A.B. Lysikov, A.Yu. Sapelin. - M.: Fiton+, 2012. - 240 p.
3. Bulygin, N.E. *Dendrology: textbook, for university students in the specialty "Forest. and forest park management"* / N.E. Bulygin, V.T. Yarmishko; Moscow state University of Forests. - 3rd ed., revised. - M.: MGUL, 2002. - 528 p.: ill.
4. Dubovitskaya E. A., Vavilova M. E., Lakeeva Y. A., Kurbatskaya A. N., Korovina M.A. *Some biological features of shrubby amorpha in modern conditions. Novgorod // Innovations in landscape architecture. [Text]: Materials of the VIII scientific and practical conference. / Nizhny Novgorod. state architecture -builds. University - N. Novgorod: NNGASU, 2012. - P73-75*



BIOECOLOGY AND TREE MONITORING IN THE CITY OF NUKUS

Kurbaniyazov B.T.¹, Saitova A.K.²

¹*Doctor of Philosophy in Biological Sciences (PhD)*

²*Candidate of Biological Sciences, Associate Professor, Karakalpak State University named after. Berdaha
The Republic of Uzbekistan*

ABSTRACT

This article is devoted to the issues of urban greening and the bio ecological characteristics of trees in cities. The article discusses the distribution of trees in the city of Nukus and plant species.

KEY WORDS: *anthropogenic and techno genic factors, landscaping*

Modern cities should be covered with green trees and bushes. Trees play an important role in creating beauty and scenic beauty in residential areas, cities and villages. When landscaping cities, it is necessary to select tree species suitable for urban conditions, soil and climatic conditions, and improve residential areas.

Another reason for the increase in desertification in our republic since the end of the last century is the drying up of the Aral Sea. In nature, the increasing influence of anthropogenic and technogenic factors and, as a consequence, deterioration of the ecological situation lead to significant changes in vegetation cover.

Currently, dendrology is developing as a science that studies the species of trees and shrubs, their taxonomy, evolution, geographical distribution, intraspecific diversity and possibilities of use in various areas of the national economy [2].

The development of dendrology was organically carried out not only with the morphology and systematics of plants, but also with such sciences as forestry, forest selection, forest systematics, cultivated forests and forest reclamation [3].

It is recommended to use trees more widely as landscape plants. When landscaping residential areas, in addition to determining the number and vital state of existing plants, it is necessary to take into account the bioecological characteristics of each plant species and their role in improving the environment. The issues of plant adaptation to the urban environment have been little studied, and most scientists note the importance of this problem [5].

The objects of the study were the trees *Maclura pomifera* (Raf.) C.K.Schneid, *Catalpa bignonioides* Walt, common in the city of Nukus.

Practical results of the study: the possibility of use in work has been proven; during the growth and development of trees selected as part of the study, the amount of heavy metals that pollute the atmosphere in their leaves was determined; It has been established that ornamental trees are quite promising species for practice, and recommendations have been developed for their use in landscaping in harsh continental conditions.

The scientific and practical significance of the research results is as follows: the scientific significance of the research results lies in the study of the bioecological characteristics of ornamental trees in the conditions of the city of Nukus, growth and development, flowering duration, influence of environmental factors are highlighted

The practical results of the study are as follows: the possibility of use in work has been proven; during the growth and development of trees selected as part of the study, the amount of heavy metals that pollute the atmosphere in their leaves was determined; It has been established that ornamental trees are quite promising species for practice, and recommendations have been developed for their use in landscaping in harsh continental conditions.



Bioecological characteristics of *Maclura pomifera* (Raf.) C.K.Schneid. In the conditions of the city of Nukus, the flowering stage of the plant is observed in late April - early May. Fruits in September-October. It grows from the root and is propagated by grafting. Maclura fruits are golden-yellow when ripe in their homeland, but in our conditions they are green-yellow.

Catalpa bignonioides Walt. In the city of Nukus it is considered to be partly of low stature and high crown. It is distinguished by pointed leaves, small flowers and thin fruit clusters. In the conditions of the city of Nukus, it was noted that the plant begins its growing season in the second ten days of March. Stem growth was observed from March to the end of May. Flowering of plants begins in the third decade of June (June 24) and lasts about 3 weeks (July 15). The duration of the total growing season of the plant is 230–245 days. Full ripening of the fruit occurs at the end of September.

Modern monitoring of the condition of trees and the study of the ecology of the urban environment is one of the most pressing problems of our time. The number of people living in urban environments is increasing every year. As a result of the urbanization process, the ecological state of the environment is radically changing, and natural ecosystems are disappearing. These situations certainly create new problems. It is known that during the summer months, green plants improve the microclimate by lowering the temperature and increasing air humidity. This is very necessary for the hot climate of our republic. They enrich the air with oxygen, reduce noise, and clean the air from various waste gases and dust, pathogens, that is, they are called biological filters.

Our research was carried out in the following 10 districts of the city of Nukus (International Innovation Center "Aralboyi" under the President of the Republic of Uzbekistan; A. Dosnazarov Street; Youth Rest House; Berdakh Avenue; Ch. Abdirov Street; Beruni and M. Jumanazarov Streets, in the area of Amir Temur Avenue ; Islam Karimov Street; T. Kaipbergenov Street). *Maclura pomifera* (Raf.) C.K.Schneid, *Catalpa bignonioides* Walt were found in the indicated areas.

Trees and shrubs are not only a source of raw materials and various products, but also one of the main factors that improve the natural environment. The vital activity of the plant world has an impact on the climate, that is, it absorbs and neutralizes SO₂ and other harmful gases and smoke in the air, reduces the amount of dust in urban air, reduces noise, as well as phytoncides released by trees. significantly reduce the number of pathogenic bacteria in the air.

Increasing attention is being paid to creating green spaces in cities, and in our hot and dry climate, the importance of trees and shrubs, especially deciduous and evergreen plants, is very great. In recent years, the number of plantings of ornamental palms and evergreen shrubs in the landscaping system of residential areas has increased. One of the main directions for the development of ornamental horticulture in Uzbekistan is to increase the range of biologically stable tree and shrub species to create green groves in urban areas for landscaping. Evergreen and flowering shrubs are also one of the most important parts of landscape design.

Table 1
Modern monitoring of ornamental trees in the city of Nukus

№	1	2	4	5	6	7	8	9	10
Name of place (street) T/r	International Innovation Center of the Aral Sea region under the President of the Republic of Uzbekistan	A. Dosnazarova street	Berdakh Avenue	Ch. Abdirov Street	Beruniy Street	M. Zhumanazarov Street	Park Amir Temura	I. Karimova Street	Street . T. Kaipbergenov
1	<i>Maclura pomifera</i> (Raf.) C.K.Schneid		-	-	-	-	<i>Maclura pomifera</i> (Raf.) C.K.Schneid	-	<i>Maclura pomifera</i> (Raf.) C.K.Schneid
2	<i>Catalpa bignonioides</i> Walt.	<i>Catalpa bignonioides</i> Walt.	<i>Catalpa bignonioides</i> Walt.	<i>Catalpa bignonioides</i> Walt.	<i>Catalpa</i>	<i>Catalpa bignonioides</i> Walt.	<i>Catalpa bignonioides</i> Walt.	<i>Catalpa bignonioides</i> Walt.	<i>Catalpa bignonioides</i> Walt.

Thus, Nukus is considered rich in urban tree species, monitoring and bioecology of urban trees. The distribution of trees in the city is taken into account.



LITERATURE

1. Gromadin A.V., Matyukhin D.L. *Dendrology: textbook - 2nd edition, erased.* // M.: Publishing Center "Academy" - 2007. - P.368.
2. Eziev L.Kh., Pechentsyn V.P., Turgunov M.D. *Landscape design. Science and education. Opposite.* 2021, B. 148.
3. Kremer B.P. *Trees: Local and introduced species of Europe: Per. from German.* // M., "Astrel Publishing House" - 2002. - P.288.
4. Kayimov A.G. *Dendrology* // "Ilm-zia" Tashkent - 2007. - B.151.
5. Kulagin Yu.Z. *Industrial dendroecology and forecasting.* // M., Nauka - 1985. - P.117.
6. Kurbaniyazov B.T. *Analysis of the state of woody plants in the city of Nukus (Ernazar Alakoz streets)* // *American Journal of Plant Sciences* Vol. 11 No. 6. 2020.- P.896-902. (03.00.00, No. 4)
7. Kurbaniyazov B.T., Berdimuratov G., Kholova Sh.A., Safarov A.K., Safarov K.S. *The importance of catalpa groups in the cultural landscaping of cities using the example of Uzbekistan* \ E3S Web of Conferences 258, 03026 (2021) UESF-2021 <https://doi.org/10.1051/e3sconf/202125803026> (No. 2. Scopus)
8. Usmanov A.U. *Dendrology* // Tashkent, Teacher - 1974. - B. 235.
9. Otenov T.O. *Botanical and geographical analysis of trees and plants introduced into the botanical gardens of the KCO of the Academy of Sciences of the Republic of Uzbekistan. Karakalpak Branch of the Academy of Sciences of the Republic of Uzbekistan.* - 1997. - No. 5. - P. 36-41
10. Kholova Sh.A., Kurbaniyazov B.T., Safarov K.S. *The use of stimulants in cuttings of ornamental woody plants* // *Roslin and urbanization Proceedings of the International Scientific and Practical Conference (Dnepr, March 1-2, 2017), Dnepr 2017.* - P. 142-144.



PROSPECTS FOR THE USE OF HYDROPHILIC PLANTS

Serekeeva G.A.¹, Utamuradova M.Ya.²

¹*Candidate of Biological Sciences, Associate Professor*

²*1st Year Master's Student Majoring in Biology, Karakalpak State University, The Republic of Uzbekistan*

ANNOTATION

The article discusses the prospects of using hydrophilic plants. In recent years, microscopic algae have attracted the attention of researchers as a source of proteins, fats, carbohydrates, vitamins and physiologically active substances. Of particular interest are some green algae (chlorella, stagedesmus) and blue-green algae (spirulina, nostoc, anabena).

KEY WORDS: *hydrophile, perspective, aquatic and coastal plants, mineral, acid*

The shortage of clean drinking water and the protection of water bodies are currently one of the pressing problems throughout the world. This issue was commented on by the 155th UNESCO Assembly, held in Uzbekistan in 1998. The United Nations declared 2003 the International Year of Freshwater. The quality of fresh water is one of the important factors of public health. Providing the population with high-quality drinking water and necessary sanitation conditions became the most important issue at the beginning of the third millennium.

Information about the flora of hygrophytic plants is given in the training manual Yu.V. Richie ["Flora of the Hygrophytes" 7]. The manual describes in detail the functions of higher plants, life that is associated with water. In addition, the allowance reflects information on the biology of moist plants and their use in practice.

Studies of hydrophilic plants in Central Asia began in the 1960s. The monograph "Flora of aquatic plants in Central Asia" by A.M. Muzafarov [4] is also information on the spread and systematics of water flora found on large rivers and water basins of Central Asia. According to these data, 31 species are given, plants belonging to 29 genera growing in water pools and along their shores.

Aquatic and embankment plants include medicinal, vitamin, nutritional, nutritional and many other important plants. The demand for plant raw materials is growing every year. Here, the significance of aquatic and coastal plants is divided into two groups: the significance of aquatic and coastal plants in nature and the significance of these plants in the human economy. Although these issues are independent of each other, they are inextricably linked. The first question is of theoretical importance and requires in-depth scientific research. The second question is of practical importance, which, in turn, determines the versatility of research.

After the death of many aquatic plants, they decompose, leaving essential elements for mineral nutrition in the water. For example, after breaking down, the roots release a large amount of phosphorus, red - potassium, and redest - calcium elements. Wetland plants strengthen the ground part of water bodies and reduce the force of wave action. As a result, a favorable environment for the living of other organisms is formed in water bodies.

Wetland vegetation is important for the presence of zooplankton, zoobenthos and other aquatic animals. That is, this is a wintering place for various mollusks, crustaceans and aquatic insects; habitat for many fish species; favorable substrate for benthic organisms; the best food for waterfowl, herbivorous fish, muskrats, nutria and many other aquatic animals; serves as a nesting site for birds and a nest for fur-bearing animals.

Reed (*Phragmites australis*) is the best raw material for the paper and pulp industry. According to data, the reed stem contains 65% and 25% leaves [9]. Many building materials are made from reeds. From cane by dry grinding you can obtain up to 3% acetic acid, 1.6% acetone, 3.6% resin, 0.8% methyl alcohol. In addition, reed is used in the preparation of glue and various raw materials for light industry. The analysis shows that cane accumulates large amounts of sugar. It contains 6.4% soluble carbohydrates. Green mass contains 33.1-51.5 mg/kg of carotene.



According to N.I. Voronikhin [1], reed is a good forage plant. It is used to make silage hay for livestock. 50.15% of ensiled reed is digested. Reed makes up 20-30% of the silage used for grazing livestock in the areas of the Amu Darya, Syrdarya and Ili rivers. Cane hay improves the quality of milk. Its young sprouts are not inferior in nutritional value to oats. According to the scientist, cane root is used in the preparation of coffee surrogates.

In terms of economic importance, reeds are not inferior to reeds and are a good source of food for muskrats, waterfowl and other aquatic animals. These are plants that store starch and sugar. Flour made from the rhizome is a good feed for pigs, cattle and poultry [3].

Many wetland plants are valuable food for herbivorous fish. These plants are considered the main food of white carp K.Z. Zolotova [10] studied quantitative indicators of the level of consumption of wetland plants by white carp. According to these scientists, fish eat the following aquatic plants well: *Potamogeton pectinatus*, *P. filiformis*, *Lemna major*, *L. trisulca*, *Spirodela polyrrhisa*, *Sagittaria sagittifolia*, *Typha latifolia*, *Glyceria aquatica*, *Gl. fluitans*, *Butomus umbellatus*, *Elodea canadensis*, *Chara fragilis*, *Cerotophyllum demersum*, *Rhizoclonium* sp.

Butomus umbellatus can be used as food instead of potatoes. The leaves contain a lot of protein. It is also used for diseases of the digestive system, skin and genital organs. Orchis root is used in medicine; powder prepared from it, mixed with water, wine or milk, is used for gastrointestinal diseases and bladder diseases.

Duckweed (*Lemna*) is a good food for domestic animals, especially chickens and pigs. The plant contains up to 30% protein, up to 5% fat, 24-34% AEM, 3% phosphorus, 6% calcium, 2% magnesium, 20-25% calcium. Duckweed when wet is rich in vitamins.

According to A.K. Kirichenko et al. [2], as a result of environmental influences, plants in aquatic ecosystems also suffer significantly. In order to determine the strength of anthropogenic impact on the environment, it is possible to determine the physiological and biochemical characteristics of plants growing in water bodies, to identify and control the processes occurring in them.

Scientists have identified 17 types of fatty acids in *Elodea canadensis Michx*, *Myriophyllum spicatum L.*, *Potamogeton crispus L.* from aquatic plants. According to the analysis, *Elodea canadensis L.* is richer in fatty acids than the other two species. It is believed that this species came from North America and is widespread in many bodies of water on Earth. It is believed that the main reason for this may be the large accumulation of fatty acids in its composition.

In recent years, microscopic algae have attracted the attention of researchers as a source of proteins, fats, carbohydrates, vitamins and physiologically active substances. Of particular interest are some green algae (*Chlorella*, *Stagedesmus*) and blue-green algae (*Spirulina*, *Nostoc*, *Anabena*). These algae have the ability to change the amount of organic matter in their cells depending on growing conditions.

An exception to the microalgae family are the colorless protothecae devoid of chlorophyll. These achlorophilic algae turn to parasitism and thus cause the disease protothecosis in humans and animals [8].

By changing the composition of the nutrient medium and growing conditions, the amount of protein in microscopic algae can be increased from 8 to 60% or more, the amount of carbohydrates - from 6 to 50%, and the amount of fat - from 5 to 85%. Microscopic algae protein contains all the essential amino acids. 15 different vitamins have been found in this algae [5].

In cultivation, high yields are produced by *Chlorella* and *Scenedesmus*. The yield of *Chlorella* grown under controlled conditions can be 50-100 g per day per m² or 1 ton of dry mass per hectare. In Japan, the production of algae (*Chlorella*) has been established on an industrial scale (300,000 tons per year). A center has been created in the USA that produces 30 tons of dry algae biomass per year.

Algae biomass production is carried out in Mexico, India, France, Italy and other countries.

In conclusion, study the economic value of hydrophilic plants, their rational use and their bioindicator properties when assessing pollution of water bodies.



REFERENCES

1. Voronikhin N.I. *Flora of continental reservoirs*. M.-L., 1953. Publishing house of the USSR Academy of Sciences. 255 pp.
2. Kirichenko K.A. Possibilities of using higher aquatic plants for biomonitoring of the ecological state of water bodies in the Baikal region // *Hydrobotany 2015: Proceedings of the VIII All-Russian Conference with international participation on aquatic macrophytes*. – Borok, 2015. pp. 133-136.
3. Kononov V.A., Prosyanyoy V.S. *Aquatic vegetation and its use in pond fisheries*. – Kyiv, 1949. P. 55-58.
4. Muzafarov A.M. *Algae flora of water bodies of Central Asia*. – Tashkent: Publishing house.,1965. 567 pp.
5. Papchenkov V.G. *On the classification of macrophytes of water bodies* // *Ecology*, No. 6. – Novosibirsk, 1985. P.6-13.
6. Pashkievich I.K., Yudin B.S. *Aquatic plants and animal life*. – Novosibirsk, 1978. 155 p.
7. Rychin Yu V. *Flora of hygrophytes*. – Moscow, 1948. 411 p.
8. Serekeeva G.A., Kulbaeva Sh. *The role and importance of microphytes in reservoirs "Theory and practice of modern science" No. 1(91) 2023*. P.159-161/
9. Taubaev T. *Flora and vegetation of water bodies of Central Asia*. – Tashkent, 1970. 490 p. -132 b.
10. Zolotova K.Z. *On the issue of selectivity in the feeding of grass carp*. -In the book *Breeding and growing herbivorous fish in ponds*, vol. – Moscow, 1966. P. 45-80.



UDC 574.5(075.8)

SETTING UP THE ECOLOGICAL BALANCE OF WATER OBJECTS OF THE SOUTH ARAL REGION

**Tureeva Kuralay Zhumabaevna¹, Maturazova Elmira Matiyazovna²,
Valieva Orazgul³**

¹*Doctor of Philosophy in Biological Sciences (PhD)*

²*Candidate of Biological Sciences, Associate Professor*

³*Assistant, Karakalpak State University named after. Berdakha, The Republic of Uzbekistan*

ANNOTATION

The article examines the current ecological state of water bodies of the Southern Aral Sea region. One type of water body is a lake ecosystem. The water mineralization in most lakes in the Southern Aral Sea region was determined by the hydroregime of the Amu Darya River. The chemical composition of water in summer is hydrocarbonate, in winter and autumn it is chloride-sulfate.

KEY WORDS: *lakes, hydroregime, Amu Darya, ecosystem, research, limnology.*

In the world's leading scientific centers, large-scale research is being carried out on the development of methods for predicting changes in the state of water ecosystems under the influence of human economic activities, with the integrated use of water management and water management.

One type of aquatic ecosystem is the lake ecosystem. Lakes are widespread on the coastal surface. According to RosKIIVX, there are 2 million lakes in Russia with a total area of more than 3.5 thousand km². 90 % of it is from rainwater bodies with an area of 0.01 to 1 km² and a depth of less than 1.5 m.

The study of lake ecosystems began at the beginning of the 20th century. Scientific works of G.G. Vinberg (1934, 1946, 1960, 1974, and 1975), S.I. Kuznetsov (1952, 1970, 1985, and 1989), and L.L. Rossolimo (1967, 1971, and 1975) provided the first complete information about the morphometry, hydrochemistry, hydrobiology and microbiological processes of some large lakes (White, Golubov and others).

The evolution of lakes is divided into several stages (youth, maturity, old age, discomfort), characterized by changes in the level of trophic and biological productivity. In addition, lake ecosystems are characterized by an accumulative nature of metabolism, a bias towards water collection, weak water exchange, significant temperature stratification, oxygen dichotomy in the summer season, etc.

Lakes are very sensitive to external influences, including natural climate changes. Based on the nature of water exchange, lakes are divided into two large groups: flowing and non-flowing. Lakes that receive water from the outside and do not release anything into natural or artificial water flow, but use it only for evaporation, infiltration or artificial water intake, are considered non-flowing. In other words, there is no flow of water over the surface of such a reservoir.

An important element of the depth of the lake is the coastal part, which, depending on the receding nature of the shore, includes a coastal ridge, a shallow coastal ridge and coastal shallows. The last two elements of lake depth are often called the littoral zone; its characteristic features include shallow water and the influence of waves. Beyond the littoral zone, there is an underwater basin (i.e., sublittoral zone). The shallow part of the lake is pelagic; the bottom of the lake is called profundal.

The lakes fill depressions of various origins. Since the processes of formation of these depressions are in most cases determined by local conditions, lakes are concentrated in certain areas. Depending on the origin, the depths of lakes can be tectonic, volcanic, meteorite, glacial, thermokarst, suffasion, river, sea, or organogenic. The lakes located in these depths bear the same names.



More recently, the lower reaches of the Amu Darya were called the “Great Lakes”. The Amu Darya used to form numerous and varied reservoirs. Reed fields, occupied an area of about 0.7 million hectares. The mineralization of water in most lakes ranged from 400 to 1400 mg/l and was determined by the hydroregime of the Amu Darya: in spring and summer, during floods, the mineralization of lake water is minimal, and in autumn and winter, it is maximum. The chemical composition of water in summer is hydrocarbonate, in winter and autumn it is chloride-sulfate.

According to experts, the group of reservoirs arose spontaneously when an excess of collector-drainage water began to fill various geomorphic depressions (Lake Togyz-Tore, Saikol). The second group of reservoirs includes the depths of former lakes (lakes Karateren, Dautkol, Sarykamys), where collector-drainage waters were transferred. The third group of lakes has freshwater flow, but in recent years, they have been heavily polluted (Khojakol, Makpalkol, and Shegekol). The modern limnological characteristics of some water bodies of the Amu Darya delta are presented in Table 1.

As a result of drainage of collector-drainage waters, new types of reservoirs appeared on the plains of the Akchadarya and Amu Darya deltas, for example: irrigation and wastewater (Ayazkala, Akchakol, Karaterenskaya, Sudoche lake systems). According to experts, these irrigation and wastewater lakes act as an accumulator of water-soluble salts, poisons and agrochemicals. On the one hand, water exchange and the total area of the watersheds under consideration experienced significant and strong fluctuations due to the strong development of irrigated agriculture in the region and the condition of soils and wastewater.

Table 1
Dynamics of expansion and change in the area of reservoirs in the Aral Sea region

Water bodies	Barkhanskova et al., 1963		Abdirov et al., 1970		Sagidullaev, 1986		Atanazarov, 2017	
	Total area, ha	Plant cover., %	Total area, ha	Plant cover., %	Total area, ha	Plant cover., %	Total area, ha	Plant cover., %
Davutkol	600	80	1170	90	650	20	3500	30
Karateren	640	15	650	12	-	-	2700*	-
Shegekol	180	65	180	60	150	25	230	10

Note: — no information, * - O. Information from Nuritdinov

According to experts, 1964-1965. In the Davutkol lake system, intensive growth of wetland vegetation was observed (up to 90% of the area), accumulation of a large mass of plant debris, which caused local death of fish.

In the 1980s, after the main drainage lines and irrigation canals were cleared and expanded, the area of vegetation of the reservoirs was significantly reduced, and the total area of the lake has recently increased significantly. In Shegekol, the anthropogenic impact was expressed in increased mineralization due to the deterioration of the water quality of the Amu Darya, in which the share of collector and drainage waste has sharply increased.

According to scientific literature, 1959. in most cases, the water in the lake was slightly mineralized and saturated with oxygen up to 127%, the reaction of the environment was neutral and slightly alkaline, pH 7.8 was not orthotic. According to 1963 data, the pH of water in the lakes was 7.4-8.4, the oxygen saturation of the water mass was 64-204%, and chlorine mineralization was 86-259 mg/l, i.e. the reaction environment changed from neutral over a 5-year period to slightly alkaline. 1964-1968 in freshwater ponds the oxygen content was 22-160%, oxygen saturation 42-153%, salinity 3.9-9.9 g/l. currently, the active reaction of the environment and the general mineralization of water have increased, and the oxygen content, on the contrary, has decreased. During the period under review, the water bodies of the Aral Sea region have undergone serious changes.

Collector-drainage waters play an important role in the formation of modern limnic ecosystems of the Amudarya River. According to experts, the volume of collector-drainage waters has recently exceeded 1 km². They are often the only source of nutrients for most Delta water bodies.

It is known that the formation of highly productive limnic ecosystems in the Amu Darya basin was carried out over thousands of years mainly due to the flow of fresh waters from the Amu Darya. Intensive activity in the Aral Sea basin has led to a significant reconstruction of the entire hydrological network in the Amu Darya delta.

The processes of aridization and desertification accelerated the processes of transformation of the region's aquatic ecosystems and led to the restructuring of all limnic systems and, ultimately, to a specific disruption of the bio- and hydrochemical regime of water bodies. For example, with the intensive development of phytoplankton, the formation of organic matter increased and, consequently, the trophicity of water bodies increased. The nutritional nature of the lakes also changed: instead of fresh (0.6-1.2 g/l) water of the Amu Darya, mineralized (1.8-8.0 g/l) water, enriched with nutrients and pesticide residues, began to flow.



1950-1960 In the Amu Darya delta in 1980, there were 490 lakes with a total area of 840 km². There are 30 lakes left with an area of 76.3 km². Currently, there are 9 large lakes left, their depth is 2-5 m, the total area is 26,500.

According to the hydrodesign institutions of the Republic of Karakalpakstan, in 1992-1993. The total area of the flooded area of the Amu Darya delta is approximately 1250-1300 thousand sq.m. It has been established that it is known that irrigation has a strong effect on all components of the soil. Most irrigation canals were built and are being built without a protective coating along the bottom and sides and lose 40-50% of water to filtration. The cessation of the flow of the Amu Darya and Syr Darya into the Aral Sea and the annual decrease in the water level in it leads to a decrease in the water level and an increase in the mineralization of the soil of the Aral Sea.

According to the reclamation cadastre, almost 96% of the lands of Karakalpakstan are saline. According to experts, 78,000 hectares (15%) are highly saline, 201,100 hectares (41%) are moderately saline, and 194,700 hectares (40%) are slightly saline. It has also been established that the mineralization of atmospheric precipitation has increased 6-7 times over the past decades.

As a result of an increase in water withdrawal for irrigation and a sharp reduction in river flow, the ability of the Amu Darya to self-purify has greatly decreased. In addition, 3 billion from the territory of Uzbekistan and Turkmenistan. More than m³ of collector-drainage and untreated industrial and domestic waters, saturated with toxic chemicals, are discharged into the Amu Darya, which saturate drinking water with residual amounts of pesticides and heavy metals, making it unsuitable for use.

Various pesticides used in agriculture enter the Amu Darya with collector and drainage waters. The increase in regulation of the content of pollutants was 4 times for phenols, copper, chromium, 5 times for petroleum products, 10 times for pesticides (hexachlorane, lindane). The results of a survey of 40 lakes and reservoirs in the Amu Darya delta also indicate high mineralization, high content of phenols (10-15 REM), petroleum products (3-5 REM), pesticides (up to 3 REM), copper, chromium (up to 6 REM). Bacterial contamination of river waters is 10 times higher than sanitary requirements. In 1994, the proportion of samples that did not meet sanitary requirements was 68.9% for chemical indicators and 13.4% for bacteriological indicators.

Thus, the restoration of natural objects is one of the priorities of ecology and environmental protection, however, it should be recognized that the concept and methodology for restoring lake ecosystems is still under development. Restoration issues were considered mainly in the CNS countries and non-CNS countries; in the Southern Aral Sea region there are few such studies, only partial studies. Therefore, the development of theoretical foundations for the restoration of ecosystems, including inland lakes, is undoubtedly one of the urgent tasks of ecology, and the determination of the features and patterns of restoration of small lakes will contribute to the formation of a new direction in ecology and the development of ecosystem theory.

LITERATURE

1. *Mirziyoyev Sh.M. Action strategy for 2017-2021. – Tashkent: Adolat, – 2017. – 193 p.*
2. *Alekseenko V.A., Alekseenko L.P. Biosphere and Life: Teaching and Learning. – M.: Logos, 2002. – 212 p.*
3. *Bykov B.A. Ecological Dictionary. – Alma-Ata: Science, 1983. – 216 p.*
4. *Iberla K. Factor analysis. – M. Statistics. – 1980. – 398 p.*
5. *Draper N., Smith G. Practical regression analysis. M. Statistics, 1973. – 392 p.*
6. *Dubrov A. M. Processing of statistical data using the principal component method. M. – Statistics. – 1978. – 135 p.*
7. *But G.F. Biometrics. – M. Higher School, 1990. – 352 p.*
8. *Nikanorov A.M. Handbook of hydrochemistry. – L. Gidrometeoizdat, 1989. – 390 p.*



UDC 639.1

HISTORY OF THE DEVELOPMENT OF HUNTING IN UZBEKISTAN

Atashov Azhiniyaz Shaniyazovich

*Assistant at the Department of Ecology and Soil Science, Karakalpak State University named after. Berdakha,
The Republic of Uzbekistan*

ANNOTATION

The article discusses the history of the development of hunting in the Republic of Uzbekistan. Studying the history of the development of hunting makes it possible to assess its current state, as well as opportunities for proper organization of hunting, optimization of management of hunting farms, improvement of the system for issuing quotas and permits for hunting animals, as well as other issues in the field of hunting.

KEY WORDS: *protection, activity, hunting, hunting farms, period, history, quota, sphere.*

Studying the history of the development of hunting makes it possible to assess its current state. Humanity has hunted animals for various purposes from the earliest times of its development to the present day. Hunting is one of the most important human activities and served to meet the needs for food and clothing, and is now widely used in industry, medicine and other fields.

At later stages of the development of society, as a result of the establishment of trade relations between states, the production and development of hunting tools, hunting methods were adapted and improved. City residents began to use firearms for hunting.

The villagers hunted using birds of prey (*Falco pelegrinoides*, *Falco cherrug*, *Accipiter gentiles*, *Accipiter nisus*, *Aquila chrysaetos*) and caught using traps, where this tradition is still preserved among the peoples of Central Asia.

In Uzbekistan, before the advent of firearms, there was very little substantiated information about hunting methods and hunting grounds. Nevertheless, stone tools and various iron hunting tools (spears, bullets), bones of wild animals, images painted on stones (petroglyphs), miniature works depicting hunting processes confirm that our ancestors in ancient times hunted various animals. Since ancient times, interest in the possession of valuable skins and game birds trained to hunt animals has served as an impetus for the improvement of hunting and, as a result, attention has been paid to the development of hunting networks and their importance.

Game birds, especially the gyrfalcon (*Falco rusticolus*), were highly valued in Western Europe and even became the subject of diplomatic negotiations in the 13th-18th centuries.

An analysis of activities related to the protection of wildlife in the 17th-18th centuries shows that during this period many reserves were created to protect species important for hunting and their habitat, and later endangered and rare animals began to be protected in them.

Due to the increase in population, increased interest in game animals served as the basis for the formation of legislation regulating the hunting sector. In the years 1730-1775, a number of regulatory documents aimed at protecting nature were adopted in Europe, including the Law "On Hunting" in 1763. According to this law, hunting of any animal is limited from March 12 to July 9. In 1892, the Law "On Hunting" was adopted in Russia, but it did not work because it was not fully implemented in practice.

The increased interest in game animals due to the increase in livestock served as the basis for the formation of legislation regulating hunting. In the years 1730-1775, a number of regulatory documents aimed at protecting nature were adopted in Europe, including the Law "On Hunting" in 1763. According to this law, hunting of any animal is limited from March 12 to July 9. In 1892, the Law "On Hunting" was adopted in Russia, but it did not work because it was not fully implemented.



The scope of this law did not extend to Siberia and Turkestan, and hunting in these lands continued to be carried out on the basis of national and local traditions. In the CIS in 1920, the first law “On Hunting” was adopted, which determined the list of fully and partially protected and hunting species, types and periods of hunting. On the basis of this document, a state monopoly has been established in relation to game animals; the sale of hunting products obtained in violation of their size, standards, hunting period and hunting rules is prohibited. This measure regulates the relationship between government procurement of hunting products, management of hunting farms and its control.

According to literary data, local residents of Central Asia hunted in a unique way, based on national traditions, and used hunting birds and hunting dogs in the hunting process. For example, in Turkmenistan, eagles (*Aquila chrysaetos*), hawks (*Accipiter nisus*) and kestrels (*Accipiter gentiles*) were used in the hunting process in the past, and now 2 species of falcons are used, namely the saker falcon (*Falco cherrug*) and the red-headed peregrine falcon (*Falco peregrinoides*). In the 1940-1950s, skilled hunters in the Karakum Desert caught 10-30 hares in one hunt, and also used them to hunt goitered gazelle, bustards and pheasants. At the beginning of the 20th century, a good falcon (*Falco cherrug*), trained for hunting in the Central Karakum, was highly valued, and its price was estimated as one camel, saddled with a quality saddle.

In subsequent years, the lack of understanding among the majority of the population of hunting and its importance, the lack of control in this area led to the formation of a mass of unorganized hunters and, as a consequence, the emergence of poachers who do not recognize any norms and restrictions, and this situation continues today.

In 1919, the first hunting farm was created in Uzbekistan in the form of a hunting society in the city of Tashkent and Tashkent district. The association is tasked with combating poaching, as well as supplying the state with fur, poultry and other game products. In the 1930s, industrial reptile hunting was organized in Central Asia, for which some species (*Vipera lebetina*, *Varanus griseus* and *Echis multisquamatus*) were caught and kept in nurseries. In 1944, a breeding plant for breeding Amudarya muskrats with an area of 350 thousand hectares was created in the Amu Darya delta; 3,345 muskrats were brought into it for industrial breeding through acclimatization.

Later, in 1956, the use of *Ondatra zibethicus* for industrial hunting was introduced in livestock farms of the Khorezm and Tashkent regions; the nutria *Myocastor* was brought to the Syrdarya region in 1950; in total, 11 species of fur-bearing animals were hunted during this period, and their fur was sent to procurement departments in the region, and then to the Tashkent fur base. Today, the recorded species are virtually extinct, with only the muskrat surviving in small numbers.

After the 1970s, fur production in Uzbekistan declined sharply, and in 2000, commercial hunting virtually ceased. In 1950, 54 thousand heads of *Vulpes vulpes*, 1100 heads of *Meles meles* and 506.6 thousand heads of *Ondatra zibethicus* were caught in the republic, and by 2017 a total of 157 heads of these species were caught (*Vulpes vulpes* 4 heads, *Meles meles* 153 heads).

Industrial hunting, which developed rapidly in Uzbekistan in the 1950-1970s and had high economic efficiency, is no longer practiced today.

Management and control of hunting farms at different times were also under the jurisdiction of different departments. Uzbekistan In 1959, the Association of Hunters and Fishermen of Uzbekistan was created, which continues to operate to this day. The military society of hunters and fishermen, which operated during this period, has ceased its activities today.

Analysis of the data shows that of the three main types of animal hunting (recreational, industrial and sport) that exist today, recreational hunting, that is, the use of hunting products mainly in the form of meat and clothing, is the oldest type of hunting. Currently, amateur hunting is widely used in Uzbekistan, mainly for hunting animals.

The three goals of the International Convention on Biodiversity, to which the Republic of Uzbekistan has joined, namely the protection of biodiversity, including wildlife, its use and equitable distribution of benefits, require in-depth theoretical and practical study of game species.

In order to regulate relations in hunting and hunting farms, the Law of the Republic of Uzbekistan, dated 07/08/2020 no. ZRU-627 “On hunting and hunting farms”, was adopted.

Thus, studying the history of the development of hunting makes it possible to assess its current state. Provides an opportunity for the proper organization of hunting, optimization of management of hunting farms, increasing the rational use of hunting farms, as well as further improvement of the system for issuing quotas and permits for hunting animals, as well as other issues in the field of hunting.



LITERATURE

1. *Law of the Republic of Uzbekistan dated July 8, 2020 no. ZRU-627 "On hunting and game management."*
2. *Grakova N.N. Hunting farm of the USSR. – M.: Timber Industry, 1973. – 406 p.*
3. *Dementyev V.I. Basics of hunting. – L., 1965. – 270 46. Bobrinsky N.A. Fauna and nature of the USSR. – M.: Nauka, 1967. – P. 376-384.*
4. *Rakhmonov R.R., Kholboev. F.R. Information on the history of hunting // Ecology and morphology of animals: Materials of a scientific and practical conference. – Samarkand, 2018. – B. 79-83. Rakhmonov R.R., Shodmonov F.K. Hunting farms of Uzbekistan and their role in the conservation of biological diversity // Factors for mitigating environmental problems of the region: Materials of the Republican Scientific and Practical Conference. – Bukhara, 2019. – B. 66-68.*
5. *Rustamov A.K. Birds of the Karakum desert. – Ashgabat: Publishing house. Academy of Sciences of the TSSR, 1954. –P. 325-333.*



FORMATION OF HERBAL TEA USING NATURAL INGREDIENTS: AN COMPLETE STUDY

Anand Khendke^{1*}, Gitesh Vyas², Shivani Khendke³

¹Student of Bachelor in Pharmacy, Faculty of Pharmacy, Dr. Babsaheb Ambedkar Tecnological University, Raigad, Lonere.

²Department of Pharmacology, Faculty of Pharmacognosy, Dr. Babsaheb Ambedkar Tecnological University, Raigad, Lonere.

³Student of Bachelor in Pharmacy, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.

*Corresponding Author

ABSTRACT

Herbal teas have been consumed for centuries, valued not only for their exquisite flavors but also for their potential therapeutic benefits. This review paper delves into the [1] [1] formation of herbal tea using a harmonious blend of natural ingredients, including fennel, ginger, cinnamon, lemongrass, sweet lemon, and honey. [2] [2] These ingredients, each possessing unique characteristics, come together to create a holistic tea experience that combines taste and health.

Fennel, with its delicate anise-like aroma, contributes digestive properties, making it a staple in traditional herbal remedies. [3] Ginger, revered for its spicy warmth, offers relief from digestive discomfort and is recognized for its anti-nausea effects. Cinnamon, with its sweet and spicy notes, brings not only flavor but also potential anti-inflammatory benefits to the mix. Lemongrass, known for its citrusy aroma, imparts a sense of calmness and relaxation, making it an ideal addition to herbal blends. Sweet lemon, with its mild and sweet essence, lends a refreshing twist while offering potential immune support. Honey, the natural sweetener, [4] not only enhances the tea's taste but also delivers antioxidants and antibacterial properties. [5]

This research paper explores the chemistry, therapeutic properties, and synergistic effects of these ingredients when combined in herbal tea. We delve into their taxonomical classification, physiological characteristics, and potential pharmacological actions. Additionally, we discuss their scientific background, including the presence of bioactive compounds and relevant scientific research.

Furthermore, the paper delves into the proportions and preparation methods of these ingredients to create a well-balanced herbal tea. We explore the benefits of individual ingredients and the harmonious symphony they create when blended. The customizable nature of herbal tea preparation allows for an experience tailored to individual preferences, while maintaining the health-promoting properties of each ingredient.

KEYWORDS: Natural Ingredients; Phytochemical Analysis; Sensory Evaluation; Antioxidant Properties; Caffeine-Free; Traditional Remedies; Herbal Infusion; Health Benefits.

1. INTRODUCTION

A combination of fennel, ginger, cinnamon, lemongrass, sweet lemon, and honey in herbal tea can potentially offer several therapeutic benefits. However, it's essential to note that herbal remedies can vary in effectiveness from person to person, and their use should not be a substitute for medical advice or treatment. Here's a breakdown of potential therapeutic effects:

- Digestive Health:** Fennel, ginger, and cinnamon are known for their digestive properties. They may help alleviate symptoms like indigestion, bloating, and nausea.
- Anti-Inflammatory:** Ginger and cinnamon have anti-inflammatory properties that may be beneficial for conditions involving inflammation.
- Stress Reduction:** Chamomile, often used with these ingredients, is known for its calming properties and may help reduce stress and anxiety. [6]
- Antioxidant:** Lemongrass and sweet lemon may provide antioxidants that can protect cells from oxidative damage
- Immune Support:** Honey is often used for its potential antibacterial and soothing effects on the throat. It may offer some immune support.
- Flavor and Enjoyment:** The blend's taste and aroma can provide relaxation and comfort, which can have a positive psychological effects.

2. PROPORTION

Creating a herbal tea with fennel, ginger, cinnamon, lemongrass, sweet lemon, and honey is a matter of personal preference, and the proportions can vary based on your taste. Here's a suggested starting point for a single cup of herbal tea:



Fennel Ginger Cinnamon Lemongrass Sweet Lemon Honey Herbal Tea Proportions:

½ teaspoon of fennel seeds or crushed fennel

½ teaspoon of dried ginger pieces or ginger root (adjust to taste)

¼ teaspoon of cinnamon bark or cinnamon chips (adjust to taste)

1 teaspoon of dried lemongrass leaves (adjust to taste)

A few slices of sweet lemon (you can adjust the amount based on how strong you want the lemon flavor)

1-2 teaspoons of honey (adjust to taste)[7]

These proportions are a starting point, and you can modify them to suit your flavor preferences. Here are some additional tips:

1. Crush or grind the ingredients (like fennel, ginger, and cinnamon) to release more flavor.
2. Experiment with the proportions to find the right balance of flavors for your taste buds. If you like it spicier, add more ginger or cinnamon; if you prefer it milder, use less.
3. Adjust the amount of honey based on how sweet you want the tea. Start with a small amount and add more if needed.[8]
4. You can also adjust the strength of the tea by varying the steeping time. Steep for a shorter time for a milder flavor and longer for a stronger brew.[9]

3. INGREDIENTS

Creating a herbal tea blend like fennel, ginger, cinnamon, lemongrass, sweet lemon, and honey in a dried package is indeed possible to produce on a small scale, even in a lab or home kitchen. Here are the basic steps to make a small batch:

Fennel seeds[10]

Dried ginger pieces or ginger root

Cinnamon bark or cinnamon chips

Dried lemongrass leaves

Dried sweet lemon zest

Honey (for sweetening)

4. EQUIPMENT NEEDED

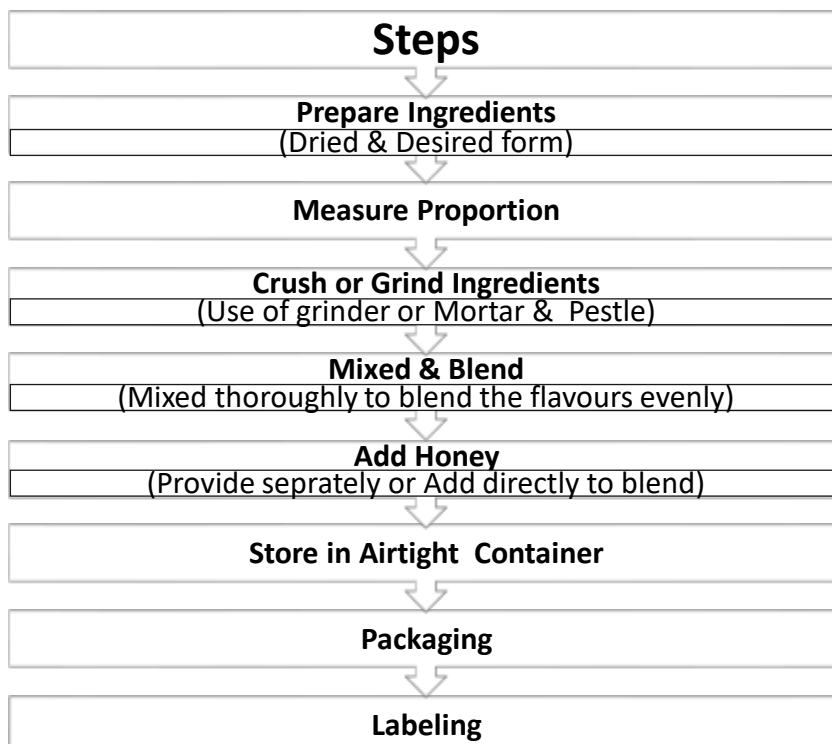
Mortar and pestle or a grinder (for crushing or grinding ingredients)

Mixing bowls and spoons

Airtight containers for storage

Tea bags or loose leaf tea filters (if you want to package the tea)[11]

5. STEPS





6. DETAILED INFORMATION ABOUT CRUDE DRUGS

6.1. Certainly, here is detailed taxonomical, physiological, pharmacological, and scientific information about fennel (*Foeniculum vulgare*) when used in herbal tea:

6.1.1. Taxonomical Information

Kingdom: Plantae
Phylum: Angiosperms
Class: Eudicots
Order: Apiales
Family: Apiaceae (Umbelliferae)
Genus: *Foeniculum*
Species: *vulgare*

Figure:1. Fennel



6.1.2. Physiological Information

Botanical Characteristics: Fennel is a perennial herb that can grow up to 2.5 meters in height.[12] It has feathery leaves, bright yellow flowers arranged in umbrella-like clusters (umbels), and small, oblong green or brownish seeds that are used in culinary and medicinal applications.[13]

6.1.3. Pharmacological Information

Phytochemicals: Fennel contains various phytochemicals with potential pharmacological effects. These include:
Anethole: The primary aromatic compound responsible for the characteristic licorice-like flavor of fennel.
Fenchone: Another important component contributing to the aroma and flavor.
Flavonoids: Including quercetin, rutin, and kaempferol, which have antioxidant properties.
Phenolic compounds: Such as rosmarinic acid, which has anti-inflammatory potential.

6.1.4. Pharmacological Actions

Fennel has been studied for various pharmacological properties, including:

Digestive Effects: Fennel is known for its carminative properties, helping to alleviate gastrointestinal discomfort, reduce gas, and promote healthy digestion.

Anti-Inflammatory: Some components of fennel, particularly the essential oil, have demonstrated anti-inflammatory effects in laboratory studies.[14]

Antioxidant: Fennel's flavonoids and phenolic compounds exhibit antioxidant activity, which may help protect cells from oxidative damage.

Antimicrobial: Fennel has shown potential as an antimicrobial agent against certain pathogens.

6.1.5. Scientific Research

Numerous scientific studies have explored the pharmacological properties and potential health benefits of fennel. Research has focused on its use in various forms, including essential oil, extracts, and dried seeds. While many studies support its traditional use for digestive complaints and as an aromatic spice, more research is needed to establish specific therapeutic doses and clinical applications fully. Fennel is generally regarded as safe when consumed in moderate amounts, such as in herbal teas. However, individual responses may vary, and it's essential to exercise caution if you have allergies to plants in the Apiaceae family or any other specific health concerns.

6.2. Certainly, here is detailed taxonomical, physiological, pharmacological, and scientific information about cinnamon (*Cinnamomum* spp.) when used in herbal tea:

6.2.1. Taxonomical Information:

Kingdom: Plantae
Phylum: Angiosperms
Class: Magnoliopsida



Order: Laurales

Family: Lauraceae

Genus: Cinnamomum

Figure: 2. Cinnamon



6.2.2. Physiological Information

Botanical Characteristics: Cinnamon is obtained from the inner bark of several tree[15] species belonging to the Cinnamomum genus.[16] The two primary types are Cinnamomum verum[17] (Ceylon or “true” cinnamon) and Cinnamomum cassia (cassia cinnamon). Ceylon cinnamon has a sweeter, milder flavor compared to cassia cinnamon, which has a stronger, spicier taste.

6.2.3. Pharmacological Information

Phytochemicals: Cinnamon contains various bioactive compounds, including:

- Cinnamaldehyde: The main component responsible for cinnamon’s flavor and aroma, as well as many of its pharmacological effects [18]
- Cinnamic acid: Has antioxidant properties.
- Eugenol: Provides an additional layer of flavor and has antimicrobial properties.
- Polyphenols: Act as antioxidants and may offer various health benefits.
- Essential oils: Contain numerous aromatic compounds that contribute to cinnamon’s characteristic scent and taste.

6.2.4. Pharmacological Actions: Cinnamon has been studied for several potential pharmacological effects:

- Antioxidant: The polyphenols in cinnamon exhibit antioxidant properties, which help protect cells from oxidative damage.[19]
- Anti-Inflammatory: Some components in cinnamon have anti-inflammatory effects.
- Antimicrobial: Cinnamon’s essential oils, particularly cinnamaldehyde, have natural antimicrobial properties and have been studied for their potential to combat various pathogens.
- Blood Sugar Regulation: Cinnamon has been explored for its potential role in improving insulin sensitivity and blood sugar control.[20]
- Heart Health: Some studies suggest that cinnamon may contribute to heart health by improving cholesterol and blood pressure levels[21].

6.2.5. Scientific Research

Cinnamon has been the subject of extensive scientific research, with numerous studies investigating its various pharmacological properties and potential health benefits. Research on cinnamon’s effects on blood sugar regulation, inflammation, and antimicrobial activity has yielded promising results. However, more studies are needed to establish definitive clinical recommendations. Cinnamon is commonly used in herbal teas to enhance flavor and aroma while potentially providing some of its health-promoting properties.

6.2.6. Safety Considerations

Cinnamon is generally considered safe when consumed in moderate amounts as a spice or in herbal teas.

However, consuming very high doses of cinnamon supplements (especially cassia cinnamon) may have adverse effects on liver health and should be avoided.

Individuals with allergies to cinnamon or sensitivity to certain compounds in cinnamon should exercise caution.



6.3. Certainly, here is detailed taxonomical, physiological, pharmacological, and scientific information about ginger (*Zingiber officinale*) when used in herbal tea:

6.3.1. Taxonomical Information

Kingdom: Plantae

Phylum: Angiosperms

Class: Monocots

Order: Zingiberales

Family: Zingiberaceae

Genus: *Zingiber*

Species: *officinale*

Figure: 3. Ginger



6.3.2. Physiological Information

Botanical Characteristics: Ginger is a flowering plant characterized by its thick underground rhizome (stem). The rhizome is the part of the plant commonly used in culinary and medicinal applications.

6.3.3. Pharmacological Information

Phytochemicals: Ginger contains several bioactive compounds, including:

- Gingerol:** The primary bioactive compound responsible for ginger's pungent flavor and potential pharmacological effects [22]
- Shogaol:** A derivative of gingerol formed when ginger is dried or cooked. It also possesses pharmacological properties.
- Zingerone:** Another compound with antioxidant properties.
- Gingerdiol:** A lesser-known compound with potential health benefits.

6.3.4. Pharmacological Actions:

 Ginger has been studied for various pharmacological properties:

- Anti-Inflammatory:** Gingerol and related compounds have demonstrated anti-inflammatory effects, potentially reducing inflammation in the body.
- Anti-Nausea:** Ginger is well-known for its ability to alleviate nausea, including motion sickness, morning sickness during pregnancy, and chemotherapy-induced nausea.
- Digestive Aid:** Ginger can help stimulate digestion, reduce bloating, and alleviate gastrointestinal discomfort.
- Antioxidant:** Some compounds in ginger exhibit antioxidant properties, protecting cells from oxidative damage.
- Pain Relief:** Ginger has been explored for its potential role in pain relief, particularly in inflammatory conditions.

6.3.5. Scientific Research

Ginger has been the subject of extensive scientific research, with numerous studies investigating its various pharmacological properties and potential health benefits. Research has demonstrated its effectiveness in reducing nausea, especially in pregnancy and chemotherapy-induced nausea. Additionally, studies suggest its potential role in reducing inflammation, improving digestion, and providing antioxidant benefits. Ginger is commonly used in herbal teas to enhance flavor and aroma while potentially providing some of its health-promoting properties.

6.3.6. Safety Considerations

Ginger is generally considered safe when consumed in moderate amounts, such as in culinary applications or herbal teas. Excessive ginger consumption, especially in supplement form, may lead to side effects such as heartburn, gastrointestinal discomfort, or a mild laxative effect. People taking blood-thinning medications or with certain medical conditions should consult a healthcare professional before consuming large amounts of ginger.



6.4. Certainly, here is detailed taxonomical, physiological, pharmacological, and scientific information about lemongrass (*Cymbopogon citratus*) [23] when used in herbal tea:

6.4.1 Taxonomical Information

Kingdom: Plantae

Phylum: Angiosperms

Class: Monocots

Order: Poales

Family: Poaceae (Gramineae)

Genus: *Cymbopogon*

Species: *citratus*

Figure 4. Lemongrass



6.4.2. **Physiological Information:** Botanical Characteristics: Lemongrass is a perennial grass known for its aromatic leaves and tall, slender stalks. The leaves are linear, sharp-edged, and emit a lemony fragrance when crushed or bruised. [24]

6.4.3. Pharmacological Information

Phytochemicals: Lemongrass contains various phytochemicals, including:

Citronellol: A terpene alcohol that contributes to lemongrass's lemony aroma.

Citral: The primary bioactive compound responsible for lemongrass's distinctive lemon scent and potential pharmacological effects.

Limonene: Another terpene found in lemongrass with potential health benefits.

Flavonoids and polyphenols: Some of these compounds have antioxidant properties.

6.4.4. **Pharmacological Actions:** Lemongrass has been studied for several potential pharmacological effects:

Antioxidant: Lemongrass contains antioxidants, which may help protect cells from oxidative damage.

Anti-Inflammatory: Citral in lemongrass has demonstrated anti-inflammatory properties in laboratory studies.

Antimicrobial: Lemongrass has natural antimicrobial properties and has been used in traditional medicine for this purpose.

Stress and Anxiety Reduction: The aroma of lemongrass may have a calming effect and is sometimes used for stress reduction.

6.4.5. Scientific Research

Lemongrass has been investigated in numerous scientific studies for its potential pharmacological properties and health benefits. [25] Research suggests that lemongrass may have antioxidant, anti-inflammatory, and antimicrobial effects. Additionally, the aroma of lemongrass may have a calming influence, making it a popular choice for herbal teas aimed at relaxation. Lemongrass is commonly used in herbal teas to impart its distinctive lemony flavor and aroma while potentially providing some of its health-promoting properties.

6.4.6. Safety Considerations

Lemongrass is generally considered safe when consumed as a flavoring agent or herbal tea. Some individuals may be sensitive or allergic to citral, which is the main aromatic compound in lemongrass. If you experience any adverse reactions, discontinue use. Consult a healthcare professional if you are pregnant, nursing, or have any underlying medical conditions before consuming large quantities of lemongrass.



6.5. While sweet lemon (*Citrus limetta*) is not commonly used in herbal tea blends, I can provide you with detailed taxonomical, physiological, pharmacological, and scientific information about it:

6.5.1. Taxonomical Information

Kingdom – Plantae
Phylum – Angiosperms
Class – Eudicots
Order – Sapindales
Family – Rutaceae
Genus – Citrus
Species – Limetta

Figure.5. Sweetlemon



6.5.2. Physiological Information: Botanical Characteristics: Sweet lemon, also known as sweet lime, is a citrus fruit that belongs to the Citrus genus. It is a small, greenish-yellow fruit with a sweet and mild flavor compared to other citrus fruits. [26,27]

6.5.3. Pharmacological Information: (Limited): While sweet lemon is primarily consumed as a fruit and not typically used as an ingredient in herbal teas, it does contain certain bioactive compounds that may have pharmacological effects:

- Vitamins: Sweet lemon is a good source of vitamin C, which has antioxidant properties and supports the immune system. [28]
- Phytochemicals: It may contain flavonoids and other phytochemicals with potential health benefits.

6.5.4. Pharmacokinetics (Limited): Pharmacokinetics refers to the processes that a substance undergoes within the body. For sweet lemon, these processes are not extensively studied as they would be for pharmaceuticals. However, when consumed in its natural fruit form, sweet lemon is absorbed through the digestive system, and its nutrients and bioactive compounds are metabolized and utilized by the body.

6.5.5. Pharmacodynamics (Limited): Pharmacodynamics involves understanding how a substance affects the body, including its mechanisms of action. Sweet lemon's pharmacodynamics are primarily related to its nutritional content, such as vitamin C providing antioxidant support and promoting overall health.

6.5.6. Scientific Research: (Limited): Research on sweet lemon's pharmacological and medicinal properties is relatively limited compared to more extensively studied herbs and plants. Most scientific studies related to sweet lemon focus on its nutritional content and dietary applications.

6.5.7. Safety Considerations: Sweet lemon, as a fruit, is generally considered safe for consumption. However, individual sensitivities or allergies can occur. If you have specific health concerns or are taking medications, it's advisable to consult a healthcare professional for personalized guidance regarding dietary choices, including the consumption of sweet lemon or herbal teas containing sweet lemon.

6.6. Certainly, here is detailed information about honey when used in herbal tea, including taxonomical, physiological, pharmacological, and scientific aspects:

6.6.1. Taxonomical Information (for Honey Bee):

Kingdom: Animalia
Phylum: Arthropoda
Class: Insecta
Order: Hymenoptera
Family: Apidae
Genus: Apis



Species: *Apis mellifera* (Western honey bee) is one of the most common species responsible for honey production.

Figure:6.Honey



6.6.2.Physiological Information (for Honey)

Source: Honey is a natural sweet substance produced by honey bees through the [29] collection, transformation, and storage of nectar from flowering plants.

Composition: Honey primarily consists of sugars (glucose and fructose) and water, but it also contains small amounts of other compounds such as enzymes, amino acids, vitamins (e.g., B vitamins), minerals (e.g., potassium), antioxidants (e.g., flavonoids), and trace elements.

Texture and Flavor: Honey's texture can vary from liquid to crystallized, depending on its composition and storage conditions. The flavor, aroma, and color of honey are influenced by the types of flowers the bees foraged from.

6.6.3.Pharmacological Information (for Honey in Herbal Tea)

Antioxidant Properties: Honey contains antioxidants, primarily in the form of polyphenols and flavonoids, which can help neutralize harmful free radicals in the body.

Antimicrobial Properties: Honey has natural antimicrobial properties due to its low water content, acidic pH, and the presence of compounds like hydrogen peroxide. It has been used historically as a wound dressing to prevent infections.

Anti-Inflammatory Effects: Some studies suggest that honey may have anti-inflammatory properties, which can be beneficial in soothing irritated throats or gastrointestinal discomfort.

Cough and Sore Throat Relief: Honey is commonly used as a natural remedy for soothing coughs and sore throats due to its soothing and coating properties.

6.6.4.Scientific Research (for Honey in Herbal Tea)

Honey is a well-researched natural product with numerous studies examining its pharmacological effects and potential health benefits, particularly when used as a remedy for various ailments. Research supports its effectiveness in cough and sore throat relief, making it a common ingredient in herbal teas designed to alleviate these symptoms.

6.6.5.Safety Considerations (for Honey in Herbal Tea)

Honey is generally safe for most people when used in moderate amounts. However, there are a few considerations:

Infant Botulism: Honey should not be given to infants under one year of age due to the risk of botulism.

Allergies: Individuals with allergies to bee products (e.g., pollen, bee stings) should use honey with caution.

Caloric Content: Honey is calorie-dense, so individuals on restricted diets should be mindful of their honey consumption.

7. FORMULA

Sr.no.	Ingredients	Category	Quantity Taken
1	Fennel Seeds	Herb and spices	1 Teaspoon(4gm)
2	Ginger Root	Herb and spices	1 Teaspoon(4gm)
3	Cinnamon Bark	Herb and spices	1/2 Teaspoon(2gm)
4	Lemongrass Leaves	Herb and spices	1 Teaspoon(4gm)
5	Sweetlemon Zest	Citrus Fruit	1 Teaspoon(4gm)
6	Honey	Sweetner	To Taste

Tabel.1.Formula.



7.1.Instructions

1. Take 1 teaspoon of fennel seeds and place them in a teapot or cup.[30]
2. Add 1 teaspoon of ginger root to the teapot or cup.
3. Add ½ teaspoon of cinnamon bark to the teapot or cup.
4. Include 1 teaspoon of dried lemongrass leaves.
5. Add 1 teaspoon of dried sweet lemon zest.[31]
1. Pour boiling water over the ingredients in the teapot or cup.
2. Allow the tea to steep for 5-10 minutes, depending on your taste preference.
3. Optionally, sweeten the tea to taste with honey.
4. Stir well and enjoy your homemade herbal tea!

Note: Adjust the quantities of each ingredient according to your personal taste preferences. This formula provides a starting point for creating a delightful herbal tea blend.

8.Herbal tea made with natural ingredients like fennel, ginger, cinnamon, lemongrass, sweet lemon, and honey is often considered better, therapeutic, and more useful than synthetic or artificial teas for several reasons:

Herbal Tea	Normal Tea
1)Natural Ingredients Made from Plants herbs & spices	1)Caffeine Content Black & Green - Nervousness, jitteriness, sleep disturbances & increased heart rate.
2) Therapeutic Properties Used for centuries in traditional medicine, holistic & healthy life.	2)Pesticides Residues Regular consumption have adverse effects.
3) Digestive Health: Ginger - Nausea, soothe upset stomach Fennel - Reduce bloating	3) Artificial Flavors & Additives Artificial colours, flavours, additive enhance their appearance
4) Anti-Inflammatory Effect: Ginger & Cinnamon – Reduce Inflammation in the body.	4)Tannins Interfere with the absorption of certain minerals like iron.
5) Stress Reduction Lemongrass – Calming effect, relaxation.	5) Quality & Processing High temperature drying or oxidation
6) Immune Support Honey Antioxidant & Antibacterial.	6) Enviromental Impact Uses of Synthetic chemical & monoculture farming.
7) Rich Flavour Profile Sweet, spicy, citrusy create unique taste.	7) Health Benefits.
8) Antioxidant: Cinnamon & Honey - Protect cell from oxidative stress & promote overall health.	
9) Customizable: Suit individual preference, adjust the quantity.	
10) No Artificial Additive Don't contain artificial flavors, colour or additive They are pure and natural.	
11) Fewer Side Effects Caffeine Free Avoid jitteriness, insomnia	

Table.2.. Herbal tea v/s Normal tea

Normal tea, often referred to as conventional or commercial tea, typically contains tea leaves that may have undergone various processing methods, which can include the use of synthetic pesticides, fertilizers, and additives. While it's generally safe to consume synthetic tea in moderation, there are some potential side effects and concerns associated with it that may be considered less healthy compared to herbal tea.

It's important to note that the side effects of synthetic tea are generally mild and occur with excessive consumption. Most people can enjoy conventional tea in moderation without significant health concerns. However, if you have specific sensitivities, allergies, or health conditions, you may want to consult with a healthcare professional or consider opting for herbal teas, which tend to have fewer potential side effects and are caffeine-free.

Ultimately, the choice between synthetic and herbal teas depends on personal preferences, health considerations, and ethical and environmental concerns. Many people find herbal teas a soothing and healthful alternative to synthetic teas, while others enjoy both for their distinct flavors and potential benefits.

9. Herbal tea made with ingredients like fennel, ginger, cinnamon, lemongrass, sweet lemon, and honey offers a wide range of potential advantages and benefits, While herbal teas made with ingredients like fennel, ginger, cinnamon, lemongrass, sweet lemon, and honey offer numerous advantages, it's important to be aware of potential disadvantages or considerations associated with these ingredients



Figure. 7. Advantages and Disadvantage.

10. The combination of fennel, ginger, cinnamon, lemongrass, sweet lemon, and honey in herbal tea can exhibit both synergistic and antagonistic properties, depending on the specific interactions between the ingredients. Here's a breakdown of these properties:

10.1. Synergistic Properties

Digestive Synergy: Fennel, ginger, and cinnamon have well-documented digestive properties. When combined, they may enhance each other's effects, promoting overall digestive health. For example, ginger's anti-nausea properties complement fennel's ability to ease indigestion and reduce bloating.

Anti-Inflammatory Synergy: Ginger and cinnamon are known for their anti-inflammatory properties. Combining these ingredients may result in a more potent anti-inflammatory effect, potentially aiding in reducing inflammation and discomfort.

Immune Support Synergy: Lemongrass and sweet lemon contribute potential immune-boosting properties due to their vitamin C content. When combined, they can provide a synergistic effect, enhancing the overall immune support provided by the herbal tea.

Flavor Harmony: The combination of these ingredients creates a well-balanced and flavorful herbal tea. The sweet and spicy notes of cinnamon and ginger complement the citrusy freshness of lemongrass and sweet lemon, while fennel and honey add depth and sweetness. This flavor harmony makes the tea enjoyable and appealing.

10.2. Antagonistic Properties

Flavor Contrast: While the flavor harmony is often considered a positive aspect, some individuals may find the contrast in flavors, such as the sweetness of honey versus the spiciness of ginger, as antagonistic or conflicting. **Overpowering Flavors:** If not carefully balanced, certain ingredients like ginger or cinnamon can overpower the more delicate flavors of lemongrass and sweet lemon, potentially leading to an imbalanced taste experience.



Allergic Reactions: Some individuals may have allergies or sensitivities to specific ingredients within the herbal tea. In such cases, the antagonistic properties may manifest as adverse reactions, such as allergic responses.

11. The future trends and Innovations in herbal tea formulation, particularly with ingredients like fennel, ginger, cinnamon, lemongrass, sweet lemon, and honey, are influenced by evolving consumer preferences, advancements in technology, and a growing interest in natural and holistic approaches to health and wellness. Here are some anticipated trends and innovations in herbal tea formulation:

Biotechnology and Ingredient Enhancement: Biotechnological methods, such as genetic engineering and controlled cultivation, may be used to enhance the quality and bioactive content of herbal ingredients, ensuring consistency and potency.

Sustainable Sourcing and Ethical Practices: There will likely be a stronger emphasis on sustainable sourcing of herbal ingredients, supporting fair trade practices, and ensuring the preservation of biodiversity. Consumers are increasingly concerned about the environmental and ethical impact of herbal production.

Herbal Tea in Functional Foods: Herbal tea formulations may find their way into a broader range of functional foods, such as herbal-infused snacks, desserts, and even skincare products, expanding their applications beyond beverages.

Packaging Innovation: Environmentally friendly packaging solutions, such as compostable tea bags and recyclable materials, may become more prevalent to reduce the environmental footprint of herbal tea products.

Emerging Herbal Ingredients: The exploration and integration of lesser-known herbal ingredients with unique health benefits will continue to grow. These may include adaptogens like ashwagandha or exotic herbs from various traditions.

Bioavailability Enhancement: Research into improving the bioavailability of herbal compounds within the body may lead to innovations in delivery systems, such as nanotechnology or encapsulation techniques.

Certification and Transparency: Increased demand for herbal products may lead to more rigorous certification standards and transparency in labeling, providing consumers with greater confidence in the quality and authenticity of herbal teas.

Scientific Research and Clinical Trials: As interest in herbal medicine grows, more extensive scientific research and clinical trials may be conducted to explore the therapeutic efficacy of herbal tea formulations, supporting evidence-based recommendations.

Global Fusion Blends: The fusion of herbal ingredients from different cultural traditions may result in innovative and unique tea blends that appeal to diverse global tastes and preferences.

Digital Platforms and E-commerce: The use of digital platforms and e-commerce will continue to make it easier for consumers to access a wide variety of herbal teas, including personalized blends and niche products.

12. Modern scientific research provides valuable insights into the health benefits and potential therapeutic properties of herbal tea made with ingredients like fennel, ginger, cinnamon, lemongrass, sweet lemon, and honey. Here's a summary of some of the key findings:

Ginger (Zingiber officinale):

Anti-Inflammatory Effects:

Ginger contains bioactive compounds like gingerol, which have potent anti-inflammatory properties. It may help reduce inflammation associated with various conditions, including osteoarthritis and inflammatory bowel disease.

Digestive Health:

Ginger is known for its ability to alleviate nausea, vomiting, and motion sickness. It's often recommended for pregnant women experiencing morning sickness.

Antioxidant Properties:

Ginger is rich in antioxidants that combat oxidative stress and may contribute to overall health.[33,36]

Cinnamon (Cinnamomum verum or Cinnamomum cassia):

Blood Sugar Control:

Cinnamon may help improve insulin sensitivity and lower blood sugar levels, making it beneficial for individuals with diabetes or at risk of developing the condition.

Antimicrobial Effects:

Cinnamon has shown antimicrobial properties, potentially helping to combat bacterial and fungal infections.

Anti-Inflammatory:

Like ginger, cinnamon has anti-inflammatory properties that may be useful in managing inflammatory conditions.[34]



Lemongrass (*Cymbopogon citratus*):

Calming and Stress Reduction:

The aroma of lemongrass is believed to have calming effects and may help reduce stress and anxiety.

Antioxidant and Anti-Inflammatory:

Lemongrass contains compounds like citral, which exhibit antioxidant and anti-inflammatory effects.

Honey (*Apis mellifera*):

Antioxidant and Antibacterial:[35]

Honey is rich in antioxidants and has natural antibacterial properties, making it useful for wound healing and sore throat relief.

Immune Support:

The phytochemicals in honey may support the immune system and help fight infections.

Fennel (*Foeniculum vulgare*):

Digestive Aid:

Fennel has been traditionally used to alleviate digestive issues like indigestion, bloating, and gas.

Antioxidant Content:

Fennel contains various antioxidants that contribute to its potential health benefits.

Sweet Lemon (*Citrus limetta* or *Citrus limon*):

Vitamin C:

Sweet lemon is a good source of vitamin C, which is essential for immune health and skin health.

Flavonoids: It contains flavonoids, which have antioxidant properties and may support cardiovascular health.

It's important to note that while these ingredients have demonstrated potential health benefits in scientific studies, the effects can vary depending on factors such as dosage, individual response, and the specific herbal tea formulation. Herbal teas made from these ingredients offer a natural and enjoyable way to incorporate these potential health benefits into your diet, but they should not replace medical treatments when needed. Consulting with a healthcare professional is advisable for specific health concerns.

13.. RESULTS

Sr.No.	Ingredients	Physical Evaluation	Sensory Observation	Chemical Analysis
1	Fennel	Dried, small, greenish brown seeds.	Aroma-Mild Anise like scent Flavour- Anise like scent	PH-slightly acidic Polarity – low SAP value – Not Applicable (No Oil) Caffeine – Negative , Not Detected Alkaloid- Negative, Not Detected Flavonoid- Positive, Present Tannin – Positive , Present Glycoside – Positive, Present
2	Cinnamon	Small, brown sticks or powder	Aroma-warm & sweet Flavour – Slightly Acidic	PH- Slightly Acidic Polarity – low SAP value – Not Applicable (No Oil) Caffeine – Negative , Not Detected Alkaloid- Negative, Not Detected Flavonoid- Positive, Present Tannin – Positive , Present Glycoside – Positive , Present
3	Ginger	Dried Ginger Root Slices or Powder	Aroma-Slightly Acidic Flavour – Spicy with mild heat	PH-Slightly Acidic Polarity – Medium SAP Value – Not Applicable,(No Oil) Caffeine – Negative , Not Detected Alkaloid-Negative, Not Detected Flavonoid- Not Detected Tannin – Positive , Present Glycoside – Negative, Not Detected
4	Lemongrass	Dried leaves & stems, greenish yellow	Aroma-Zesty citrus notes Flavour – Citrusy & Fresh	PH-Slightly Acidic Polarity – Medium SAP value – Not Applicable (No Oil) Caffeine – Negative , Not Detected Alkaloid-Negative, Not Detected



				Flavonoid-Positive, Present Tannin- Positive, Present Glycoside – Positive , Present
5	Sweetlemon	Lemmon zest or dehydrated Lemmon peel	Aroma-Intense luminescent Flavour – Strong Citrus notes	PH-Acidic Polarity – Low SAP value – Not Applicable (No Oil) Caffeine – Negative , Not Detected Alkaloid-Negative, Not Detected Flavonoid-Positive, Present Tannin-Positive, Present Glycoside – Positive , Present
6	Honey	Sticky liquid, Golden to amber in colour	Aroma – Sweet floral notes Flavour – Sweet & viscous	PH- Acidic Polarity – low SAP value – Not Applicable (No Oil) Caffeine – Negative , Not Detected Alkaloid-Negative, Not Detected Flavonoid-Positive, Present Tannin- Negative, Not Detected Glycoside – Positive , Present

14. DISCUSSION

This table presents the results of the requested physical, sensory, and chemical tests for each ingredient in the herbal tea, including pH, polarity, saponification value, caffeine, alkaloids, flavonoids, tannins, and glycosides. The “Positive” or “Negative” results indicate the presence or absence of the specified compounds. Please note that actual laboratory testing would involve more complex and precise analytical methods for these compounds.

15. CONCLUSION

In conclusion, the formation of herbal tea using natural ingredients represents a fusion of tradition, science, and taste. This reserach paper offers a comprehensive exploration of the components and potential therapeutic advantages of fennel, ginger, cinnamon, lemongrass, sweet lemon, and honey when combined in a flavorful and holistic herbal tea. The interplay of these natural ingredients embodies the essence of wellness and a mindful approach to tea consumption.

TABLES AND FIGURES

Table 1 Formula

Sr.no.	Ingredients	Category	Quantity Taken
1	Fennel Seeds	Herb and spices	1Teaspoon(4mg)
2	Ginger Root	Herb and spices	1Teaspoon(4mg)
3	Cinnamon Bark	Herb and spices	1/2Teaspoon(2mg)
4	Lemongrass Leaves	Herb and spices	1Teaspoon(4mg)
5	Sweetlemon Leaves	Citrus Fruit	1Teaspoon(4mg)
6	Honey	Sweetner	To Taste

[Table 2]. Herbal Tea v/s Normal Tea

Herbal Tea	Normal Tea
1)Natural Ingr,edients Made from Plants herbs & spices	1) Caffeine Content Black & Green - Nervousness, jitteriness, sleep disturbances & increased heart rate.
2) Therapeutic Properties Used for centuries in traditional medicine, holistic & healthy life.	2) Pesticides Residues Regular consumption have adverse effects.
3) Digestive Health Ginger - Nausea, soothe upset stomach Fennel - Reduce bloating	3) Artificial Flavors & Additives Artificial colours, flavours, additive enhance their appearance
4) Anti-Inflammatory Effect Ginger & Cinnamon - Reduce Inflammation in the body.	4)Tannins Interfere with the absorption of certain minerals like iron.
5) Stress Reduction Lemongrass – Calming effect, relaxation.	5) Quality & Processing High temperature drying or oxidation
6) Immune Support Honey Antioxidant & Antibacterial.	6) Enviromental Impact Uses of Synthetic chemical & monoculture farming.



7) Rich Flavour Profile Sweet, spicy, citrusy create unique taste.	7) Health Benefits
8) Antioxidant Cinnamon & Honey - Protect cell from oxidative stress & promote overall health.	
9) Customizable Suit individual preference, adjust the quantity.	
10) No Artificial Additive Don't contain artificial flavors, colour or additive They are pure and natural.	
11) Fewer Side Effects Caffeine Free Avoid jitteriness, insomnia	

Figure 1. Fennel



Figure 2. Cinnamon



Figure 3. Ginger



Figure 4. Lemongrass



Figure 5. Sweetlemon



Figure 6. Honey

Figure 7. Advantages and Disadvantage



ACKNOWLEDGEMENTS

I am pleased to submit this Project report studied out in Institute of pharmacy, Badnapur.

I would like to thank all those who helped me to make this Project. I specially thank to our respected Principal Dr. Swati Rawat who gave me full support and opportunity to work on this Project.

I also deeply acknowledge my guide Mr. Gitesh V. Vyas, Ms. Pooja Muley, Ms. Ashwini Bahir for never ending encouragement, moral support and patience during the preparation of my project.

I express my heart filled gratitude to Mr. Gitesh V. Vyas Sir who offered me all possible assistance during my developing period and for the interest he took in sorting my difficulties and offering me guidance, encouragement and help. Lastly I am also obliging to the teachers and lab Technician & also some of my friends Vitthal, Sima, Yogesh, Dnyaneshwar, Kiran and all my Final year classmate who helped me to solve the problem and for give suggestions for my project and hearty thanks to my parents who gave me moral, financial support.

Author contributions: Concept – V.G.; Design – A.K., T.S., E.T.; Supervision – P.M., A.B.; Resources – D.K.; Materials – I.O.P.; Data Collection and/or Processing – ONLINE, BOOKS.; Analysis and/or Interpretation – P.L., Y.P., S.P., T.S.; Literature Search – ONLINE, BOOKS., PHARMACOPEIA.; Writing – A.H.; Critical Reviews – V.G.

Conflict of interest statement: Herbal tea was used in case of anxiety, depression, weight loss, caffeine addiction. An GIT still to be studied.

REFERENCES

Reference to a book

1. *A text book of pharmacognosy* CK Kokate, AP Purohit, SB Gokhale Pune: Nirali Prakashan 8 (66), 1-624, 2003
2. *The text book of Trease, E.C. and Evans, W.C. (2009) Pharmacognosy. 16th Edition, W.B. Saunders, Philadelphia, 365-650.*

Reference to a website

1. *Peer-Review In-depth Analyzis | by Reyalist Corneja*



1. <https://medium.com/@arecorneja/peer-review-in-depth-analyzis...>
2. Top 10 Unknown Health Benefits of Honey That May ...
<https://healthybuffs.com/health/unknown-health-benefits-of-h...>
3. Herbal medicinal products – Language selection | Public Health
<https://health.ec.europa.eu/medicinal-products/herbal-medici...>
4. Honey And Lemongrass Recipes
<https://www.supercook.com/recipes/en/honey-and-lemongrass/>
5. Skin Script Green Tea Citrus Antioxidant Cleanser
<https://alexanders-aesthetics.com/product/skin-script-green-....>
6. 9 foods that help reduce anxiety
<https://www.medicalnewstoday.com/articles/322652>
7. HerbalSip's Post
https://www.linkedin.com/posts/herbalsip_healthboost-wellnes...
8. The Benefits of Lemon and Honey Water in the Morning
<https://widewebblog.com/the-benefits-of-lemon-and-honey-wate...>
9. How to apply cologne without spray – directionforyouth.org
<https://txrik.directionforyouth.org/how-to-apply-cologne-wit...>
10. Fennel Seed
https://www.herbsociety.org/file_download/inline/b31e0936-1d...
11. Tea Filter 101: How To Use A Tea Infuser & More
<https://www.sipsby.com/blogs/tealover-101/all-about-tea-filt...>
12. Wild Fennel - VOLF
<https://www.volf.co.uk/forage-id/Wild-fennel>
13. Fennel (not native)
<https://naturecollective.org/plant-guide/details/fennel-non-....>
14. Chilcuague: A Natural Remedy for Pain and Inflammation
<https://maraorganic.com/blogs/news/chilcuague-a-natural-reme...>
15. Cinnamon
<https://en.wikipedia.org/wiki/Cinnamon>
16. Cinnamon
<https://en.wikipedia.org/wiki/Cinnamon>
17. Cinnamon, *Cinnamomum* spp.
https://www.herbsociety.org/file_download/inline/587ec42d-5e...
18. Health Benefits of Cinnamon
<https://healthnews.com/nutrition/healthy-eating/health-benef...>
19. "Lightning protectors" protect cells from oxidative damage
<https://www.dkfz.de/en/presse/pressemitteilungen/2018/dkfz-p...>
20. The Crucial Role of Insulin in the Body
<https://www.rainier-research.com/blog/the-crucial-role-of-in...>
21. How to lower cholesterol and hypertension naturally and ...
<https://www.quora.com/How-do-I-lower-cholesterol-and-hyperte...>
22. The Top 5 Therapeutic Uses of Ginger
<https://www.rupahealth.com/post/top-5-therapeutic-uses-of-gi...>
23. *Cymbopogon citratus* (Lemon Grass) - Gardenia.net
<https://www.gardenia.net/plant/cymbopogon-citratus>
24. Unveiling The Appearance Of Lemongrass Plants: A Visual Guide
<https://shuncy.com/article/what-do-lemongrass-plants-look-li...>
25. What are the benefits and side effects of lemongrass?
<https://www.quora.com/What-are-the-benefits-and-side-effects...>
26. Citrus Fruits List: 30 Types of Citrus You Didn't Know
<https://facts.net/types-of-citrus-fruits/>
27. Citrus Limon - an overview
<https://www.sciencedirect.com/topics/agricultural-and-biolog...>
28. The Benefits of Immune-Supporting Nutrition
<https://www.nutritionnews.abbott/healthy-living/diet-wellnes...>
29. Learn About Honey
<https://www.mainstreethoney.com/pages/learn-about-honey>
30. How to Make Dried Lemon Peel
<https://foodtasia.com/dried-lemon-peel/>
31. Easy Fennel Tea Recipe - 24 Mantra Organic
<https://www.24mantra.com/blogs/recipes/simple-and-most-benef...>
32. Dried Ginger Exporters and Suppliers in India



<https://cmmfoodproducts.com/Spices/Dried-Ginger>

33. *What cinnamon is the best for your health and why? How ...*
<https://www.quora.com/What-cinnamon-is-the-best-for-your-hea...>
34. *Antioxidant and antibacterial activity of flavonoid-, polyphenol*
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4573149/>
35. *Ginger - an overview | ScienceDirect Topics*
<https://www.sciencedirect.com/topics/pharmacology-toxicology...>



NAVIGATING SYNERGY: OUTCOME-BASED EDUCATION IN ENGLISH LANGUAGE CURRICULUM

Jhunisa Ann A. Merueña

Philippine Normal University, Curriculum Development in Language Education

INTRODUCTION

In the ever-evolving landscape of education, the fusion of pedagogical philosophies and curriculum design is paramount to preparing students for the complexities of the modern world. At the forefront of this transformative paradigm is Outcome-Based Education (OBE), a pedagogical approach that transcends traditional content delivery by prioritizing the attainment of clearly defined learning outcomes. Within this dynamic context, our exploration delves into the intricate interplay between OBE and the English language curriculum, seeking to unravel the tapestry of insights that guide educators in shaping a future-ready learning environment.

As language educators, we navigate the convergence of OBE principles with the nuances of teaching English, recognizing that language proficiency extends beyond the confines of linguistic mastery. This synthesis of literature reviews, spanning evaluations in diverse cultural contexts, underscores not only the global recognition of OBE but also the challenges inherent in its implementation. However, our focus extends beyond theoretical discussions, delving into practical strategies for modeling effective applications of content knowledge within and across curriculum teaching areas.

This exploration contends that the synergy between OBE and the English language curriculum is not a mere theoretical abstraction but a dynamic force that reshapes the landscape of language education. As we embark on this journey, we delve into the complexities of OBE's application, embracing its transformative potential while acknowledging the nuances that arise in diverse cultural and educational settings. Together, we illuminate a path for language educators, beckoning them to not only teach language but to empower students with the practical and interdisciplinary skills needed to thrive in an ever-changing world.

LITERATURE REVIEW

The concept of Outcome-Based Education (OBE) has been widely discussed in the education literature, with many scholars emphasizing its potential to enhance student learning outcomes and improve the overall quality of education. OBE is based on the idea that the educational process should be focused on achieving specific learning outcomes, rather than simply covering content. This approach emphasizes the alignment of curriculum, teaching, and assessment to achieve these outcomes and the continuous monitoring of student progress.

Outcome-Based Education (OBE) represents a pedagogical approach that shifts the focus from traditional content delivery to clearly defined learning outcomes. The literature reviews discussed here provide valuable insights into the implementation, effectiveness, and challenges of OBE within the context of English language curriculum at various educational levels and in diverse settings.

In the context of global recognition and adoption of OBE in education systems, a study by Zhang and Fan (2019) found that the implementation of OBE in the "workplace communication" curriculum at Guangdong Ocean University resulted in significant improvements in students' communication skills. Furthermore, the study also highlighted that the OBE approach led to improvements in foundational knowledge, understanding of communication objects, communication skills, self-presentation skills, and reduced communication fear and bad communication behavior. Likewise, Asim et al. (2019) found out that Outcome-Based Education (OBE) helps shape student learning outcomes in higher education, with a specific look at the context of Pakistan. Factors that influence student learning outcomes include learning objectives based on complexity levels, assessment methods, English language proficiency, learning styles, and the requirements of employers for graduates. In addition, Schlebusch and Thobedi (2004) also stated that the OBE approach had some positive effects on student learning outcomes in the English Second Language (ESL) classroom in South Africa. This recognition is further exemplified by the study conducted by Khan and Khan (2019) which is the integration of OBE into the Foundation Program at Dhofar University in Oman emphasizing competencies in English language, Mathematics, Computing, and Study Skills.



The authors outlined how the English language program at Dhofar University has harmonized with these standards by formulating specific learning outcomes for each course.

All the above-mentioned studies have collectively highlighted that OBE has gained prominence as an approach that aligns educational goals with desired outcomes.

Some pieces of literature show the effectiveness of OBE in the context of English language teaching and become a central theme across the literature reviews. In a study conducted by Duan (2019), he discussed how OBE can make a real difference in College English teaching by fostering independent learning and practical skills, aligning with the evolving needs of society. OBE is seen as a game-changer, not only improving learning outcomes but also honing problem-solving skills. Ultimately, it equips students with a solid foundation in English and practical application skills that are in sync with the evolving needs of our society and economy. Similarly, Zhao (2020) explored OBE and its application in college English teaching, advocating for a shift from traditional methods to better meet the demands of application-oriented personnel training. He reviewed existing literature and found emphasis on the importance of OBE in modern education, especially in preparing students for the challenges of the 21st century. Both reviews suggest that OBE not only enhances language proficiency but also cultivates problem-solving abilities, aligning with the evolving requirements of the 21st century.

However, challenges in the implementation of OBE are also evident. Alata's (2019) study on private junior high schools in Metro Manila reveals that despite positive outcomes, challenges such as lack of teacher training, inadequate support systems, and limited resources can impede effective implementation. Similarly, Khan and Khan (2019) acknowledged the challenges associated with crafting meaningful learning outcomes and aligning assessments within the Foundation Program at Dhofar University in Oman.

Despite these challenges, the potential benefits of implementing OBE in the English Language Curriculum have been widely recognized in the literature. OBE offers an opportunity to enhance students' language proficiency, critical thinking skills, and overall language learning experience by focusing on specific learning outcomes and aligning the entire educational process to achieve these outcomes.

The attitudes of educators play a crucial role in the successful implementation of OBE, as explored by Ortega and Ortega-Dela Cruz (2016) and Khan and Khan (2019). Ortega and Ortega-Dela Cruz provided a quantitative exploration of English language educators' attitudes, indicating an overall positive reception toward OBE in the Philippines. Khan and Khan, on the other hand, focused on integrating OBE into the Foundation Program in Oman, emphasizing the importance of understanding educators' feelings for effective implementation.

Meanwhile, assessment emerges as a pivotal aspect of OBE, providing valuable feedback to students and teachers, as emphasized by Zhang and Fan (2019) and Khan and Khan (2019). Zhang and Fan's study evaluates workplace communication competence, demonstrating the integral role of assessment in measuring the effectiveness of OBE. Khan and Khan outline the assessment of learning outcomes in the English language program, highlighting the importance of assessments in providing meaningful feedback to enhance student and teacher progress.

Some studies touch upon the cultural considerations of implementing OBE. Schlebusch and Thobedi (2004) note that the OBE approach may not always be culturally appropriate for the diverse student population in South Africa. This highlights the importance of tailoring educational approaches to specific cultural contexts to ensure relevance and effectiveness.

The literature reviewed thus far has emphasized the positive outcomes associated with OBE, particularly in improving students' language proficiency. However, it's essential to explore specific strategies and methodologies within OBE that contribute to this enhancement.

PRACTICAL APPLICATION OF OBE FOR LANGUAGE TEACHERS

Demonstrating effective applications of content knowledge within and across curriculum teaching areas is a powerful strategy for showcasing the principles of Outcome-Based Education (OBE) to students. As a language teacher, adopting an Outcome-Based Education approach means shifting the focus from delivering content to facilitating student-centric learning. Embracing this approach involves ensuring that students not only acquire knowledge but also develop practical language skills applicable in real-world contexts. To achieve this, it is crucial to transparently share the learning outcomes for each lesson or unit, clearly articulating what students are expected to know and be able to do by the end of the learning experience. This sets the stage for an outcomes-focused approach.



Moreover, it is important to demonstrate how language skills are interconnected with other disciplines. Designing lessons that incorporate real-world applications of language in various contexts, connecting the English language curriculum to subjects like science, history, or current affairs, helps students see the relevance and application of language skills across diverse areas of knowledge.

Implementing authentic assessments that mirror real-world scenarios is another crucial step. For example, if the learning outcome is effective communication, designing assessments where students need to create presentations, write reports, or engage in discussions on topics spanning multiple subject areas showcases the practical application of language skills beyond the confines of an English language class.

Additionally, working together with teachers from different subjects to co-teach integrated lessons shows students how language is used in various areas and encourages a collaborative learning environment. This method also helps to break down the barriers between different subjects, fitting with the interdisciplinary nature of Outcome-Based Education.

After completing interdisciplinary activities or projects, facilitating reflection sessions is essential. Encouraging students to reflect on how their language skills were applied and improved throughout the process and providing constructive feedback on both language proficiency and the application of knowledge are valuable practices.

By consistently modeling these practices, language teachers provide tangible examples of how language skills are intricately woven into the fabric of diverse subjects and real-world applications, aligning with the principles of Outcome-Based Education.

CONCLUSION

To conclude, our exploration into the symbiotic relationship between Outcome-Based Education (OBE) and the English language curriculum unravels a tapestry of insights crucial for modern pedagogy. The consolidation of literature reviews showcases the global recognition and adoption of OBE, emphasizing its transformative potential in aligning education with the dynamic demands of the 21st century. The literature not only underscores the effectiveness of OBE in enhancing language proficiency but also reveals challenges in its implementation, particularly in diverse cultural contexts.

As language educators, the responsibility to model effective applications of content knowledge within and across curriculum teaching areas becomes paramount. By crafting clear learning outcomes, fostering interdisciplinary connections, and employing authentic assessments, educators can illuminate the practical utility of language skills. The call for collaborative teaching, industry-relevant examples, and reflective practices emerges as a guide for seamlessly integrating language into various academic disciplines.

This comprehensive journey into OBE and the English language curriculum emphasizes the need for continuous professional development and a nuanced understanding of cultural contexts. As we navigate the pedagogical landscape, our role as educators is not merely to impart knowledge but to empower students with practical language skills that transcend disciplinary boundaries. The synthesis of literature reviews, practical considerations, and effective teaching models contributes to a holistic vision for shaping the future of language education within the dynamic framework of Outcome-Based Education, especially in the Philippine context where the Matatag Curriculum will soon be fully implemented.

REFERENCES

1. Alata, E. J. P. (2019). *Evaluation of outcomes-based private junior high school English curricula*. *International Journal of Curriculum and Instruction*, 11(1), 43–64.
2. Asim, H. M., Vaz, A., Ahmed, A., & Sadiq, S. (2021). *A review on outcome-based education and factors that impact student learning outcomes in tertiary education system*. *International Education Studies*, 14(2), 1-11. <https://doi.org/10.5539/ies.v14n2p1>
3. Duan, M. (2019). *Analysis on the application of OBE concept in college English teaching*. *Advances in Social Science, Education, and Humanities Research*, 378. <https://doi.org/10.2991/assehr.k.191217.060>
4. Khan, K., & Khan, F.N. (2017). *Implementing outcomes-based education in the foundation program at Dhofar University. Revisiting EFL assessment (pp. 85-104)*. https://doi.org/10.1007/978-3-319-32601-6_6
5. Ortega, R.A., & Ortega-Dela Cruz, R.A. (2016). *Educators' attitude towards outcomes-based educational approach in English second language learning*. *American Journal of Educational Research*, 4(8), 598-601. <https://doi.org/10.12691/education-4-8-3>
6. Rani, C. N. (2020). *A study on outcome-based education – Issues and challenges*. *International Review of Business and Economics*, 4(1), 271-279. <https://digitalcommons.du.edu/cgi/viewcontent.cgi?article=1220&context=irbe>
7. Schlebusch, G., & Thobedi, M. (2004). *Outcomes-based education in the English second language classroom in South Africa*. *The Qualitative Report*, 9(1), 35-48.



8. Zhang, G., & Fan, L. (2019). Research on the effectiveness of outcome-based education in the workplace communication curriculum of undergraduates. *Advances in Social Science, Education and Humanities Research*, 385, 246-249.
<https://doi.org/10.2991/assehr.k.191221.058>
9. Zhao, H. (2020). A study of college English teaching mode based on OBE concepts. *Advances in Social Science, Education, and Humanities Research*, 505, 453-457.



EXPLORING THE ROLE OF TEACHING TRAINING AND DEVELOPMENT

Smt. Jayashri Purushottam Borase

Assistant Professor, A.Y.K.K.'s College of Education, Dhule

ABSTRACT

This abstract explores the pivotal role of teacher training and development in shaping effective and responsive education systems. Investigating innovative pedagogies, technology integration, and a heightened focus on diversity and ethics, teacher training programs emerge as catalysts for preparing educators to meet the evolving challenges of contemporary classrooms. This study emphasizes the long-term impact of such training, extending beyond immediate skill acquisition to influence ongoing professional growth and, consequently, student outcomes. Investing in the continuous development of teachers is not merely an educational necessity but a societal imperative. By fostering key competencies, addressing well-being, and facilitating collaborative learning communities, teacher training and development contribute to a transformative educational experience. This abstract underscores the holistic approach required to nurture a teaching force capable of meeting the diverse needs of students and advancing a future where education stands as a beacon of empowerment, equity, and excellence.

KEYWORDS: *Education, Identification, Ethics, Development, Analysis*

INTRODUCTION

Education is the cornerstone of societal progress and at the heart of this transformative process lies the pivotal role of educators. The effectiveness of a nation's education system is intricately tied to the competence and dedication of its teachers. In this context, the exploration of the role of teacher training and development emerges as a critical inquiry into the very foundation of educational excellence. As we delve into the vast landscape of education, it becomes evident that the quality of teaching is not solely dependent on innate abilities but is profoundly influenced by the ongoing professional growth of educators. Teacher training and development programs serve as the compass guiding instructors through the dynamic currents of pedagogical advancements, technological shifts, and evolving student needs. This exploration is not merely an academic exercise but a crucial examination of the mechanisms that shape the future of generations. The nuances of teacher training and development go beyond the surface of instructional methodologies; they extend to the core of instilling passion, fostering innovation, and nurturing an environment where learning becomes a reciprocal journey. Teaching, training, and development are integral components that contribute to individual and organizational growth. Teaching involves the dissemination of knowledge in formal educational settings, training focuses on specific skill enhancement for job performance, and development encompasses continuous personal and professional growth. Together, they foster adaptability, lifelong learning, and enhanced productivity, playing crucial roles in shaping capable individuals and thriving organizations. Teaching, training, and development are not isolated endeavours; they work synergistically to shape well-rounded individuals and dynamic organizations. Lifelong learning, adaptability, and enhanced productivity emerge as common threads woven through these processes. The ability to learn continuously, adapt to change, and contribute meaningfully in various contexts underscores the collective impact of teaching, training, and development.

OBJECTIVES

1. Examine the existing landscape of teacher training and development programs in a specific educational context.
2. Explore how these competencies align with evolving educational standards and student needs.
3. Investigate various pedagogical approaches incorporated into teacher training programs.
4. Examine the integration of technology in teacher training and its impact on classroom practices.
5. Explore how teacher training programs address diversity in classrooms.
6. Investigate the long-term effects of teacher training and development on educators' professional growth
7. To study the point of view of graduate male and female students in need of teacher training and development program.



HYPOTHESIS

"Effective teacher training programs, with a focus on student-centered learning and differentiated instruction, will result in a measurable increase in students' critical thinking skills and overall learning outcomes."

RESEARCH METHODOLOGY

There are research paper to took the secondary data for the study as well as used of analytical and description accepted method for the research paper therefore the secondary sources of data are used for the present paper the sources of data are reference of book research paper and used of internet, survey of graduate students.

Present research depends upon present situation therefore survey method was used for this study. The sample of 100 male and 100 female graduate students. Simple random sampling was used for this study. The age range of sample was 25 to 30 years.. The scale consists of 40 items covering 5 dimensions of Educational Awareness among current Teachers in India.

The scale was administered individually as per respective suggestions to all students. For data analysis and interpretation mean, standard deviation, t Test was used.

RESULTS AND DISCUSSIONS

Variables	Mean	Standard Deviation	Table t value	Obtained t value	Significance level
Male	27.44	4.81	3.80	1.96	0.05
Female	29.88	6.30			

Above table shows the awareness of Education among current Teachers where, mean score among female students was higher than male. On df 198 obtained t value is 3.08 and table t value 1.96. the obtained t value is greater than table t value, so and even null hypothesis is rejected at 0.05 significance level. It indicates that there is significant difference about the results of awareness regarding to gender.

ASSESSING THE CURRENT STATE

The current state of teacher training and development in India is characterized by a mix of initiatives and challenges. The government has implemented various programs to enhance teacher education, such as DIETs and the ITEP scheme, with a focus on incorporating technology, modern pedagogical approaches, and inclusive education. However, there are persistent challenges related to the quality and standardization of training programs, regional disparities in accessibility, and addressing the mental well-being of educators. Efforts have been made to encourage continuous professional development, but the effectiveness and uniformity of such opportunities vary. Collaborations with international organizations aim to share best practices, and there is an ongoing evolution of policies to align with the changing dynamics of education. It's important to note that the landscape may have evolved since my last update, and for the latest information, one should refer to recent reports and studies on teacher training and development in India.

IDENTIFYING KEY COMPETENCIES

Identifying key competencies in the role of teacher training and development is essential for fostering effective educators. Key competencies encompass a range of skills and attributes crucial for navigating the complexities of modern classrooms. These include pedagogical expertise, incorporating innovative teaching methods, adapting to diverse learning needs, leveraging technology for enhanced instruction, and fostering a positive and inclusive classroom environment. Communication skills, both with students and parents, are vital, as is a commitment to continuous professional development. Cultural competence, emotional intelligence, and the ability to address the holistic well-being of students contribute to a comprehensive set of competencies. Identifying and nurturing these key competencies in teacher training programs are pivotal steps in preparing educators to meet the evolving demands of education and positively impact student learning outcomes.

ANALYZING PEDAGOGICAL APPROACHES

Analysing pedagogical approaches in the context of teacher training and development is a critical component of preparing educators for the dynamic landscape of modern education. Pedagogical approaches encompass a spectrum of teaching methodologies and strategies that influence how information is imparted and how students engage with content. Effective teacher training programs delve into research-based pedagogies, emphasizing learner-centered methods, active and experiential learning, and the integration of technology.



The analysis involves understanding the adaptability of these approaches to diverse student needs, fostering critical thinking, and creating an inclusive learning environment. Moreover, teacher training should empower educators to select and modify pedagogical approaches based on the unique requirements of their students, ensuring that instruction remains relevant, engaging, and conducive to fostering a lifelong love for learning.

TECHNOLOGY INTEGRATION

The integration of technology in the role of teacher training and development is a pivotal aspect of preparing educators for the 21st-century classroom. In the digital age, technology serves as a catalyst for transformative teaching practices. Teacher training programs focused on technology integration aim to equip educators with the skills to effectively use digital tools, online resources, and interactive platforms in their teaching methodologies. This involves not only technical proficiency but also an understanding of how technology can enhance student engagement, facilitate personalized learning experiences, and address diverse learning needs. Training programs emphasize the importance of digital literacy for both teachers and students, fostering the ability to critically evaluate and leverage technological resources for improved educational outcomes. The integration of technology in teacher training thus plays a crucial role in empowering educators to navigate the evolving landscape of education and prepare students for a technology-driven future.

UNDERSTANDING DIVERSITY AND INCLUSION

Understanding diversity and inclusion is a fundamental aspect of teacher training and development, reflecting the commitment to creating equitable and supportive learning environments. In the context of diverse student populations, effective teacher training programs emphasize cultural competence, awareness of varying learning styles, and strategies for inclusive teaching. Educators are equipped with the tools to recognize and address the unique needs of students from different backgrounds, including those with disabilities. The training fosters an appreciation for diversity, encouraging teachers to create an inclusive atmosphere that values and respects the contributions of all students. By promoting a culturally responsive and inclusive pedagogy, teacher training programs aim to ensure that educators are well-prepared to meet the diverse needs of their students, fostering an environment where every learner can thrive academically and emotionally.

EXAMINING LONG-TERM IMPACT

Examining the long-term impact of teacher training and development is crucial for assessing the sustained benefits that educators bring to the classroom over time. Effective teacher training programs go beyond immediate skill acquisition, focusing on the enduring influence on teaching practices and student outcomes. This involves tracking the professional growth of educators throughout their careers, evaluating how training contributes to their ongoing development, and understanding its influence on instructional methodologies. Long-term impact assessment also considers factors such as teacher retention rates, student achievements, and the overall quality of the educational environment. By examining the lasting effects of training initiatives, education stakeholders can make informed decisions on resource allocation and policy development, ensuring a continuous and positive trajectory for the educational landscape.

ETHICS AND PROFESSIONALISM IN TEACHING

Ethics and professionalism in teaching encompass the moral and ethical responsibilities educators have in their roles, contributing to a positive and effective learning environment. Professionalism in teaching involves adhering to a set of ethical principles, demonstrating integrity, and upholding the standards of the teaching profession. This includes maintaining confidentiality, respecting the rights and dignity of students, colleagues, and parents, and ensuring fairness and equity in educational practices. Ethical considerations also extend to issues such as plagiarism, grading transparency, and the responsible use of technology in the classroom. In essence, fostering a culture of ethics and professionalism in teaching not only contributes to the trust and respect of the educational community but also sets a foundation for students to learn and grow in an atmosphere of integrity and mutual respect.

TRAINING FOR SOFT SKILLS

Training for soft skills is a crucial aspect of teacher training and development, recognizing that effective teaching goes beyond subject matter expertise. Soft skills, encompassing interpersonal, communication, and emotional intelligence abilities, are integral to creating a positive and enriching learning environment. Soft skills are essential for teachers to engage students, build strong relationships, and create a conducive learning atmosphere. These skills contribute to effective communication, empathy, and adaptability, which are vital in addressing diverse student needs and fostering a supportive educational environment.



GLOBAL PERSPECTIVES ON EDUCATION

Global perspectives on education have become increasingly important in teacher training and development as the world becomes more interconnected and diverse. Teachers need to be equipped with a broad understanding of educational practices, cultural contexts, and global issues to effectively prepare students for the challenges and opportunities of an interconnected world. Global perspectives help teachers develop cultural competence, enabling them to understand and appreciate diverse cultures, languages, and customs. This awareness is crucial for fostering inclusive and respectful learning environments. Teachers play a pivotal role in shaping global citizens. Training with a global perspective emphasizes the importance of instilling values such as empathy, social responsibility, and awareness of global issues among students.

LEADERSHIP DEVELOPMENT

Leadership development for teachers is crucial as educators play a significant role in shaping the learning environment, influencing colleagues, and contributing to the overall success of schools and educational institutions. Effective teacher leadership goes beyond the classroom, encompassing instructional leadership, collaboration, and a commitment to continuous improvement. Teachers in leadership roles can contribute to the design and improvement of curricula, ensuring alignment with educational goals and standards. Encouraging and modeling innovative teaching strategies allows teachers to lead by example, inspiring colleagues to incorporate new methods into their classrooms.

CONCLUSION

In conclusion, the role of teacher training and development emerges as a linchpin in shaping the quality, effectiveness, and sustainability of education systems. Through a comprehensive exploration of innovative pedagogies, technology integration, and a heightened focus on diversity, inclusivity, and ethics, teacher training programs play a pivotal role in preparing educators for the dynamic challenges of modern classrooms. The long-term impact of such training extends beyond immediate skill acquisition, influencing the ongoing professional growth of teachers and, consequently, student outcomes. As we navigate the ever-evolving landscape of education, it is evident that investing in the continuous development of teachers is not just an educational imperative but a societal one. A commitment to fostering the key competencies of educators, addressing their well-being, and facilitating collaborative learning communities is essential for cultivating a teaching force equipped to nurture the diverse needs of students and contribute to a positive and transformative educational experience. In this holistic approach to teacher training and development, we pave the way for a future where education becomes a beacon of empowerment, equity, and excellence. From the above study of need in teacher development it shows that female graduates are much more aware than male graduates regarding teacher training and development.

REFERENCES

1. <https://www.blog.ipemgzb.ac.in/the-crucial-role-of-teacher-training-programs#:~:text=Enhancing%20professional%20competence%3A%20Teacher%20training,are%20essential%20for%20effective%20teaching>
2. <https://files.eric.ed.gov/fulltext/EJ1338294.pdf>
3. <https://educationforallinindia.com/teacher-training-in-india/>
4. *Training and Development Book by Dr. B. Janakiram*
Teaching Development in India Building on Grassroots Innovation and Technology by Vijay Sherry Chand, Samvet Kuril and Ketan Satish Deshmukh.



IMPACTS OF YOGIC PRACTICE WITH PLYOMETRIC TRAINING ON SELECTED MOTOR FITNESS VARIABLES AMONG VOLLEYBALL PLAYERS

P. Mahesh¹, Dr. V. Vallimurugan²

¹ Ph.D Research Scholar, Department of Physical Education, Bharathiar University, Coimbatore, Tamilnadu.

² Assistant Professor, Department of Physical Education, Bharathiar University, Coimbatore, Tamilnadu.

ABSTRACT

This study aims to investigate the impacts of incorporating yogic practice with plyometric training on selected motor fitness variables among volleyball players. Twenty participants were selected from V.C.V. Shishu Vidyodaya Matric. Hr. Sec. School in Coimbatore, Tamil Nadu, falling within the age group of 14 to 17 years. The subjects were divided into two equal groups, comprising ten players each – an experimental group and a control group.

Over an eight-week period, the experimental group engaged in a regimen that combined yogic practices with plyometric training, involving one hour per day for three days a week. In contrast, the control group did not participate in any structured training during the study period. The chosen motor fitness variables for assessment included flexibility, explosive power, and muscular strength.

Statistical analysis, employing the paired 't' ratio, was utilized to compare the means of pre-test and post-test data for both the experimental and control groups. The findings indicated a significant difference in the criterion variables. This difference was attributed to the impact of the combined yogic practice with plyometric training administered to the experimental group, showcasing improvements in flexibility, explosive power, and muscular strength compared to the control group. The results of this study shed light on the potential efficacy of integrating these two distinct training modalities for enhancing motor fitness variables among volleyball players.

KEYWORDS: *Yogic Practice, Plyometric Training, Flexibility, Explosive Power, Muscular Strength and Volley Players.*

INTRODUCTION

In the realm of sports and athletic performance, the quest for optimal training methods that seamlessly combine traditional practices with contemporary approaches is unceasing. One such intriguing synergy lies at the intersection of yogic practice and plyometric training, a convergence that holds the potential to significantly impact the motor fitness variables of volleyball players. This study delves into the exploration of the combined effects of yogic practices and plyometric training on selected motor fitness variables among volleyball players, aiming to unravel the potential synergies and enhancements these two diverse yet complementary methodologies might offer.

The comparison of yogic principles, renowned for their focus on mindfulness, flexibility, and holistic well-being, with plyometric training, a dynamic and explosive form of exercise aimed at maximizing power and performance, presents an intriguing fusion. Volleyball, a sport that demands a unique blend of strength, agility, and mental acuity, provides an ideal context for investigating the potential benefits of integrating these two distinct training modalities.

METHODOLOGY

This study aims to assess the impact of integrating yogic practice with plyometric training on selected motor fitness variables among volleyball players. The cohort comprised twenty subjects drawn from V.C.V. Shishu Vidyodaya Matric. Hr. Sec. School in Coimbatore, Tamil Nadu, falling within the age range of 14 to 17 years. These participants were evenly divided into two groups, namely the experimental group and the control group, each consisting of ten volleyball players.

Over an eight-week period, the experimental group underwent a regimen that combined yogic practices with plyometric training, engaging in one-hour sessions per day for three days a week. In contrast, the control group did not participate in any structured training throughout the study. The motor fitness variables selected for evaluation included flexibility, explosive power, and muscular strength, serving as the criterion variables in this investigation.



To analyze the data, a statistical approach utilizing paired 't' ratios was employed, comparing the means of the pre-test and post-test data for both the experimental and control groups. The results revealed significant differences in the criterion variables, indicating the notable impact of the combined yogic practice with plyometric training on enhancing flexibility, explosive power, and muscular strength in the experimental group when compared to the control group. This study contributes valuable insights into the potential benefits of integrating these two distinct training modalities for improving motor fitness variables among volleyball player.

Table – I: Selection of variables and criterion measures

S.No		Experimental Group	Control Group
1	Flexibility	Sit and Reach Test	Meters
2	Explosive Power	Standing Broad Jump	Meters
3	Muscular Strength	Sit-ups	Counts / Minutes

STATISTICAL TECHNIQUE

Data will be gathered both prior to and after the experimental intervention. The information acquired during the experimental period will undergo statistical analysis using a paired 't' test at a significance level of 0.05. The objective is to assess improvements in flexibility, explosive power, and muscular strength from the baseline to the post-treatment phase.

Table – II: The summary of t-ratio for the pre-test and post-test of experimental group and control group

S.No	Motor Fitness Variables	Groups	Test	Mean	't' value
1	Flexibility	Experimental group	Pre-test	22.40	26.00*
			Post-test	26.70	
		Control group	Pre-test	21.50	0.71
			Post-test	22.10	
2	Explosive Power	Experimental group	Pre-test	1.78	7.42*
			Post-test	1.81	
		Control group	Pre-test	1.75	0.83
			Post-test	1.77	
3	Muscular Strength	Experimental group	Pre-test	31.50	10.80*
			Post-test	34.60	
		Control group	Pre-test	27.50	1.08
			Post-test	30.50	

*Significance at 0.05 level

Table –II shows that the obtained mean values of pre-test and post-test of experimental group for flexibility, explosive power and muscular strength were 22.40 and 26.70, 1.78 and 1.81, 31.50 and 34.60 respectively, the obtained 't' ratio were 26.00*, 7.42*, 10.80* respectively. The tabulated 't' value is 2.26 at 0.05 level for the degree of freedom 9. The calculated 't' ratio was greater than the table value. It is found to be significant change in flexibility, explosive power and muscular strength of the volleyball players. The obtained mean values of pre-test and post-test of control group for flexibility, explosive power and muscular strength were 21.50 and 22.10, 1.75 and 1.77, 27.50 and 30.50. The required table value is 2.26 at 0.05 level for the degree of freedom 9. The calculated 't' ratio was lesser than the table value. It is found to be insignificant change in flexibility, explosive power and muscular strength of the volleyball players. The mean values of selected motor fitness variables among experimental group and control group are graphically represented in fig-1.

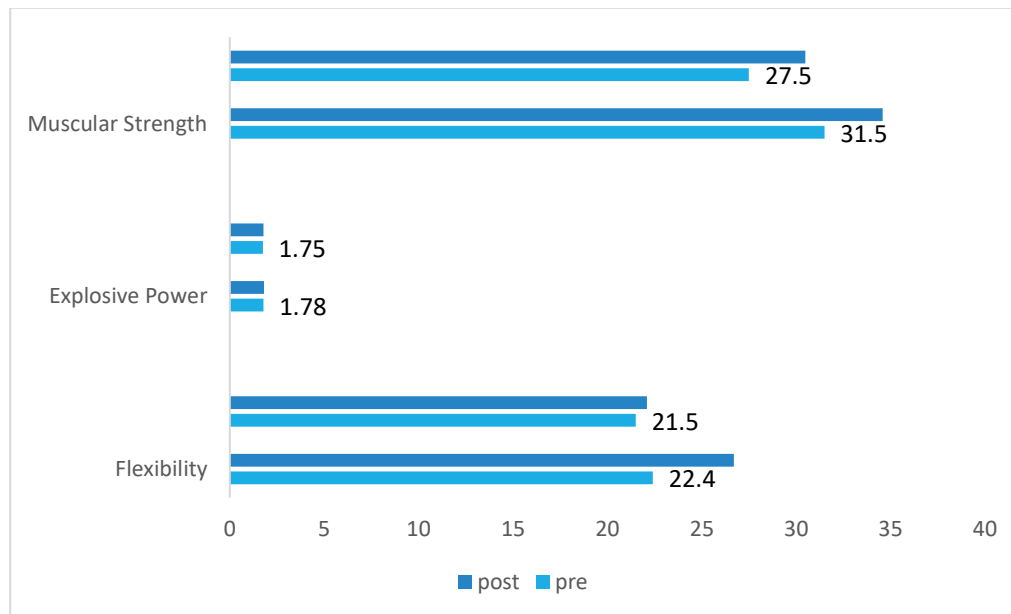


Fig-1: Bar diagram shows the pre-test and post-test on selected motor fitness variables of experimental group and control group

DISCUSSION ON FINDINGS

The study's outcomes revealed a significant enhancement in selected motor fitness variables, including flexibility, explosive power, and muscular strength, following the implementation of yogic practice with plyometric training. These improvements were attributed to the meticulous planning, preparation, and execution of the training regimen provided to the volleyball players. Notably, the findings of this study align with those of previous research conducted by Prasanna, **Sathiyabama et al (2023)¹**, **Senthil Kumaran et al (2021)²**, **Senthil Kumaran (2018)³**, and **Ooraniyan et al (2018)⁴**. The collective evidence from these studies suggests that the integration of yogic practice with plyometric training represents a valuable protocol for enhancing the aforementioned motor fitness variables among volleyball players. The clear and consistent improvements observed in flexibility, explosive power, and muscular strength underscore the effectiveness of this training approach. Consequently, the results of the present study contribute to the growing body of knowledge supporting the use of yogic practice with plyometric training as an appropriate and beneficial methodology for optimizing the physical performance of volleyball players.

CONCLUSION

Based on the study's findings and considering its limitations, it is evident that incorporating yogic practice with plyometric training contributes to the improvement of motor fitness variables among volleyball players. The research observed a consistent and progressive enhancement in the selected criterion variables for the group engaged in plyometric training over an eight-week period. This improvement encompassed increased muscular strength, heightened leg explosive power, and enhanced flexibility. In conclusion, the study determined that the customized yogic practice with plyometric training demonstrated statistically significant effects on motor fitness variables among volleyball players throughout the treatment period.

1. It was concluded that individualized effect of control group showed a statistically insignificant over the course of the period on selected motor fitness variables of among school level male volleyball players.
2. The results of comparative effects lead to conclude that the yogic practice with plyometric training group had better significant improvement on selected motor fitness variables of school level male volleyball players as compared to their performance with control group.

REFERENCES

1. **Sathiyabama, Senthil Kumaran and Rajesh. (2023).** *Yoga asana and yoga Nidra's different impacts on volleyball players anxiety levels. International Journal of Research in Special Education, 3(1), 16-17.*
2. **Senthil Kumaran, Jenith, Abdul Halik and Kodeeswaran (2021).** *Volleyball Players Skill Output in Response to Plyometric Training. Epra International Journal of Research and Development (IJRD), Volume-6, Issue-5, Pages: 176-179.*
3. **Senthil Kumaran (2018).** *Impacts of Plyometric Training on Selected Physical Fitness Variables among Basketball Players. International*



Journal of Yoga, Physiotherapy & Physical Education, Vol. 3 Issue 4, Pages: 52-54.

4. Ooraniyan and Senthil Kumaran (2018). Effect of Game Specific Aerobic Training on Motor Fitness Components among Handball Players. *International Journal of Yoga, Physiotherapy & Physical Education, 2018, Vol. 3 Issue 4, Pages: 68-70.*
5. Gayatri, C., & Sarojini, G. S. (2022). Effect of plyometric training with yogic practices and plyometric training without yogic practices on physical fitness variables among women cricket players.
6. R.Manoranjith, Dr.T.Arun Prasanna Prof.S.Nagarajan,(2020) Collusion of Different Ground Surface of Plyometric with Aerobic Training on Selected Agility and Explosive Power Among SchoolBoys Volleyball Players *International Journal of Advanced Science and Technology Volume 29, IssueNo.03 Pages 3827-3833*
7. Anand, M., Vaithianathan, K., Saran, K. S., & Prasanna, T. A. (2019). Effect of Game Specific Circuit Training and Plyometrics on Selected Physiological and Hematological Variables of Handball Players. *Indian Journal of Public Health Research & Development, 10(7).*
8. Prasanna, T. A., & Vaithianathan, K. (2019). The Combined Effect of Continuous Run, Alternate Pace Run and Fartlek Training on Selected Physiological Variable among Male Athletes. *Indian Journal of Public Health Research & Development, 10(3), 238-241.*
9. Anand, M., Vaithianathan, K., Saran, K. S., & Prasanna, T. A. (2019). Effect of Game Specific Circuit Training and Plyometrics on Selected Physiological and Hematological Variables of Handball Players. *Scopus Ijphrd Citation Score, 10(7), 375.*
10. Arunprasanna, T., Sundar, M., & Jaskar, K. M. M. (2019). Isolated and Combined Effect of Continuous Run Alternate Pace Run on Selected Motor Fitness Physiological Haematological Variables among Male Athletes. *Indian Journal of Public Health Research & Development, 10(11).*
11. Yokesh, T. (2019). Effects Of Plyometric Training With And Without Yogic Practices On Reaction Time Among Handball Players. *Think India Journal, 22(35), 801-804.*
12. Yokesh, T. (2019). Effects Of Plyometric Training With And Without Yogic Practices On Balance Among Handball Players. *Think India Journal, 22(10), 9357-9360.*



SUBSTANCE-RELATED AND ADDICTIVE DISORDERS: SUICIDE RISK ASSESSMENT

Marco Silenzi

Department of Human Sciences and Promotion of the Quality of Life, San Raffaele Roma Open University, Rome, Italy

Article DOI: <https://doi.org/10.36713/epra15189>

DOI No: 10.36713/epra15189

ABSTRACT

With the publication of the DSM-5 manual, gambling is placed in the category of "behavioral addictions" and renamed Gambling Disorder, along with substance addictions, in the substance and addictive disorders category. A change is made, compared to the DSM-IV that we could consider fundamental that is the shift of gambling from the impulse control chapter to the addiction chapter, in line with scientific research in recent years that has placed gambling closer to the addictive disorder.

The hypothesis of this paper is to test whether between the relevancies and risk factors involved in substance use disorders and addiction disorders, of which gambling disorder is currently the only categorized disorder, there may be an analogy for what concerns suicide risk.

KEYWORDS: *Gambling disorder; addictions; suicide risk*

LIST OF ABBREVIATIONS

SD= Standard Deviation; BHS= Beck Hopelessness Scale; GMDS= Gotland Scale for Assessing Male Depression SHSS= Suicidal History Self-Rating Screening Scale; ASL= Local Health Unit;

INTRODUCTION

Suicidal behaviors are among the major social and health issues worldwide. It is estimated that between 10% and 18% of adults on our planet experience thoughts of suicide at some point in their lives, with 3% to 5% of them attempting to take their own lives (Pompili & Tatarelli, 2010). Substance dependence in patients without other psychiatric disorders is calculated to contribute to the phenomenon in a range between 5% and 10% (Pompili & Tatarelli, 2007). It is important to consider that the data related to the suicide rate is likely underestimated due to the difficulty of making a correct assumption of suicide, rather than accidental death from overdose, accident, or even homicide.

Pathological gambling, in turn, due to some of its peculiarities, activates mechanisms very similar to those of substance dependencies. Over the years, an ever-growing number of researchers have noticed that especially alcoholism, substance abuse, and pathological gambling share close similarities. All these disorders involve states of activation that either increase or decrease the level of awareness in individuals. In gamblers, a genuine withdrawal syndrome can be found, with symptoms similar to opioid withdrawal. Furthermore, it has been observed that drinking, drug use, and gambling are sometimes carried out simultaneously or in sequence.

In the DSM V (American Psychiatric Association, 2013), gambling is placed in the category of "behavioral addictions" and renamed Gambling Disorder, alongside substance dependencies, under the category of "Substance-Related and Addictive Disorders."

The hypothesis of this study is to verify whether there might be an analogy among the associations and risk factors related to substance use disorders and addictive disorders, of which gambling disorder is currently the only categorized disorder, concerning the risk of suicide.

The participants in the research are 149 patients (80 males and 69 females) affiliated with ASL RM/6, during the period from July 2013 to July 2014. The average age of the patients is 44.42 years (SD= 11.50; range: 19-75 years). Inclusion criteria were an age of 18 years and older; exclusion criteria included major central nervous system pathologies (epilepsy, dementia, Parkinson's, etc.), and any other condition that would prevent completion of the assessment, including lack of informed consent. The research has been approved by the local ethics committee.



MATERIALS AND METHODS

All participants completed a sociodemographic questionnaire, which was useful for evaluating key sociodemographic variables such as age, gender, and education.

Additionally, they underwent a battery of tests, including:

- Temperament Evaluation of Memphis, Pisa, Paris, and San Diego - autoquestionnaire version (TEMPS-A) (Akiskal et al., 2005);
- Beck Hopelessness Scale (BHS) (Beck and Steer, 1989);
- Gotland Scale for Assessing Male Depression (GMDS) (Rutz, 1999);
- Suicidal History Self-Rating Screening Scale (SHSS) (Innamorati et al., 2011);
- Childhood Trauma Questionnaire (CTQ) (Bernstein & Fink, 1998).

Table 1 presents the main clinical and socio-demographic data of the sample. The sample composition based on the primary substance of abuse is distributed as follows: heroin 40 patients (26%), cocaine 34 patients (22.1%), alcohol 39 patients (25.3%), and gambling 36 patients (23.4%). 33.6% of the patients reported abusing at least one other substance in addition to the primary one, particularly alcohol (16.1%).

Table 1

Variables	Frequencies	%
Women	69	53,7
Age – Mean (SD)	44,42	(11,50)
Age at onset of behavior – Mean (SD)	26,14	(11,85)
Age of continued use – Mean (SD)	30,54	(11,95)
Age of first treatment – Mean (SD)	36,17	(11,99)
Primary substance of abuse		
Heroin	40	26
Cocaine	34	21,1
Alcohol	39	25,3
Gambling	36	23,4
Polyabuse	50	33,6
TEMPS-A		
Depression – Mean (SD)	10,11	(3,90)
Cyclothymia – Mean (SD)	9,53	(4,12)
Hyperthymia – Mean (SD)	10,05	(4,52)
Irritability – Mean (SD)	6,71	(3,92)
Anxiety – Mean (SD)	12,23	(5,71)
BHS – Mean (SD)	8,44	(4,62)
GMDS – Mean (SD)	11,08	(7,95)
SHSS – Mean (SD)	2,84	(2,76)
CTQ		
Emotional Abuse – Mean (SD)	7,67	(4,04)
Physical Abuse – Mean (SD)	9,12	(4,62)
Sexual Abuse – Mean (SD)	6,97	(3,47)
Emotional Neglect – Mean (SD)	13,51	(5,02)
Physical Neglect – Mean (SD)	10,65	(2,63)
Total Trauma – Mean (SD)	47,92	(15,47)

RESULTS

The data analysis was conducted using the statistical software SPSS 17.0 for Windows (IBM, Somers, NY, USA).

A comparison between the means of patients with or without polyabuse and with pathological gambling (PG) vs. substance dependence was performed using a series of independent samples t-tests. The comparison between patients with substance abuse (heroin, cocaine, alcohol) was carried out through Analysis of Variance (ANOVA). Post-hoc comparisons were executed using the Tamhane test. For variables measured on a nominal scale, a series of χ^2 chi-square tests were conducted.

Differences among patients based on the type of substance abuse

Substance abuse and socio-demographic differences

Socio-demographic differences based on the main substance of abuse are presented in **Table 2**. No significant differences were observed concerning age, gender, marital status, occupational status, and education level. Patients dependent on alcohol, compared



to patients with cocaine dependence, reported a significantly higher mean age at the onset of problematic behavior (25.00±11.09 vs. 19.71±4.76; $p = 0.032$). Alcohol-dependent patients also, in comparison to patients dependent on heroin and cocaine, reported a significantly higher mean age related to the continued use of the substance (31.27±10.59 vs. 23.82±6.04; $p = 0.001$; 31.27±10.59 vs. 25.38±7.34; $p = 0.024$) and the mean age of the first treatment (38.97±10.27 vs. 28.56±6.57; $p < 0.001$; 38.97±10.27 vs. 29.68±6.65; $p < 0.001$). Furthermore, patients with heroin and cocaine dependence, compared to alcohol-dependent patients, were more likely to report the abuse of a second substance (55% vs. 12.8%; $\chi^2_1 = 15.62$; $p < 0.001$; 44.1% vs. 12.8%; $\chi^2_1 = 8.05$; $p = 0.003$). Although the mean age was also significantly different among the three groups, post hoc analyses did not identify significant differences.

Table 2

	Heroin (40) Mean (SD)	Cocaine (34) Mean (SD)	Alcohol (39) Mean (SD)	Test		p	post hoc test
				F _{2;110}	χ^2_2		
Age	43,83±9,53	39,09±8,36	44,64±11,39	3,27		0,042	A = B = C [#]
Males - N (%)	22 (55)	19 (55,9)	20 (51,3)		0,18	0,914	
Married or in a stable relationship – N (%)	14 (35)	13 (39,4)	16 (41)		2,94	0,568	
Education ≥ 13 anni – N (%)	12 (30)	9 (26,5)	14 (36,8)		0,94	0,642	
Currently unemployed – N (%)	16 (42,1)	11 (33,3)	16 (42,1)		5,70	0,222	
No friends to rely on – N (%)	17 (42,5)	17 (50)	21 (55,3)		1,29	0,526	
Uses other substances – N (%)	22 (55)	15 (44,1)	5 (12,8)		16,05	<0,001	A,B> C
Age at onset of behavior	21,55±4,97	19,71±4,76	25,00±11,09	4,56		0,013	A = B; B < C [#]
Age of continued use	23,82±6,04	25,38±7,34	31,27±10,59	8,57		<0,001	A, B < C [#]
Age of first treatment	28,56±6,57	29,68±6,65	38,97±10,27	17,81		<0,001	A, B < C [#]

Note:

[#] = Tamhane post-hoc test

Substance Abuse, Depression, Hopelessness, and Suicidal Spectrum

The differences among groups are detailed in **Table 3**.

The three groups do not differ in the total scores on the GMDS, BHS, and SHSS. However, significant differences were found in death wishes in the last 12 months and suicidal plans in the last month. Patients dependent on heroin, compared to those dependent on cocaine, are more likely to report death wishes in the last 12 months (57.5% vs. 46.2%; $\chi^2_1 = 7.21$; $p = 0.007$) and suicidal plans (17.5% vs. 0%; $\chi^2_1 = 6.57$; $p = 0.01$). No difference was observed between patients with heroin dependence and alcoholic patients, and between alcoholic patients and those dependent on heroin.

Table 3

	Heroin (40) Mean (SD)	Cocaine (34) Mean (SD)	Alcohol (39) Mean (SD)	Test		p	post hoc test
				F	χ^2		
Total GMDS	12,45±9,56	10,09±6,24	11,67±7,62	0,81		0,447	
Total BHS	9,15±4,05	6,97±4,48	8,82±4,95	2,43		0,093	
Total SHSS	3,68±3,10	2,41±2,35	3,03±2,40	2,09		0,129	
Death wishes last 12 months - N (%)	23 (57,5)	9 (26,5)	18 (46,2)		7,26	0,027	A > B
Suicidal ideation last 12 months - N (%)	12 (30)	4 (11,8)	8 (20,5)		3,67	0,159	
Suicidal plans last 12 months - N (%)	17 (17,5)	0 (0)	4 (10,3)		6,42	0,040	A > B
Suicide attempt last 12 months - N (%)	2 (5)	1 (2,9)	1 (2,6)		0,37	0,830	
Death wishes lifetime - N (%)	30 (75)	18 (52,9)	24 (61,5)		3,99	0,136	
Suicidal ideation lifetime - N (%)	20 (50)	14 (41,2)	16 (41)		0,83	0,660	
Suicidal plans lifetime - N (%)	8 (20)	10 (29,4)	8 (20,5)		1,13	0,569	
Suicide attempt lifetime - N (%)	6 (15)	5 (14,7)	4 (10,3)		0,47	0,790	



Substance Abuse, Temperaments, and Childhood Trauma

The differences between groups are detailed in **Table 4**.

No significant difference was observed among the three groups regarding both temperamental aspects and different forms of childhood trauma. A trend towards significance was observed for depressive temperament, with patients with heroin and alcohol dependence reporting higher average scores than those with cocaine dependence.

Table 4.

	Heroin (40) Mean (SD)	Cocaine (34) Mean (SD)	Alcohol (39) Mean (SD)	Test F	p	post hoc test
TEMPS-A						
Depression	11,13±4,52	9,00±3,33	10,62±3,95	2,74	0,067	
Cyclothymia	9,48±4,31	9,21±4,32	9,82±3,61	0,21	0,812	
Hyperthymia	9,35±5,30	10,71±3,50	9,95±4,03	0,88	0,419	
Irritability	6,58±3,92	7,38±4,17	6,44±3,89	0,64	0,53	
Anxiety	13,35±6,40	11,47±5,42	12,87±5,58	1,01	0,368	
CTQ						
Emotional Abuse	7,85±3,85	7,35±3,56	7,36±3,75	0,23	0,798	
Physical Abuse	10,08±5,03	8,56±3,94	8,87±4,44	1,19	0,307	
Sexual Abuse	7,45±3,82	7,00±3,71	6,77±3,05	0,38	0,69	
Emotional Neglect	13,78±5,10	13,71±4,90	13,15±4,59	0,19	0,828	
Physical Neglect	10,93±2,98	11,12±2,41	10,21±2,11	1,35	0,263	
Total Trauma	50,08±16,97	47,74±14,07	46,36±14,08	0,61	0,547	

Differences between substance abusers and gambling disorder patients.

Socio-demographic differences

Differences between the two groups are presented in **Table 5**.

Patients with substance dependence, compared to those with gambling disorder, are characterized by a younger mean age (42.83±10.11 vs 49.86±13.88; $t_{47,39} = -2.87$; $p = 0.006$), a younger mean age at the onset of problematic behavior (22.14±7.78 vs 38.83±13.62; $t_{47,39} = -6.91$; $p < 0.001$), a younger mean age when the behavior becomes continuous (26.81±8.76 vs 42.29±13.13; $t_{47,39} = -6.53$; $p < 0.001$), and a younger mean age at the first treatment-seeking (32.30±9.20 vs 48.75±11.46; $t_{147} = -7.42$; $p < 0.001$). No differences were observed for other socio-demographic variables.

Table 5

	Substance Dependence (113) Mean (SD)	Gambling Disorder (36) Mean (SD)	Test	p
Age	42,83±10,11	49,86±13,88	$t_{47,39} = -2,87$	0,006
Males - N (%)	61 (54)	19 (52,8)	$\chi^2_1 = 0,02$	0,900
Married or in a stable relationship – N (%)	43 (38,4)	17 (47,2)	$\chi^2_1 = 1,09$	0,58
Education ≥ 13 anni – N (%)	35 (31,3)	12 (34,3)	$\chi^2_1 = 0,11$	0,737
Currently not employed – N (%)	67 (61,5)	23 (65,7)	$\chi^2_1 = 0,02$	0,652
No friends to rely on – N (%)	55 (49,1)	17 (47,2)	$\chi^2_1 = 0,04$	0,844
Use of other substances – N (%)	42 (37,2)	8 (22,2)	$\chi^2_1 = 2,74$	0,10
Age at onset of behavior	22,14±7,78	38,83±13,62	$t_{47,39} = -6,91$	<0,001
Age of continuous use	26,81±8,76	42,29±13,13	$t_{47,39} = -6,53$	<0,001
Age at first treatment	32,30±9,20	48,75±11,46	$t_{147} = -7,42$	<0,001



Substance Dependence, Gambling Disorder, Depression, Hopelessness, and Suicidal Spectrum

Differences between the two groups are presented in **Table 6**.

No significant differences were observed between patients with substance dependence and those with pathological gambling concerning total scores for depression and hopelessness. Similarly, no differences were revealed for any aspect of the suicidal spectrum.

Table 6

	Substance Dependence (113) Mean (SD)	Gambling Disorder (36) Mean (SD)	Test	p
Total GMDS	11,47±10,36	10,36±7,26	t ₁₄₇ = 0,74	0,462
Total BHS	8,38±4,57	8,64±4,88	t ₁₄₇ = -0,29	0,77
Total SHSS	3,07±2,68	2,33±3,03	t ₁₄₇ = 1,39	0,17
Wishes for death in the last 12 months - N (%)	50 (44,2)	11 (30,6)	χ ² ₁ = 2,12	0,146
Suicidal ideation in the last 12 months - N (%)	24 (21,2)	5 (13,9)	χ ² ₁ = 0,94	0,332
Suicidal plans in the last 12 months - N (%)	11 (9,7)	4 (11,1)	χ ² ₁ = 0,06	0,811
Suicide attempts in the last 12 months - N (%)	4 (3,6)	1 (2,8)	χ ² ₁ = 0,5	0,819
Wishes for death lifetime - N (%)	72 (63,7)	18 (50)	χ ² ₁ = 2,15	0,143
Lifetime suicidal ideation - N (%)	50 (44,2)	12 (33,3)	χ ² ₁ = 1,43	0,247
Lifetime suicidal plans - N (%)	26 (23)	6 (16,7)	χ ² ₁ = 0,65	0,420
Lifetime suicide attempts - N (%)	15 (13,3)	4 (11,4)	χ ² ₁ = 0,08	0,775

Substance Abuse, Gambling, Temperaments, and Childhood Trauma

The differences between groups are detailed in **Table 7**.

No significant differences were observed among the three groups regarding both temperamental aspects and different forms of childhood trauma. A trend toward significance was noted for depressive temperament, with patients with heroin and alcohol dependence reporting higher average scores compared to those with cocaine dependence.

Table 7

	Substance Dependence (113) Mean (SD)	Gambling Disorder (36) Mean (SD)	Test	p
TEMPS-A				
Depression	10,31±4,06	9,58±3,57	t ₁₄₇ = 0,96	0,338
Cyclothymia	9,51±4,06	9,97±4,29	t ₁₄₇ = -0,58	0,561
Hyperthymia	9,96±4,39	10,11±5,04	t ₁₄₇ = -0,17	0,867
Irritability	6,77±3,81	6,92±4,16	t ₁₄₇ = -0,20	0,844
Anxiety	12,62±5,84	11,06±5,04	t ₁₄₇ = 1,44	0,151
CTQ				
Emotional Abuse	7,53±3,70	7,58±4,03	t ₁₄₇ = -0,07	0,942
Physical Abuse	9,20±4,53	8,69±4,82	t ₁₄₇ = 0,58	0,564
Sexual Abuse	7,08±3,52	6,69±3,48	t ₁₄₇ = 0,57	0,567
Emotional Neglect	13,54±4,83	13,33±5,58	t ₁₄₇ = 0,22	0,830
Physical Neglect	10,73±2,54	10,53±2,79	t ₁₄₇ = 0,42	0,679
Total Trauma	48,09±15,11	46,83±15,37	t ₁₄₇ = 0,43	0,666

Differences between Polydrug Abusers and Single Substance Abusers.

Socio-demographic differences

The differences between the two groups are reported in **Table 8**.

Patients with poly-substance abuse differ from those dependent on a single substance in having a younger average age (40.40±9.71 vs 46.27±11.76; t_{115.17} = -3.27; p = 0.003), a younger average age when the behavior becomes continuous (26.80±8.06 vs



32.50±13.19; $t_{115,17} = -3.27$; $p < 0.001$), and a younger average age when they seek the first treatment (31.59±8.75 vs 38.45±12.71; $t_{115,17} = -3.74$; $p < 0.001$).

Furthermore, these patients are more likely to be male (66% vs 45.2%; $\chi^2_1 = 5.86$; $p = 0.016$) and report more individuals they can rely on (66% vs 45.6% $\chi^2_1 = 5.60$; $p = 0.018$).

No differences were found for other socio-demographic variables.

Table 8

	Poly-substance Abusers (50) Mean (SD)	Mono-substance Abusers (104) Mean (SD)	Test	p
Age	40,40±9,71	46,27±11,76	$t_{115,17} = -3,27$	0,003
Males - N (%)	33 (66)	47 (45,2)	$\chi^2_1 = 5,86$	0,016
Married or in a stable relationship – N (%)	19 (38,8)	42 (40,4)	$\chi^2_1 = 0,86$	0,652
Education ≥ 13 anni – N (%)	11 (22)	38 (37,3)	$\chi^2_1 = 3,57$	0,059
Currently unemployed – N (%)	32 (66,7)	60 (59,4)	$\chi^2_1 = 0,73$	0,394
No friend to rely on – N (%)	34 (17)	56 (54,4)	$\chi^2_1 = 5,60$	0,018
Age at onset of behavior	23,80±7,75	27,24±13,90	$t_{115,17} = -1,69$	0,093
Age of continuous use	26,80±8,06	32,50±13,19	$t_{115,17} = -3,27$	<0,001
Age at first treatment	31,59±8,75	38,45±12,71	$t_{115,17} = -3,74$	<0,001

Poly-substance Abuse, Depression, Hopelessness, and Suicidal Spectrum

Differences between the two groups are reported in **Table 9**.

Patients with poly-substance abuse, compared to those dependent on a single substance, reported significantly higher scores in GMDS (12.94±8.42 vs 10.18±7.59; $t_{152} = 2.04$; $p = 0.043$) and in SHSS (3.57±2.87 vs 2.50±2.66; $t_{152} = 2.21$; $p = 0.028$). Moreover, patients with poly-substance abuse, compared to those dependent on a single substance, have a higher probability of reporting lifetime death wishes excluding the last 12 months (74% vs 52.9%; $\chi^2_1 = 6.26$; $p = 0.012$) and lifetime suicidal ideation excluding the last 12 months (56% vs 33.7%; $\chi^2_1 = 6.98$; $p = 0.008$).

Table 9

	Poly-substance Abusers (50) Mean (SD)	Mono-substance Abusers (104) Mean (SD)	Test	p
total GMDS	12,94±8,42	10,18±7,59	$t_{152} = 2,04$	0,043
total BHS	8,28±4,54	8,52±4,68	$t_{152} = -0,30$	0,765
total SHSS	3,57±2,87	2,50±2,66	$t_{152} = 2,21$	0,028
Wishes for death in the last 12 months - N (%)	23 (46)	39 (37,5)	$\chi^2_1 = 1,01$	0,314
Suicidal ideation in the last 12 months - N (%)	11 (22)	18 (17,3)	$\chi^2_1 = 0,49$	0,846
Suicidal plans in the last 12 months - N (%)	6 (12)	9 (8,7)	$\chi^2_1 = 0,43$	0,512
Suicide attempts in the last 12 months - N (%)	1 (2)	4 (3,9)	$\chi^2_1 = 0,5$	0,819
Wishes for death lifetime - N (%)	37 (74)	55 (52,9)	$\chi^2_1 = 6,26$	0,012
Lifetime suicidal ideation - N (%)	28 (56)	35 (33,7)	$\chi^2_1 = 6,98$	0,008
Lifetime suicidal plans - N (%)	13 (26)	20 (19,2)	$\chi^2_1 = 0,92$	0,338
Lifetime suicide attempts - N (%)	9 (18,4)	10 (9,6)	$\chi^2_1 = 2,35$	0,126



Poly-substance Abuse, Temperaments, and Childhood Trauma

Group differences are detailed in *Table 10*.

Concerning temperamental aspects, patients with poly-substance abuse, compared to those dependent on a single substance, reported significantly higher scores in the subscales of depression (11.04±4.03 vs 9.66±3.78; $t_{152} = 2.07$; $p = 0.040$), cyclothymia (10.86±3.92 vs 8.88±4.08; $t_{152} = 2.85$; $p = 0.005$), and anxiety (14.28±5.07 vs 11.24±5.76; $t_{152} = 3.18$; $p = 0.002$). Regarding childhood trauma, patients with poly-substance abuse, furthermore, compared to those dependent on a single substance, reported significantly higher scores in the subscale of sexual abuse (9.78±4.63 vs 8.02±4.08; $t_{152} = 1.25$; $p = 0.002$). A trend towards significance was also observed in the total score of the CTQ (51.24±16.58 vs 46.32±14.72; $t_{152} = 1.87$; $p = 0.064$).

Table 10

	Poly-substance Abusers (50)	Mono-substance Abusers (104)	Test	p
	Mean (SD)	Mean (SD)		
TEMPS-A				
Depression	11,04±4,03	9,66±3,78	$t_{152} = 2,07$	0,040
Cyclothymia	10,86±3,92	8,88±4,08	$t_{152} = 2,85$	0,005
Hyperthymia	9,18±4,56	10,47±4,47	$t_{152} = -1,67$	0,097
Irritability	6,82±3,54	6,65±4,11	$t_{152} = 0,25$	0,807
Anxiety	14,28±5,07	11,24±5,76	$t_{152} = 3,18$	0,002
CTQ				
Emotional Abuse	8,02±4,02	7,50±4,05	$t_{152} = 0,75$	0,456
Physical Abuse	9,78±4,63	8,80±4,60	$t_{152} = 1,25$	0,218
Sexual Abuse	8,02±4,08	6,47±3,03	$t_{152} = 2,64$	0,009
Emotional Neglect	14,50±5,40	13,03±4,78	$t_{152} = 1,71$	0,089
Physical Neglect	10,92±2,99	10,52±2,48	$t_{152} = 0,89$	0,377
Total Trauma	51,24±16,58	46,32±14,72	$t_{152} = 1,87$	0,064

DISCUSSIONS

In this study, given the documented similarities in the literature between "substance use disorder" and "gambling disorder," an investigation was conducted to determine if there was a higher level of suicidal ideation in a sample composed of individuals with heroin dependence, cocaine dependence, alcohol dependence, and gambling addiction.

Regarding substance use, no significant differences were found between the groups, except for suicidal thoughts in the last 12 months and suicidal plans in the last month. Specifically, patients dependent on heroin, compared to those dependent on cocaine, were more likely to report suicidal thoughts (57.5% vs. 46.2%) and suicidal plans (17.5% vs. 0%) in the last 12 months. No differences were observed between patients with heroin dependence and alcoholic patients, as well as between alcoholic patients and patients dependent on cocaine. A trend towards significance was also noted for depressive temperament, with patients dependent on heroin and alcohol reporting higher average scores than those dependent on cocaine.

Regarding the comparison between substance use disorder and gambling addiction, no significant differences were found between the two groups, both in terms of total depression and hopelessness scores. Moreover, no significant differences were observed in any aspect of the suicidal spectrum between these two groups.

A significant difference was found between the grouping of "poly-substance abusers" and those without poly-substance abuse. Poly-substance abusers, compared to individuals dependent on a single substance or behavior, were characterized by a lower average age, an earlier onset of continuous behavior, and an earlier age when seeking initial treatment. Additionally, they were more likely to be male and reported having a larger social support network (interpreted, perhaps, as a larger circle of friends with similar substance abuse issues).

Poly-substance abusers, compared to those dependent on a single substance, reported significantly higher scores on the "Gotland Scale for Assessing Male Depression" (GMDS) and the "Suicidal History Self-Rating Screening Scale" (SHSS). Furthermore, they were more likely to report lifetime suicidal thoughts, excluding the last 12 months, and lifetime suicidal ideation, excluding the last 12 months.

In terms of temperamental aspects, poly-substance abusers, compared to those dependent on a single substance, reported significantly higher scores in the subscales of depression, cyclothymia, and anxiety. Regarding childhood trauma, poly-substance



abusers, compared to those dependent on a single substance, reported significantly higher scores in the subscale of sexual abuse, with a trend towards significance in the total score of the Childhood Trauma Questionnaire (CTQ).

CONCLUSIONS

From the observations, it can be concluded that in our sample, no significant differences emerged concerning the observed dependence, whether from substances or gambling. However, a higher vulnerability and an increased risk of suicide were evident in users dependent on multiple substances or both substances and gambling (poly-substance abusers) compared to those with dependence on a single substance or gambling alone.

REFERENCES

1. Akiskal, H.S., Akiskal, K.K., Haykal, R.F., Manning, J.S. & Connord, P.D. (2005). *TEMPS-A: progress towards validation of a self-rated clinical version of the Temperament Evaluation of the Memphis, Pisa, Paris, and San Diego Autoquestionnaire*. *Journal of Affective Disorders*. Vol. 85, Issues 1–2, Pp 3–16
2. American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders (5th ed.)*. Arlington, VA: American Psychiatric Publishing. Edizione italiana: *Manuale diagnostico e statistico dei disturbi mentali*. Raffaello Cortina, Milano, 2014.
3. Bastiani, L., Gori, M., Colasante, E., Siciliano, V., Capitanucci, D., Jarre, P., et al. (2013). *Complex factors and behaviors in the gambling population of Italy*. *Journal of Gambling Studies*, 29(1), 1-13.
4. Beck, A.T., Weissman, A., Lester, D. & Trexler, L. (1974). *The measurement of pessimism: The Hopelessness Scale*. *Journal of Consulting and Clinical Psychology*, Vol 42(6), Pp. 861-865.
5. Beck, A.T., Brown, G. & Steer, R.A. (1989). *Prediction of eventual suicide in psychiatric inpatients by clinical ratings of hopelessness*. *Journal of Consulting and Clinical Psychology* 57, 2, 309-310.
6. Beck, A.T., Brown, G., Berchick, R.J., Stewart, B.L. & Steer, R.A. (1990). *Relationship between hopelessness and ultimate suicide: a replication with psychiatric outpatients*. *American Journal of Psychiatry* 147, 2, 190-195.
7. Bernstein, D. P., & Fink, L. (1998). *Childhood Trauma Questionnaire: A retrospective self-report manual*. San Antonio, TX: The Psychological Corporation.
8. Capitanucci, S. (2006). *Post-modernità e nuove dipendenze*, in *Prospettive Sociali e Sanitarie*, n. 6.
9. Caretti, V., & La Barbera, D. (2009). *Le nuove dipendenze: diagnosi e clinica*. Carocci Ed. - Roma.
10. Clerici, M. (2007). *Suicidio e Tentativi di Suicidio nei disturbi correlati all'uso di sostanze in "doppia diagnosi"*. *Studi su aggressività e suicidio*, 9, 5-10.
11. Gilberti, F. & Rossi, R. (2009). *Manuale di Psichiatria, IV ed. aggiornata*, Piccin Nuova Libreria - Padova.
12. Innamorati, M., Pompili, M., Gonda, X., Amore, M., Serafini, G., Niolu, C., et al. (2011). *Psychometric properties of the Gotland Scale for Depression in Italian psychiatric inpatients and its utility in the prediction of suicide risk*. *Journal of affective disorders*, 132(1-2), 99-103.
13. Innamorati, M., Pompili, M., Serafini, G., Lester, D., Erbutto, D., Amore, M., Tatarelli, R. & Girardi, P. (2011). *Psychometric Properties of the Suicidal History Self-Rating Screening Scale*. *Archives of Suicide Research*. Vol. 15, Issue 1, Pp. 87-92.
14. Lesieur, H.R. & Blume, S.B. (1987). *The South Oaks Gambling Screen (SOGS): A new instrument for the identification of pathological gamblers*. *American Journal of Psychiatry*, 144 (9), 1184-1188.
15. Pompili, M., Innamorati, M., Lester, D., Akiskal, H.S., Rihmer, Z., Del Casale, A., Amore, M., Girardi, P. & Tatarelli, R. (2009). *Substance Abuse, Temperament and Suicide Risk: Evidence from a Case-Control Study*. *Journal of Addictive Diseases*. Vol. 28, Issue 1, Pp. 13-20.
16. Pompili, M. & Tatarelli, R. (2007). *Suicidio e suicidologia: uno sguardo al futuro*. *Minerva Psichiatrica*, 48, 99-118.
17. Pompili, M. & Tatarelli, R. (2010). *La prevenzione del suicidio in psicoterapia*. Alpes, Roma.



SCIENTIFIC HERITAGE OF THE SAM'ANI FAMILY

Halilulloh Yusupov

Phd Student, International Islamic Academy of Uzbekistan

ABSTRACT

In the lands of Movarounnahr and Khurasan, famous families who have gone to the world with science lived and worked. They made their unique contributions to Islamic heritage in the fields of fiqh, kalam and hadith. Moza Bukhari dynasty in Movarounnahr, Ibn Manda dynasty and Sam'ani dynasty in Khorasan are vivid examples. Among them, the Samani family is the subject of research.

KEYWORDS: *Hadith, science of hadith, muhaddith, sunnah, school of hadith, memorization of hadiths, writing of hadiths.*

INTRODUCTION

Abu Muzaffar Sam'ani and Abu Sa'd Sam'ani, whose words are cited as evidence in the books of hadith science and usul fiqh, were the representatives of this blessed dynasty. The Samani family lived in Marv, Khorasan. During the centuries in the history of Khorasan, this dynasty spread knowledge from generation to generation. In particular, Abu Sa'd Sam'ani is well known to eastern and western researchers with his masterpiece "Al-Ansab". The biographies of scientists from Movarounnahr in the work have been translated into Uzbek.

REFERENCES AND METHODOLOGY

The Sam'ani ratio belongs to one of the Tamim tribes, and the dynasty is known by this ratio. The laudatory words of scholars about the Sam'ani family have come down to us. In the bibliography of scholars of the Shafi'i sect, Tajiddin Subki, Khorezmi says about Abu Sa'd Samani: "The Sam'ani family is one of the most valuable families in Islamic countries. Abu Sa'd's forefathers were pioneers in Shariah sciences and were among the virtuous and exemplary personalities of their time in terms of knowledge and morals. About the dynasty, Ibn Asir says: "The Sam'anids are the house of knowledge and have achieved worldly and religious happiness."

The Egyptian scientist Abdulazim Munziri in his treatise Jarh and Tadil said: "I was informed by Abu Muzaffar Abdurahim Hafiz", and he called the person "al-asyl" (Arabic: noble, white-boned). Munziri's teacher Abu Muzaffar belonged to the Sam'ani dynasty and was the son of Abu Sa'd Sam'ani. With this quality, Munziri meant that he was a representative of the family of intellectuals.

1. The eldest of the representatives of the dynasty is Abu Mansur Muhammad ibn Abdul Jabbar ibn Ahmad. He was a Marvite, a judge of his time, one of the jurists of the Hanafi sect. Historian Zahabi quoted the scholar's biography and described him as "a pious man, a connoisseur of the Arabic language, a lexicographer." Abu Sa'd Sam'ani remembered: "He was the first among our forefathers to tell hadith." The scholar's published works on various topics include "Tuhfatul iyyayn", "Duhulul Hammam", "Majmu' Gharaibul Ahadis" and other works related to the grammar of the Arabic language.

2. Abu Muzaffar Sam'ani, whose full name is Mansur ibn Muhammad ibn Abdul Jabbar ibn Ahmad, is one of the representatives of the dynasty that created a fruitful work. Historian Zahabi says: "He was educated under his father Abu Mansur." He became a prominent jurist in the Hanafi school. Abu Hasan Abdulghafir remembered the scientist and said: "He was the only one of his age in knowledge, asceticism and piety. He read books of hadith. He went on a pilgrimage." Abu Sa'd Sam'ani listed the works of the scholar: "He classified books on tafsir, fiqh, usul al-fiqh and hadith science. Tafsir books are in three volumes. The study of the scientist's life and scientific heritage requires a separate study.

3. Abu Muzaffar Samani's brothers are Abul Qasim Ali ibn Muhammad ibn Abdul Jabbar ibn Ahmad. Abu Sa'd Sam'ani described his great-grandfather as a "virtuous scholar".

4. Abu Muzaffar Samani's son Abu Bakr Muhammad was one of the successors of the dynasty. Abu Muzaffar was proud of his son, he used to say about him at the spelling meeting: "Muhammad is more knowledgeable than me." He is the father of Abu Sa'd Sam'ani.

5. Abu Muzaffar Abdulwahab ibn Muhammad ibn Mansur ibn Muhammad ibn Abduljabbar ibn Ahmad. Abu Sa'd Sam'ani remembers about that person: "My elder brother, my father told us both a hadith in Nishapur." He died at the age of twelve.



6. Abu Muhammad Hasan ibn Mansur ibn Muhammad ibn Abdul Jabbar ibn Ahmad. Abu Sa'd was Samani's uncle. About his uncle: "He was ascetic and pious. He did pray Tahajjud. He was away from people. He left his house only on Friday for prayer. I heard many hadiths from that person. He used to urinate on me, he loved me," he mentioned.

7. Abu Mansur Muhammad ibn Mansur ibn Muhammad ibn Abdul Jabbar ibn Ahmad. Abdulkarim Samani about his cousins: "A good guy. He was a master of poetry. I heard many poems from him. "He died before he was forty."

8. One of Abdulkarim Samani's uncles is Abul Kasim Ahmad ibn Mansur ibn Muhammad ibn Abduljabbar ibn Ahmad. Sam'ani said about him: "My little uncle, my teacher. I learned jurisprudence from him. He was a great imam, mufti, famous preacher. He was the owner of high virtue. He was brought up by my father. He learned from him. We traveled to Sarakhs and Nishapur together," he recalls.

9. Abul Ala Ali ibn Ali ibn Muhammad ibn Abdul Jabbar. He learned from Abu Muzaffar Sam'ani.

10. Abu Sa'd Abdulkarim ibn Abu Bakr Muhammad ibn Mansur ibn Muhammad ibn Abdul Jabbar. Author of "Al-Ansab", "Adabul Imla wal Istimla" and other valuable works.

11. Hurra bint Abu Bakr Muhammad ibn Mansur ibn Muhammad ibn Abdul Jabbar. Sister of Abu Sa'd Abdulkarim Sam'ani. The scientist said about that person: "Saliha, a chaste woman." He was always reciting the Qur'an. He was the patron of goodness. She was in a hurry to do righteous deeds. "I received permission by reading some hadiths to my sister," he mentioned.

12. Abul Ma'ali Muhammad ibn Ahmad ibn Mansur ibn Abdul Jabbar ibn Ahmad. One of Sam'ani's cousins. Historian Zahabi: "He came to Baghdad. He preached there for a while. He died in Baghdad. In the history books of Khorezm, it is said that the scientist went there twice.

13. Abul Muzaffar Abdurahim ibn Abdulkarim ibn Muhammad ibn Mansur ibn Abduljabbar ibn Ahmed. Son of Abu Sa'd Sam'ani. Zahabi said: "He was an allama, a mufti, a muhaddith. He was the imam of the Shafi'i sect.

14. Abu Zayd Muhammad ibn Abdulkarim ibn Muhammad ibn Mansur ibn Abduljabbar ibn Ahmad. Son of Abu Sa'd Sam'ani.

DISCUSSION AND RESULTS

Research and studies have revealed the following:

- The Sam'ani dynasty is well known;
- There are 14 scientists whose biographies are mentioned, 13 of them are men and one is a woman;
- The number of works belonging to the Samani family is 88;
- Among the dynasty, the most famous are Abul Muzaffar and Abu Sa'd Sam'ani;

The last representatives of the Samani family, which had been leading the field of science for many years, were destroyed during the Mongol invasions.

REFERENCES

1. Dr. Mahmoud Tahhon. *Taysir mustalah hadith. -Riyad, Maktabatul Maarif, 1987.*
2. Shaykh Muhammad Sadiq Muhammad Yusuf. *Hadith and life. -T.: Sharq, 2003*
3. Translation Team. *The golden sill is Sahihul Bukhari. - T.: Hilal - Nashr 2013*
4. Ibn Hajar Asqalani. *Fathul Boriy Bisharhi Sohiyhil Bukhori. - Cairo: Dor ur-Royan lith-turos, 1988.*
5. Mustafa Muhammad Ammora. *Javohiril Bukhori and Sharhul Kastaloni. - UAE, Dorul ulum.*
6. Daniel L. Pals. *Seven Theories of Religion. New York-Oxford: Oxford University Press, 1996. 7+294 pp.*
7. Fuat Sezgin. *Geschichte des Arabischen Schrifttums. Band I. - Leiden, E.J.Brill, 1967. - 14+936 pp.*
8. *The Islamic Concept of Belief in the 4th/10th Century. Abū l-Lays as-Samarqandī's Commentary on Abū Hanīfa (died 150/767) al-Fiqh al-absat / Introduction, Text and Commentary by Hans Daiber. - Tokyo: Institute for the Study of Languages and Cultures of Asia and Africa (ILCAA) Tokyo University of Foreign Studies, 1995. - 309 pp.*
9. Kavakci, Yusuf Ziya. *XI ve XII. Asırlarda Karahanlılar Devrinde Māvāra' (!) al-Nahr Islām Hukukçuları. Ankara, 1976 (Atatürk Üniversitesi Yayınları, 430). - XXIV+322 c.*
10. Lewis M. Hopfe. *Religions of the World. - Upper Saddle River, New Jersey, 2001. - 17+400 pp.*
11. Mitchell T.F. *An Introduction to Egyptian Colloquial Arabic. Lecturer in Linguistics School of Oriental and African Studies. - London: Oxford University Press-New York-Toronto, 1960. 12+285 pp.*
12. Ibrahim T., Sagadeev A. *Classical Islamic Philosophy. Translated from the Russian by H.Campbell Creighton, M.A.(Oxon). - Moscow: Progress Publishers, 1991. - 350 pp. (Артур Владимирович Сагадеев, Тауфик Камель Ибрагим. Классическая арабо-мусульманская философия. На английском языке).*
13. *Classical Approaches to the Study of Religion: Aims, Methods and Theories of Research. 1: Introduction and Anthology by Jacques Waardenburg, University of Utrecht // Religion and Reason. Method and Theory in the Study and Interpretation of Religion. General editor: Jacques Waardenburg, University of Utrecht. - Mouton-The Hague-Paris, 1973. - 742 pp.*



14. Eliade Mircea. *A History of Religious Ideas. Vol. 3. From Muhammad to the Age of Reforms.* – Chicago and London: The University of Chicago Press, 1985. – 12+360 pp.
15. Eric J. Sharpe. *Comparative Religion: A History. Second edition.* Great Britain, 2003. 16+344 pp.
16. Robert C. Monk, Walter C. Hofheinz, Kenneth T. Lawrence, Joseph D. Stemey, Bert Affleck, Tetsunao Yamamory. *Exploring Religious Meaning. Fourth edition.* – Prentice Hall, Englewood Cliffs, New Jersey, 1994. – 13+337 pp.
17. Vernon S. McCasland, Grace E. Cifers, David C. Yu. *Religions of the World.* – New-York: Random House, 1969. – 16+760 pp.



PREPARATION OF SHORT-DISTANCE PARALYMPIC ATHLETES FOR COMPETITION

Umarova Mohiro'y Rasiljon qizi

Basic Doctoral Student, Uzbek State University of Physical Culture and Sport

ABSTRACT

This scientific article aims to study the main elements involved in the Paralympics. By analyzing the training techniques, necessary adaptations, and mindsets of these athletes, we can better understand the challenges they face and the strategies they use to succeed.

KEYWORDS: *Paralympics, strategy, weightlifting, high-intensity interval training, running.*

The Paralympic Games have emerged as a platform for athletes with disabilities to showcase their extraordinary talent and determination. Among the various disciplines, sprinting has gained a lot of attention due to its high intensity and exciting nature. The training required of Paralympic short-distance runners is unique and demanding given the physical handicaps they face. Understanding the training process not only provides valuable insights into the physical abilities of Paralympic runners, but also sheds light on their indomitable spirit and resilience.

In the process of preparing for the competition, physical training plays an important role in improving the Paralympic short-distance performance. A well-designed training program focuses on specific areas such as strength, speed, agility, and endurance that are critical to achieving peak athletic performance. Strength training, including resistance training and weightlifting, is aimed at developing the muscles needed for explosive movements during sprinting. Speed training, including interval and repetition training, increases runners' maximum speed, allowing them to reach top speed more efficiently and sustain it for longer. In addition, agility training improves athletes' ability to quickly change direction and maintain balance during a race, and finally, endurance training through long-distance running and high-intensity interval training helps runners develop aerobic capacity, enabling them to perform at longer distances and durations. That's why a comprehensive fitness regimen is crucial in preparation for the Paralympic short-distance events, ensuring optimal performance on the field.

Psychological preparation for Paralympic short distance runners is critical to their overall success in the competition. Athletes in this category face unique challenges due to their physical disabilities, which require a tailored approach to their mental preparation. One of the important aspects of their psychological preparation is the development of a strong sense of self-confidence and self-confidence. Short-distance runners not only have to overcome physical obstacles, but also the social stigma surrounding their disability. By developing a positive mindset, athletes can develop a strong belief in their abilities and overcome any doubts or negative thoughts that may arise. Also, mental toughness is essential to deal with the pressure of competition.

Psychological Preparation for Paralympic Short Distance Runners In addition to physical training, preparing Paralympic short distance runners for competition should also include careful attention to their nutritional needs. Because the demands of sprinting are extremely taxing on the body, proper fueling and hydration are essential to optimize performance and recovery. First, it is necessary to consume sufficient carbohydrates to ensure sufficient glycogen stores in the muscles, which serve as the main fuel source during high-intensity exercise. Short distance runners need to eat a diet rich in complex carbohydrates such as whole grains, fruits and vegetables to meet their energy requirements. In addition, protein intake should be sufficient to support muscle recovery and growth. Research shows that consuming protein post-workout can enhance recovery and contribute to better training adaptations. In addition, proper hydration is essential for optimal performance. Fluid requirements should be adjusted according to individual sweat rates and environmental conditions to prevent dehydration and electrolyte imbalance. By addressing these key nutritional issues, Paralympic sprinters can optimize their training and fuel adequately for competitive success.

Another important aspect of preparing Paralympic sprinters for competition is technical training. Technical training focuses on refining and improving the specific skills and movements required for optimal performance in short distance running events. This training not only focuses on improving general Sprint technique, but also addresses unique challenges faced by athletes with physical disabilities. Different modifications and adaptations may be necessary to meet the different needs of Paralympic runners. Some key areas of technical training include stride length, stride frequency, starting technique, acceleration, deceleration, change of direction,



and sprint mechanics. Coaches and trainers work closely with athletes to identify areas of improvement that can lead to marginal increases in time and performance. Using video analysis and advanced motion-tracking systems, give expert athletes detailed feedback and help them make the necessary adjustments to their running. This technical training plays a crucial role in enabling Paralympic sprinters to reach their full potential and compete at the highest level in international competitions.

SUMMARY

In conclusion, the successful preparation of Paralympic sprinters for competition requires a comprehensive and individualized training program that covers all aspects of their physical and mental abilities. Athletes should undergo specific strength and power training to improve muscular strength and explosiveness, as well as regular endurance training to improve cardiovascular fitness. In addition, runners should participate in regular Sprint training to improve their technique and increase their speed. In addition, proper nutrition and hydration are essential to optimize performance and recovery.

REFERENCES

1. Elizabeth Keng. *Sports nutrition for Paralympic athletes*. CRC Press, 2/6/2014
2. Walter R. Thompson. *Handbook of Sports Medicine and Science, Paralympic Athlete*. 1/31/2011
3. Victoria L. Goosey-Tolfrey. *Rio, Tokyo Paralympics and beyond: How to prepare athletes with motor disabilities for the top*. Pierre-Marie Lepr Ractre, Frontier Media SA, 5/25/2017



PIRIMKUL KADIROV'S STYLE IN WRITING HISTORICAL-BIOGRAPHICAL NOVELS

Radjabova Dildora Rakhimovna

Bukhara State University

ANNOTATION

This article deals with the writing style of Pirimkul Kadirov in historical-biographical novels where the author raised the standard for a new example of the creative evolution of the historical narrative. He carefully examines the cultures, customs, and way of life of the characters in his novels, conducting in-depth study on the eras he writes about. He usually presents a wide variety of characters in his novels, each with their own unique personalities and goals. Readers will find it easier to relate to and perceive the characters as more authentic because they are flawed and have feelings. Pirimkul Kadirov skillfully uses internal monologues and dialogues to uncover the traits of people and help them improve.

KEY WORDS: *writer's language, approach, characters, display, strategy, historical event, literary aspect*

Pirimkul Kadirov is regarded as a brilliant scientist, writer, and historian who devoted a considerable deal of time and effort to reconstructing Uzbekistan's cultural and historical past.

The capacity of Pirimkul Kadirov to produce realistic and vivid historical imagery is one of his signature stylistic elements. He meticulously researches the eras he writes about in his books, paying close attention to the characters' cultures, habits, and way of life. In his stories, a diverse range of people are typically presented, each possessing distinct personalities and objectives. Because the characters are flawed and have feelings, readers will find it easier to relate to them and see them as more authentic. Pirimkul Kadirov deftly develops individuals and reveals their characteristics through internal monologues and dialogues.

The writer's meticulous investigation of historical events and facts is another aspect of his style; in order to provide readers the most authentic image of the past, he carefully examines archival data, memories, and historical sources. His writings become more credible as a result of this historical validation, which also helps readers comprehend the setting and period of the events.

Pirimkul Kadirov's style is characterized by his ability to vividly depict space and time. The historic city's congested streets bring back the horrifying scenery of bygone eras, each with its own distinct character. His depictions of historical architecture, fashion, and cultural customs immerse the reader in the era's ambiance and give the impression that they are living through history firsthand. The writer goes thoroughly into the political, social, and cultural facets of the time, and his attention to detail gives his works depth and authenticity while also enabling readers to comprehend historical events and how they affected society.

The ability of Pirimkul Kadirov to bring history to life through compelling characters, in-depth research, evocative settings, and deft storytelling techniques sets his historical fiction apart. His writings enlighten the reader about significant historical eras, impart knowledge, and uplift them in addition to being entertaining. The author stresses that the voices and stories of the past shouldn't be forgotten and makes it feasible to study the nuanced and complex parts of the history through his works. To express the accuracy of the work, Pirimkul Kadirov used a variety of literary and methodological devices in the construction of the "Starry Nights" novel. The writer's language is one of the key components of his style. He uses dated expressions that are real and historically accurate, goes to the post where it is detailed to get a sense of the time period. Furthermore, Pirimkul Kadirov illustrates events and characters through metaphors and imagery. To illustrate, he says that Babur is "ready to fight his enemies" and "ready to fly to heaven". These pictures contribute to illustrating the protagonist's fortitude and personality. He repeats words and phrases to highlight how important their meaning is. He also depicts the characters' innermost sentiments and thoughts through speech and monologues.



The capacity of Pirmkul Kadirov's approach to evoke tension and dramatic situations is among its most impressive features. To maintain the reader's interest in the narrative and their attention, he employs plot twists and surprises. Giving freedom to his imagination based on the materials at hand, Pirmkul Kadirov made a depiction of Babur and other historical and textile personalities, not far from historical reality. "Let them call my father Sherpanja. I have seen that his punches are ten times more than that. If they punch, they can knock down even the best guy", Babur retorted to an official who had observed the young man during training. It displays Babur's innocence, his affection and pride for his royal father, and his physical similarity to him. "Starry Nights" stands out from other Uzbek books in general as well as the author's other works. The author lifted a fresh illustration of the imaginative development of the historical narrative to a new level while penning a historical-biographical book.

In the novel "Humayun and Akbar" majority of the action takes place in India, a friendly and nearby nation, in the sixteenth century. Numerous individuals are aware that the artistic expression of gifted historical characters who traveled to Movarunnahr influenced the cultural upsurge that occurred in the lives of the Indian people at this time. The fruits of spirituality have blossomed from the sites of junction and fusion of our peoples' histories, spiritually uniting and elevating diverse peoples and cultures.

India, which at the time had grown to be among the most powerful and progressive nations on earth, was searching for fresh approaches to free all countries from the curse of international strife and religious hatred. It had declared all peoples and nations to be equal and to form a single nation, one of the first people in history to create a complete peace policy was "sulhi kull". Akbar, who saw India as his birthplace was the one who started this strategy although there were significant disagreements and clashes between life and politics. Akbar and his father Humayun experienced constant internal and external strife throughout their lives. Historical records attest to the fact that at the most perilous of times, the selfless, upright laborers' spokesmen kept them from instant death. Thus, the author attempted to ascertain the novel's ideological tenor by using well-known figures like Nizam, Salim, La'l, Chand, and Mohim-nanny.

The writer is impacted by the insights he gained from his artistic examination of historical teachings and contemporary requirements. He discovers the central notion that the written novel will be built around. The author starts to assume that many of the issues plaguing our modern-day counterparts were previously faced by our ancestors, who overcame them and passed on their historical knowledge to us. The prevention of catastrophic conflicts caused by hostility and the noble effort of propagating concepts of peace were the great acts of universal significance accomplished by historical heroes like as Babur, Humayun and Akbar, whose activities were grounded in the spiritual realm by this figurative conception. Because of his extraordinary creative vision, the writer considers more than just his native people, but about all of humanity.

Strengthening the links of love, eradicating generational strife, and bringing all nations spiritually closer to one another are equally vital goals. The law of nature states that generations change. History is full of examples of tensions and arguments that occur when a new generation comes to replace the old. A new generation appears to have crossed the high pass of history when it gains the greatest level of human and creative experience from its forebears. It was quite hard to pass such spiritual tests, particularly in the past when ignorance, superstition, and absolute power ruled. The idea behind publishing these books was to use the spiritual heritage and life experiences of those who succeeded in overcoming obstacles would serve as a historical lesson for today's generation. Because the author delves so deeply into the world of historical figures and the bosom of life, every scene and image's spiritual realm reflects the evolution of that era in all its grandeur, as if reflected in a clear mirror.

The author claims that a kingdom is not made up of perpetual existence and happiness, that only strong and enterprising people can administer a kingdom, and that any monarch who is devoted to his people will be held in high regard by the entire nation, justice and equity, charity, and enlightened monarchs; he was able to eloquently convey the literary aspect of his life by using these historical personalities as artistic representations of the facts of his day. The writer's ability to incorporate these realities into the literary characters through artistic skill that makes his work so exceptional. History makes it abundantly evident that India elevated Babur, Humayun, and Akbar to the status of eminent historical personalities by nurturing their outstanding skills. Because he carefully and thoroughly examined these historical events, the author was able to construct unique monuments that reflect humanity's perspective. The primary ideological focus of the author's historical work was the eradication of religious and national animosity.

REFERENCES

1. Муродов Ф. Тарихий романинг муштараклик ва ўзига хосликлар уйғунлиги муаммолари: Филол. фан. д-ри (DSc) дисс. автореф. – Т., 2018.
2. Исаева Ш. Ўзбек тарихий романларида характер ружиятини тасвирлаш усуллари: Филол. фан. ном. ...дисс. – Тошкент, 2001.



3. Раджабова, Дилдора. "ИНГЛИЗ АДАБИЁТИДА ТАРИХИЙ РОМАН ГЕНЕЗИСИ." ЦЕНТР НАУЧНЫХ ПУБЛИКАЦИЙ (*buxdu.uz*) 35.35 (2023).
4. *Тарихий ҳақиқат ва унинг бадиий талқини («Юлдузли тунлар» романи мисолида): Филол. фан. ном. ...дисс. – Тошкент, 1999;*
5. Тўраева Б. *Тарихий романларда бадиий замон муаммоси. (О.Ёқубов ва П.Қодиров романлари мисолида): Филол. фан. б. фал. д-ри (PhD) дисс. автореф. – Т., 2018. – В.47.*
6. Dildora, Radjabova. "The interpretation of urbanonyms in the novel "jenny gerhardt" by american writer theodore dreiser." *ACADEMICIA: An International Multidisciplinary Research Journal* 12.5 (2022): 196-199.
7. Feruza Khajieva, and Shakhmoza Rakhimova. "EXPLORING LITERARY INNOVATIONS: A CLASSIFICATION OF FRAGMENTED FORMS IN BELLES-LETTRES TEXT". *International Journal Of Literature And Languages*, vol. 3, no. 11, Nov. 2023, pp. 47-53, doi:10.37547/ijll/Volume03Issue11-07.
8. Rakhimovna, Radjabova Dildora. "Analysis Of Mythological Urbanonyms In Edgar Allan Poe And Thomas Hardy's Poems." (2021).
9. Rakhimovna, Radjabova Dildora. "PSYCHOLOGY IN LITERATURE." *Open Access Repository* 4.03 (2023): 275-278.
10. Rakhimovna, Radjabova Dildora. "American Toponymy as Reflection its History and Culture." *Middle European Scientific Bulletin* 22 (2022): 34-37.
11. Toirova Umida Sobirovna. (2023). IT VA MUSHUK ZOOSEMIZMI O'ZBEK ASARLARI TALQINIDA. *Miasto Przyszłości*, 42, 13–22. Retrieved from <https://miastoprzyszlosci.com.pl/index.php/mp/article/view/1980>
12. Toirova Umida Sobirovna. (2023). SHER ZOOSEMISM IN UZBEK WORKS. *Web of Teachers: Inderscience Research*, 1(8), 168–176. Retrieved from <https://webofjournals.com/index.php/1/article/view/345>
13. Tukhtayeva Farida. (2023). MULTICULTURALISM IN THE INTERPRETATION OF PEARL BAK. *UNIVERSAL JOURNAL OF SOCIAL SCIENCES, PHILOSOPHY AND CULTURE*, 1(6), 74–77. Retrieved from <https://humoscience.com/index.php/ss/article/view/1947>



A COMPARATIVE STUDY ON SELECTED PHYSICAL FITNESS VARIABLES BETWEEN SCHOOL LEVEL KABADDI AND KHO-KHO PLAYERS

V.Tamilvanan¹ V. Thiyagarajan² G Pushpa³

¹Research Scholar, Department of Physical Education, Bharathiar University, Coimbatore, Tamil Nadu, India.

²Research Scholar, Department of Physical Education, Bharathiar University, Coimbatore, Tamil Nadu, India.

³Research Scholar, Department of Physical Education, Bharathiar University, Coimbatore, Tamil Nadu, India.

ABSTRACT

The present study has been designed to investigate the Agility and reaction time of kabaddi and kho-kho players. For accomplish the study total 50 players (25 kabaddi and 25 kho-kho) were randomly selected as Govt high school Mettupalayam. The age of the subjects was ranged from 14-17 years. To measure the agility, we used the shuttle run test and to measure the reaction time Illinois test in the study. The data was analysed by applying 't' test in the order to determine the difference of endurance between kabaddi and kho-kho players. The level of significance was set at 0.05. A significant difference was observed between kabaddi and kho-kho players in their agility and reaction time. We find out that kabaddi players having more agility and reaction time in comparison of kho-kho players.

KEYWORDS: Kabaddi, Kho-Kho, agility and reaction time.

INTRODUCTION

Essential physical attributes such as agility and reaction time play a crucial role in the performance of Kabaddi and Kho-Kho players. However, the unique demands inherent in each sport can give rise to distinctions in the prioritization and training methodologies associated with these attributes. This study aims to delve into the nuanced relationship between agility, reaction time, and the specific requirements of Kabaddi and Kho-Kho. Understanding how these attributes are interlinked and how they contribute to the overall proficiency of players in each sport is vital for tailoring effective training programs. By examining the intricacies of agility and reaction time in Kabaddi and Kho-Kho, this research seeks to provide valuable insights that can inform targeted training regimens, potentially enhancing the performance and injury prevention strategies for players in both sports.

KABADDI

Kabaddi, a body contact sport contested by two teams comprising seven players each, demands of strength, speed, endurance, agility, flexibility, coordination, and balance. Defensive players endeavour either individually or collaboratively to restrain the raider while simultaneously evading being touched by them. Conversely, the raider strives to score points by reaching out to touch defensive players with extended limbs, all while attempting to evade the defensive holds. This description is attributed to **Amar Kumar (January 2001)**, highlighting the multifaceted nature of skills and strategies involved in the dynamic game of Kabaddi.

Kho-Kho

Kho-Kho is a traditional Indian sport that falls under the category of tag games. In Kho-Kho, two teams of twelve players each compete against each other, with the objective of tagging the opponents as quickly as possible. The game involves a designated chaser, known as the "Kho," who tries to tag members of the opposing team while the other team members attempt to avoid being tagged. Unfortunately, the term "Kho-Kho" is not directly associated with a specific author or originator, as it is a traditional game that has evolved over time within Indian culture. The sport has ancient roots and is deeply ingrained in Indian traditions, with historical references suggesting its existence for several centuries. While there may not be a single author or specific originator linked to Kho-Kho, it is recognized as a cultural and traditional game that has been passed down through generations, contributing to the rich tapestry of Indian sports and recreational activities.

CRITERION MEASURES

The following tests were used to measure the selected variables.

1. Illinois test was used to measure the agility and score was recorded in seconds.
2. Peeny test was used to measure the reaction time and score was recorded in seconds.



OBJECTIVES OF THE STUDY

- ❖ To compare the Agility and reaction time between kabaddi and kho-kho players.

HYPOTHESIS OF THE STUDY

- ❖ There would be no significant difference in Agility of kabaddi and kho-kho players.
- ❖ There would be no significant difference in Reaction time of Kabaddi and kho-kho players.

METHODOLOGY

To achieve the purpose of the study, 15 kabaddi and 15 kho-kho players will be selected as subjects from Govt high School mettupalayam. The subjects age ranged between 14 and 17 years. The selected football and basketball players will be assessed by endurance and agility. The selected 30 subjects will be divided into two equal groups, Group – I school level kabaddi players and Group-II school level kho-kho players.

STATISTICAL METHOD

The obtained data were analyzed by applying ‘t’ test in order to determine the agility and reaction time between kabaddi and kho-kho players. The level of significance was set at 0.05. For obtaining reliable result Statistical Package for the Social Sciences (spss) was used.

TABLE-1
Computation of t-ratio on agility of inter school kabaddi and kho-kho players.

Group	N	Mean	S. D	Mean Difference	‘t’ ratio
Kabaddi	15	11.89	0.69	0.18	15.51
Kho-kho	15	11.71	0.73		

*Significant at 0.05 level of confidence (1 and 14) 2.14

Table –I shows that the mean values of inter school level kabaddi and Kho Kho players on agility were 11.89 and 11.71 respectively. The obtained t-ratio of 15.51 on agility is higher than the required table value 2.14 for significance with degrees of freedom 1, 14 at 0.05 level of confidence. The result of the study shows that there is significant difference in agility between inter school level kabaddi and kho-kho players.

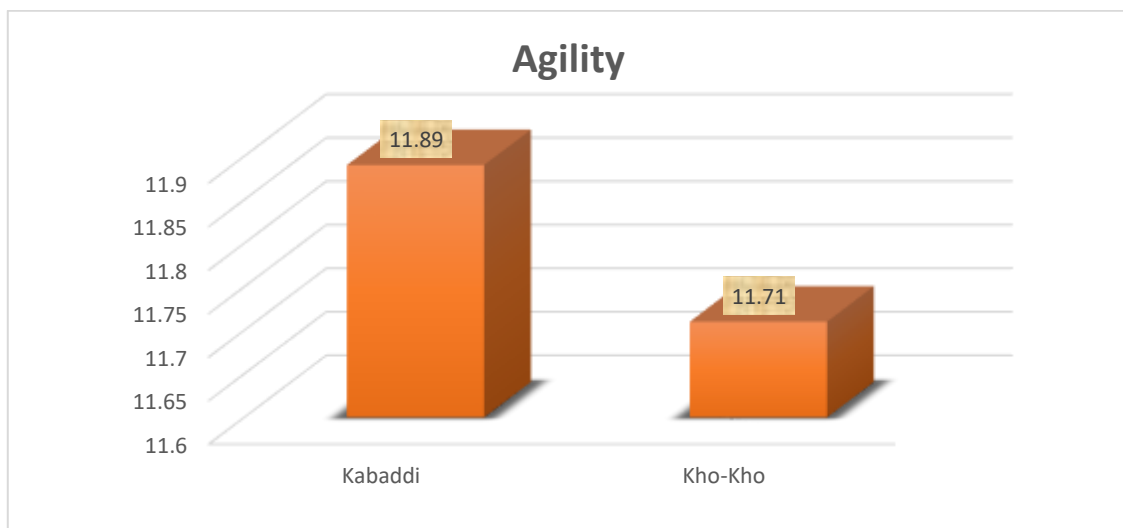


Figure-1 Graphical Represented on mean values of Kabaddi and Kho-Kho on Agility

TABLE-II
Computation of t-ratio on reaction time of inter school kabaddi and kho-kho players.

Group	N	Mean	S. D	Mean Difference	‘t’ ratio
Kabaddi	15	5.41	0.19	0.04	3.74
Kho-kho	15	5.20	0.13		

*Significant at 0.05 level of confidence (1 and 14) 2.14

Table –II shows that the mean values of inter school level kabaddi and kho kho players on reaction time were 5.41 and 5.20 respectively. The obtained t-ratio of 3.73* on speed is higher than the required table value 2.14 for significance with degrees of



freedom 1, 14 at 0.05 level of confidence. The result of the study shows that there is significant difference in reaction time between inter school level kabaddi and kho kho players

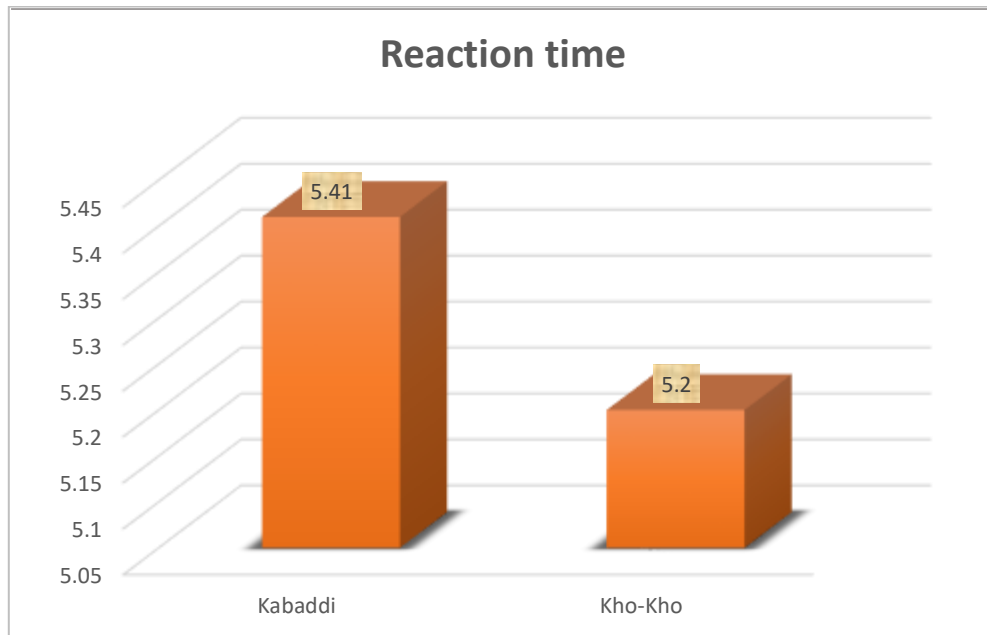


Figure-1 Graphical Represented on mean values of Kabaddi and Kho-Kho on Reaction Time

CONCLUSIONS

1. It was concluded that there was significant difference between Kabaddi and kho kho players on Agility.
2. Further, it was concluded that there was significant difference between kabaddi and kho kho players on Reaction time.
3. The study found that kho kho players exhibit superior reaction time and agility compared to kabaddi players.

REFERENCE

1. **Ghosh Mahaprasad and Md. Kamrul Hassa** "Comparative Study on Self Confidence among University Level Football, Kho-Kho and Kabaddi Players" *Journal of Sports and Physical Education* e-ISSN: 2347-6737, p-ISSN: 2347-6745, Volume 1, Issue 3 (Jan. 2014), PP 16-18.
2. **Jesudoss et al.,** (2014) "comparative analysis of physical fitness variables of kho-kho and kabaddi players" *Jesudoss / Star Phy. Edn.* Vol.2 Issue 9(1), September (2014) ISSN: 2321-676X.
3. **Kumar Vikesh (2018)** "a comparative study of physical fitness variables of male volleyball players and handball players" *International Journal of Physiology, Nutrition and Physical Education* 2018; 3(1)p 248-250 ISSN: 2456-0057.
4. **Kumar Anil** "Comparison status of strength and speed between Kho-Kho and Kabaddi male players" *International Journal of Multidisciplinary Research and Development* 2014; 1(7): 63-66 ISSN: 2321-676X.
5. **Kumar Ashok et al.,** (2017) "a comparative Study of selected physical fitness variables between Kabaddi and Kho-kho girls players" *International Journal of Applied Research* (2017), Volume 3(1) Issue 7, 239-242 ISSN: 2321-676X.
6. **Debajyoti Haldar.** A Comparative Study on Selected Physical Fitness Components of Kabaddi and Kho-Kho Players *international research journal.* 2015; 4(10).
7. **Sanesh Kumari (2015),** A comparative study of physical fitness components Between Kho-Kho and kabaddi girls players of Haryana" *International Journal of Physical Education, Sports and Health.* 2015; 2(2): 242-244.
8. **Sunil Kumar.** A Comparative Study on Selected Psycho-Physical Fitness Components of Kabaddi and Kho-Kho Players of Delhi Schools" *International Journal of Research in Social Sciences and Humanities.* 2011; 1(1).



EVALUATION OF THE RESULTS OBTAINED BY VARIOUS METHODS IN TRADITIONAL SURGICAL PRACTICE AND THE USE OF OPTIMAL SUTURE MATERIALS

Kurbanov Khasan Askarovich

*Assistant of the Department of Faculty and Hospital Surgery
Andijan State Medical Institute*

SUMMARY

The article discusses the results obtained by various methods in traditional surgical practice and the use of optimal suture materials. The study is based on the results of surgical treatment of 481 (100.0%) patients with various pathologies of the abdominal organs who were treated in the surgical department of the Andijan Regional Multidisciplinary Medical Center in 2020-2023. Before surgical treatment, the condition of the patients was assessed not only visually, but also through additional examinations. The influence of suture materials on recovery time and the level of functional state of organs and tissues after surgery was studied.

KEYWORDS. Suture material. Surgery. Regeneration. Relevance of the topic.

RELEVANCE

In surgical practice, the main emphasis on focusing on the seroma causes the wound to suppurate, open the sutures, or remove the sutures. Puncture methods are often used in the treatment of seromas[1]. Large seromas affect the general condition of patients, causing not only a local but also a general disorder.

Methods of identifying risk factors and prevention of postoperative purulent-inflammatory complications in emergency surgery, the frequency of their occurrence is much higher, from 2.8% to 23.5%, and after emergency cases, this indicator increases to 26.1%[2]. For example, local purulent-inflammatory complications during gall bladder surgery occur in 9.3% of surgical procedures for diseases of abdominal organs; on the pancreas in 26%; y in the colon in 23.5% ; 21.1% with intestinal obstruction; 15.8% with acute appendicitis; with gastric operations can be observed from 1.6 to 15.8%. According to other authors, post-appendectomy wound suppuration occurs from 2.5 to 60.7%. Complications after colon surgery can be observed in 11.1-60.0%[4].

The problem under consideration is that the frequency of purulent-septic complications after urgently performed surgical operations is 23.5-71.2%, and in planned operations, this indicator is 0.29%-30%[3]. This situation is described as follows: in urgent surgical pathologies, patients often present with symptoms of intoxication, which in turn is due to the fact that the protective function of the body is in a decompensated state . It should also be noted that urgent surgery is performed in conditions of high contamination of organs and tissues, and in the group of "conditionally dirty" and "dirty" operations, with a high risk of post-diagnosis purulent complications[6,7].

Much research is being done to develop various interventions to prevent surgical site infection. Antibacterial therapy, as well as local application of low-intensity laser rays, are included in the scope of secondary preventive measures. Also, the prevention of surgical site infection is considered one of the insufficiently studied methods, but the use of various (usually antimicrobial) biologically active suture materials during surgery is considered one of the solutions to this problem[5].

PURPOSE OF THE STUDY

Study of the results obtained by various methods in traditional surgical practice and the use of optimal suture materials.

RESEARCH MATERIALS AND METHODS

This study is based on the results of surgical treatment of 481 (100.0%) patients with various abdominal pathologies treated in the surgical department of Andijan regional multidisciplinary medical center in 2020-2023. The patients included in the study were completed by us during the primary and repeated examinations in the clinic according to the specially developed questionnaire "Protocol of examination of patients after abdominal examination". Before surgical treatment, the condition of patients was evaluated not only visually, but also through additional examinations . The effects of suture materials on recovery periods and levels of the functional state of organs and tissues after the operation were studied.



RESEARCH RESULTS

In traditional surgical practices, the study of the results obtained from different methods allows the use of optimal suture materials. It should also be taken into account that the obtained results depend on the general surface of the wound and the level of complexity of the performed operation. Let's study the characteristics of dependence on the inspection area with the help of table 1.

Table 1

A comparative analysis of the direct effect of suture materials on the results depending on the inspection area

Cursors	Plastic methods						Total
	ChBE	OR	XE	IR	SE	B	
Patients in the comparable group	91	36	89	16	2	7	241 (100%)
Positive results							
Small	44					2	46
Medium	15	20	49	6	2	3	95
Big	15	8	27	6		2	58
General	74	28	76	12	2	5	197 (82.8%)
Negative results							
Small	3						3
Medium	5	2	5	2		1	15
Big	9	6	8	2		1	26
General	17	8	13	4		2	44 (18.2%)

Izox: * - EH – elimination of hernia; GR-gastric resection; XE-cholecystectomy; BR-bowel resection; SE-splenectomy; B-general type of operations.

Good results of abdominal surgery were observed in small and large areas. Good direct results in small and large surgical procedures were observed in 141 (71.6%) of 197 patients. In the case of large sizes, this indicator was only 58 (29.4%). 44 negative results were observed in 59.1% of large-field surgical operations. This can be explained as follows. As mentioned above, large-scale surgical operations are directly related not only to the cavity or parenchymatous organ and tissue, but also to the thickness of the used suture material, its effect on the tissues, the restoration of intestinal peristalsis, and the regeneration of the intestinal loop.

The long-term results of the surgical procedures performed in the pathologies of the abdominal organs were determined after 6-12 months by reorganizing the patient's visit to the clinic. According to this, the long-term results, both functional and cosmetic, were made according to the criteria presented in chapter 2, according to the types of operations included in the comparative group and the condition of the wound area. The analyzes show that the location, area and depth of the scar deformation, its size and depth are considered to be one of the reasons for the reduction of the immediate result. In addition, according to the instructions, abdominal organs were examined by ultrasound, and in some cases, X-rays were performed. The distribution of the long-term results showed that in the long-term after the examination, complications such as dome formation, expansion and non-swelling of the scar were observed (Table 2).

Table 2

Frequency of outcomes after practice by type of practice

Cursors	Plastic methods						Total
	ChBE	OR	XE	IR	SE	B	
Patients in the control group	91	36	89	16	2	7	241 (100%)
Complications:	17	9	11	7		3	50 (20.7%)
The dome is scarred	6		3	2		1	12 (24%)
Scar enlargement	2	3	3	1			9 (18%)
A lump under the skin	5	3	3	1		1	13 (26%)
A draining wound	2	2		3		1	8 (16%)
A contagious disease	2	1	2				5 (10%)

Izox: * - EH – elimination of hernia; GR-gastric resection; XE-cholecystectomy; SE-splenectomy; B-general type of operations.

As can be seen from this table, the number of complications in the early result was 44, while in the long term this indicator increased to 50, that is, from 18.2% to 20.7%. The average is 19.1 ± 0.7 , Pearson's χ^2 test is 19.712 ; $df=4$; $R = 0.0012$. The most common complication is the feeling of a nodule under the skin, depending on these two criteria. If the results are based on the results after 6 months after the examination, the period of absorption of the used polyfilament is low, the other side of the issue is characterized by the low body weight of the patients and the rough examination. Large scars accounted for 5% of 12 patients, which is evaluated



by the fact that patients did not receive comprehensive preventive treatment aimed at absorption of scars during the postoperative rehabilitation phase.

When assessing the functional state of patients, the state of the patients during the satisfaction of their needs without physical movements is considered, while the cosmetic aspects, the effect of each performed procedure on the psycho-emotional state of the person was studied. These patients are expected to acquire skills in relation to the practice, early employment, activeness in finding their place in the surrounding society, and other criteria. This directly affects the quality of life. In the assessment of cosmetic and functional condition, 3 main criteria were evaluated: good, satisfactory and unsatisfactory. We can see this in Table 3.

Table 3
Analysis of remote results based on the type of survey conducted

Types of operations	A Distant Result						Number of patients (%)	
	Good		Conical		Without cones			
	n	%	n	%	N	%	N	%
EG	22	24.2	52	57.1	17	18.7	91	37.8
GR	8	22.2	19	52.8	9	25	36	14.9
XE	21	23.6	57	64.0	11	12.4	89	36.9
IR	3	18.8	6	37.5	7	43.8	16	6.6
SI	1	50	1	50			2	0.8
B	2	28.6	2	28.6	3	42.9	7	2.9
Total	57	23.7	137	56.8	47	19.5	241	100.0

Izox: * - EG – elimination of hernia; OR-gastric resection; XE-cholecystectomy; SE-splenoectomy; B-general type of operations. Analysis of the results for all parameters shows that the best long-term result is the result after cholecystectomy. Despite the fact that the majority of operative procedures of this type were performed in traditional ways, unsatisfactory results were achieved in only 12.4% of cases. In the operation of hernia removal, the highest good result was achieved in 22 (24.2) patients. The average relative error in the analysis of the results should be below $R \geq 0.0012$, according to Pearson's χ^2 test-8.932; d indicates $f=6$. The best and conic distant result was observed in 78 (87.6%) of 89 patients. We found it necessary to express this situation as it should. The use of absorbable monofilaments of suture materials based on the criteria established in the mid-range studies has a significant effect on the time of thread absorption, the regeneration process, the reduction of the rehabilitation period, and the quality of life, which occupies an essential place.

SUMMARY

Thus, the use of traditionally used suture materials, including absorbable polyfilaments, in abdominal procedures depends on the size of the wound, its location, adhesion to the underlying tissues, and the degree of limitation. The results of the study showed that conventional absorbable polyfilaments increase the number of positive results without side effects on the surrounding healthy tissue in small, medium and large surgical procedures. Despite the fact that polyfilaments used in traditional surgical practice have several advantages, we found it necessary to improve the use of polyfilaments and develop new ones due to high complications in long-term results.

LITERATURE

1. Adamyan A.A. *Modern dressings and suture materials: results and experience of creation and clinical use.* // *Materials of the III International Conference "Modern approaches to the development of effective dressings, suture materials and polymer implants."* – M., 1998. – P. 20–22.
2. Akopov E.M., Brekhov E.I., Sukhorukov V.A. *The use of domestic suturing devices such as UDO when applying "triangular" anastomoses with everted mechanical suture* // *Surgery.* – 1988. – No. 12. – P. 102–107.
3. Brekhov E.I., Bashilov V.P., Petrunin V.V. *Triangular anastomoses in gastric surgery* // *Surgery.* – 1999. – No. 9. – P. 27–31.
4. Volenko A.V., Menshikov D.D., Titova G.P., Kuprikov S.V. *Prevention of wound infection with immobilized antibacterial drugs* // *Surgery.* – 2004. – No. 10. – P. 54–58.
5. *Fibers with special properties* / Ed. Wolf L.A. – M.: Chemistry, 1980. – 240 p.
6. Egiev V.N., Buyanov V.M., Udotov O.A. *Surgical suture.* – M.: Medpraktika, 2001. – 110 p.
7. Egiev V.N. *The magical world of stitching machines.* – M.: "Center", 1995. – 176 p.



THE USE OF INTERNET IN SEX EDUCATION AMONG UNDERGRADUATE STUDENTS: A CASE STUDY IN UNIVERSITY OF PORT HARCOURT

Ukwuije, Chinedu Kelechi

*Department of Educational Psychology, Guidance and Counselling, Faculty of Education,
University of Port Harcourt*

ABSTRACT

The study investigated use of internet in sex education among undergraduate students: a case study in university of Port Harcourt. A sample of 300 undergraduate students was used for the study from 12 departments using sample size of 300 was drawn using two sampling techniques: cluster sampling technique and simple random sampling technique. Three research questions were answered. The instrument for the study was a questionnaire tagged “Use of Internet in Sex Education (UISE). The data collected were analyzed with mean and standard deviation to answer the research questions one and two while percentage is used to answer research question three. From the analysis, it was found out that there is effectiveness in using internet for sex education among undergraduate students. The findings revealed that there is availability of internet for sex education among undergraduate students in university of Port Harcourt. Finally, respondents agreed that social media is the best suited channel for sex education among undergraduate students in university of Port Harcourt. Based on the findings, it was recommended that Internet sex education should be introduced at all level of the educational systems in Nigeria, this will to a large extent expose undergraduate students to the dangers associated with certain dangerous sexual behaviour which is occasioned by exposure to the social media.

KEY WORDS: *Use of Internet, Sex education, effectiveness, availability and undergraduate*

INTRODUCTION

As the world becomes more interconnected than ever before, young people over the world are seeking and requesting credible and accessible information on sexuality and reproductive health. They want to have their many questions and concerns about sexuality addressed. They need information not only about physiology and a better understanding of the norms that society has set for sexual behaviour, but they also need to acquire the skills necessary to develop healthy relationships and engage in responsible decision-making about sex, especially during adolescence when their emotional development accelerates (Pascal, 2017).

Traditionally, sex educations were taught in the classroom according to the will of teacher and little attention was paid to the eagerness, curiosity and capability of the students. Discussing sex with teachers, parents, or even friends is considered embarrassing, shameful, controversial, or sensitive (Kendall, 2012; Moran, 2017). Benson & Whitworth (2016) pointed out that this technique of teaching is a one way flow of information in which the teacher often talks at length and personal questions and concerns of students about sexuality are not addressed because they consider it sensitive and private. In this unconventional era, ICTs offer different techniques available that have impact on teaching and learning than traditional pedagogy.

In contrast, the threshold for adolescents to search for answers to these questions and answers they are seeking is lowered by the anonymous nature of the Internet, it's easy, quick availability, and its low cost. Hence, online sex education and e-learning atmosphere is rapidly being exploited by institutions, instructors and students, and therefore ought to be created centered on their desires. Multimedia content founded on e-learning generally is considered effective in sex education process (Folarin, 2016). The Internet is perceived as a more private and anonymous place to search for information on sensitive topics. The confidentiality of the Internet may also be particularly attractive for these adolescents, who may not be comfortable discussing sexual health topics they considered sensitive and private with parents or friends (Barak & Fisher, 2015; Valkenburg & Peter, 2018). The Internet's appeal as a sex education resource may therefore be based on more than just the quality of an adolescent's available offline sex education; the Internet's ease of use, its availability to increasingly large numbers of adolescents, and its perceived anonymity regarding sensitive topics are unique in the delivery of sexual information in the digital age.

This approach helps to construct a scholar centered sex education where learners can study at their own pace, anywhere and anytime, answer questions and ask question that is of concern to them without shame. Internet has also been at the forefront of new instructional techniques use in teaching and learning in this digital age (Hannafin, 2017). The use of technology is regarded as an



instructional enhancement in the classroom (Kearsley, 2014).

Today young people are known for their early and fervent adoption of the Internet and its associated mobile technologies, such as cell phones and tablet computers (Rideout, Foehr, & Roberts, 2015). Unlike their parents, undergraduate students in the digital age accept the Internet as playing an important role in their everyday lives where information on sexuality and reproductive health concerns are handy. It is well documented that the Internet is used to view sexually explicit material, in addition to nonsexual entertainment and information (Fox & Jones, 2019; Peter & Valkenburg, 2015).

Faced with a lack of access to correct information, youth harbor misconceptions about sex, and remain ill-equipped to deal with unwanted pregnancies or sexually transmitted diseases (STDs). Internet sex education is required to create healthy perceptions about sexuality and knowledge of prevention and mitigation of STDs and unwanted pregnancies. Evidence suggests that the Internet could serve as an alternative source of strategic health education (Borzekowski, 2016; Nwagwu, 2017).

Internet sex education is a process whereby information is given or imparted to a group of young ones and which takes into account the development, growth, the anatomy and physiology of the human reproductive system and changes that occur from youth all through the stage of adulthood (Yinka, 2012). Goldman (2016) defined Sex education as the acquisition of knowledge that deals with human sexuality. It consists of instruction on the development of an understanding of the physical, mental, emotional, social, economic, and psychological phases of human relations as they are affected by sex through digital source. According to Humphrey (2016), sex education involves providing children with knowledge and concept that will enable them make informed and responsible decisions about sex at all stages of their lives. It is also to develop in adolescents the desired skills necessary to enhance interactive learning so that communication, negotiation, and listening skills can be developed and practiced (Mario, 2014). Sex education does not encourage early initiation of intercourse but instead delay first intercourse and lead to more consistent and understanding of what the concept is all about.

The aims of sex education according to British Medical Association Foundation for AIDS are ambitious relating to the life-long quality of relationships and personal behavior. It should be age appropriate and available to everyone through a variety of formal and informal settings. Therefore, it is widely accepted that these undergraduates have the right to internet sex education because it is a means by which they are helped to protect themselves against abuse, exploitation, unintended pregnancy and sexually transmitted diseases (STDs), and understand their body mechanism in general (World youth, 2000 in Nwaizu, 2016). Some adolescents' characteristics predispose them to high risky sexual activities, behavioral interventions are needed to reduce these at risk behaviors. This present study is an attempt in that direction.

Researchers have identified four main types of sex education namely; abstinence-only, abstinence-based, comprehensive sex education (Fields, 2016; Allen, 2012). A fourth type of sex education, often referred to as sex positive education is rarely taught in schools but is more common in Europe and Nordic countries (Schalet, 2014)

Bialo & Sivin-Kachala (2013) listed the following benefit of effectiveness of using internet in these types of sex education: emphasizing active learning, responding to different learning styles, enhancing collaborative learning, increasing individualized learning and self-paced study, and encouraging greater student independence. Other researchers (Cardenas, 2014; Lyons, Kysilka, & Pawlas, 2016) also reported the positive learning benefits for learners using multimedia, which include; more interactivity, exploratory learning, and higher class retention. Effective learning occurs when learner interacts with multimedia content and on basis of activity feedback which they performed to improve their skills. Internet is blind to racial, cultural and sexual differences as it offers no more or less learning support to any individual. It promotes disinhibition which enables learners to express themselves openly. It promotes the interaction of shy people because they are more comfortable when they have space and time. The accessibility of E-learning content has biggest impact on learners so they can access learning at their own convenience.

However, Interactive multimedia has negative implications on the learners which include the problems resulting from self-guidance, lack of personal contact, unreliable sources, diminished media richness and issues regarding technology compatibility (Kopena, 2013). Variations on learner preferences like lack of self-directed learning, unclear objectives may result in a hesitancy and reluctance to learn among them. Due to instructional systems, multimedia may be time consuming for learners and sometimes due to lack of experience beginners take poor decision to proceed with given information. Media richness associated with face to face communication diminishes when communication goes electronically. It can be resolved by using multimedia content as adding visual to text. If learner gets distracted due to information available on the web or in online environment then desired animated software enhance their interactive skills and provide fun learning environment for others. Lots of technical issues are involved in interactive multimedia as lots of software are required to play multimedia files and computer capabilities affect online speed in web that prevent learners from accessing multimedia efficiently.



Furthermore, in teaching learning process in sex education, various channels are being utilized by undergraduates like Radio, TV, newspaper, smart phones, laptops, digital media including social network site etc. Digital media, including social networking sites, apps and text messaging services, are increasingly being used to reach adolescents with sexual health interventions, and studies have demonstrated efficacy in improving knowledge and behaviours across a range of sexual health outcomes (Adepoju, 2015). It provides a dynamic interaction between students (Kelly & Morgan-Kidd, 2017). The sources are used as a delivery tools to present information, receive the response, analyze the response and give immediate feedback to the students (Debra, 2014). To ensure that internet use for teaching sex education realize their potential, it is necessary to stand back and re-examine how they can be used to enhance sex education. It is against this background that the present study is being carried out.

1.2 STATEMENT OF THE PROBLEM

A lot of problems seem to be invading the knowledge of sex education and sexual risk behaviors among undergraduate students. There is increase problem today as to moral laxity, promiscuity, unwanted pregnancy, abortion, sexually transmitted diseases (STDs), forced marriage, school dropout among youths. Also, the increase in these problems has been attributed to ignorance of youths about sex education. However, most parents are not interested in the developmental stages of their adolescents because they have no time for their wards only seeking for money. Adolescents who are sexually active need to explore the changes being experienced. They usually have so many unanswered questions and thus need listening ears from their parents who have no time for them.

Due to lack of sex education, most undergraduate students have become victims of sexual molestation and other social vices; some have dropped out of school due to unwanted pregnancies, stigma from sexually transmitted diseases and infections, etc. furthermore, many factors have been attributed to sexual risk behaviors which include; inadequate access to correct information online and from peers, limited availability to health services, peer pressure and coercion of the role of the family as a source of information on sex education. This study therefore, intends to investigate the use of internet in teaching sex education among undergraduate students of university of Port Harcourt. This is the problem of the study.

1.3 AIM AND OBJECTIVES OF THE STUDY

The aim of the study is to examine the use of internet in sex education among undergraduate students: a case study in university of Port Harcourt. Specifically this study intends to;

1. Examine the effectiveness of using internet in sex education among undergraduate students in university of Port Harcourt
2. Know the availability of using internet in sex education among undergraduate students in university of Port Harcourt
3. Examine the best source of using internet in sex education among undergraduate students in university of Port Harcourt

1.4 RESEARCH QUESTIONS

The following research questions will guide this study

1. How is the effectiveness of using internet in sex education among undergraduate students in university of Port Harcourt
2. What extent is the availability of using internet in sex education among undergraduate students in university of Port Harcourt
3. What is the best source of using internet in sex education among undergraduate students in university of Port Harcourt

METHODOLOGY

The research design of the study is descriptive research design. The population of the study was 20,568 undergraduate students. The sample size of 300 was drawn using two sampling techniques: cluster sampling technique and simple random sampling technique. In adopting the cluster sampling technique, the researcher first of all divided the thirteen (13) faculties in the University of Port Harcourt into three clusters. Therefore, random sampling technique by balloting was used to draw one faculty from each of the above clusters. This is because random sampling technique gives each member equal opportunity of being selected during study. The selected faculties were Education, Health Sciences and Agriculture and two (2) departments were selected from each of the faculties. From the total 6 department, 42 students are selected from each of the department using simple random sampling technique. A questionnaire tagged "Use of Internet in Sex Education Questionnaire" (UISEQ) was used to collect data for the study. The reliability of the instrument was 0.76. The data collected were analyzed with mean and standard deviation to answer question one and two while research question three was answered with percentage count.

PRESENTATION OF DATA AND ANALYSIS

Research Question 1: How is the effectiveness of using internet in sex education among undergraduate students in university of Port Harcourt?



Table 1: Showing analysis of mean and standard deviation of effectiveness of using internet in sex education

S/N	Items	X	SD	Decision
1.	Internet helps in sharing and Providing learning material	2.78	0.73	Accepted
2.	Internet allows different learning styles and can be used as a platform independently by various users	2.56	0.62	Accepted
3.	Internet has measurable assessment which can be used to evaluate learners	2.61	0.68	Accepted
4.	It is cost efficient	2.87	0.82	Accepted
5.	Internet allows selection of learning material according to knowledge level of learner	3.06	3.08	Accepted
Grand Mean		3.1	0.9	Accepted

The result of the data analyzed shows that the items had a grand mean of 3.1 and standard deviation of 0.9 while the criterion mean is 2.5. This shows that there is effectiveness in using internet for sex education among undergraduate students. Since the calculated mean is greater than the criterion mean, it is accepted. This implies that using internet for teaching of sex education is effective.

Research Question 2: What extent is the availability of using internet in sex education among undergraduate students in university of Port Harcourt?

Table 2: Showing analysis of mean and standard deviation of Availability of Internet in Sex Education

S/N	Items	X	SD	Decision
1.	I have access to internet at home and at school	3.11	3.41	Accepted
2.	Internet are much time effective and less costlier than traditional learning	2.99	3.55	Accepted
3.	I have access to the computer in ICT to study and do my assignment	2.04	3.31	Accepted
4.	I have smart to phone access the internet	2.87	0.82	Accepted
5.	I have personnal computer to access the internet	2.87	3.14	Accepted
Grand Mean		2.7	0.83	Accepted

In table 2, the result of the data analyzed shows that grand mean score is 2.7 and SD = 0.83 while the criterion mean is 2.5. Since the calculated mean is greater than the criterion mean, it is accepted. Therefore, this indicates that there is availability of internet for sex education among undergraduate students in university of Port Harcourt?

Research Question 3: What is the best source of using internet in sex education among undergraduate students in university of Port Harcourt?

**Table 4.3: Showing percentage count of Best Source of Using Internet in Sex Education**

S/N	Items	N	%
1.	Website	24	12%
2.	Social Media	104	54%
3.	Apps	51	25.5%
4.	Online Content	21	10.5%
Total		200	100%

Based on Table 4.4, 52% (104 students) agree that the social media is the best source for sex education followed by Apps (25.5%), website 12%, and online content 10.5% respectively. Hence, this shows that undergraduate students in university of Port Harcourt agree that social media is the best suited channel for sex education followed by Apps, website and online content respectively.

SUMMARY OF FINDINGS

1. The findings revealed that there is effectiveness in using internet for sex education among undergraduate students.
2. The findings revealed that there is availability of internet for sex education among undergraduate students in university of Port Harcourt?
3. From the findings, respondents agreed that social media is the best source for sex education among undergraduate students in university of Port Harcourt.

DISCUSSION OF FINDINGS

The result of the findings revealed that there is effectiveness in using internet for sex education among undergraduate students. This shows that there is effectiveness in using internet for sex education among undergraduate students. This study is in agreement with a previous study by Odu (2020) who stated that effective sex education develops young people's skills in negotiation, decision-making assertion and listening. It also helps them to be able to recognize pressures from other people and to resist them, deal with and challenge prejudice, seek help from adult including parents, careers and professionals through the family, community, health and welfare services the need for sexual education that work, according to Forest also help equip young people with skills to be able to differentiate between accurate and inaccurate information, discuss and range of mortal and social issues and perspectives on sex and sexuality, including different cultural.

More so, the result of the findings revealed that there is availability of internet for sex education among undergraduate students in university of Port Harcourt. Therefore, this indicates that there is availability of internet for sex education among undergraduate students in university of Port Harcourt. This present study agrees with the previous study by Kelvin (2019) who stated that the Internet's appeal as a sex education resource may therefore be based on more than just the quality of an adolescent's available offline sex education; the Internet's ease of use, its availability to increasingly large numbers of adolescents, and its perceived anonymity regarding sensitive topics are unique in the delivery of sexual information in the digital age.

Furthermore, from result of the findings, the respondents agreed that social media is the best source for sex education among undergraduate students in university of Port Harcourt. Hence, this shows that undergraduate students in university of Port Harcourt agree that social media is the best suited channel for sex education followed by Apps, website and online content respectively. The study agrees with the previous study by Owell (2011) who stated that the sources are used as a delivery tools to present information, receive the response, analyze the response and give immediate feedback to the students (Debra, 2014).

CONCLUSION

From the findings, the study concluded that there is effectiveness in using internet for sex education among undergraduate students. The findings revealed that there is availability of internet for sex education among undergraduate students in university of Port Harcourt. Finally, respondents agreed that social media is the best suited channel for sex education among undergraduate students in university of Port Harcourt.

RECOMMENDATIONS

The following recommendations were highlighted based on the findings of the study.



1. Internet sex education should be introduced at all level of the educational systems in Nigeria, this will to a large extent expose undergraduate students to the dangers associated with certain dangerous sexual behaviour which is occasioned by exposure to the social media.
2. Universities should set up effective counselling units to counsel students on the dangers social media pose to their sexual and reproductive health.
3. Students should be aware that the internet portrays more of sex inviting images that appeal to their emotion, thus, public enlightenment on the dangers of excessive exposure to the social media should be organized for undergraduates students.
4. Instructors should obtain more training in multimedia development and delivery, this as a major inhibitor to the use of multimedia technology.
5. Administrators should develop appropriate skills in making appropriate selection of media materials with regards to curriculum needs, objectives of instruction, characteristics of the students and condition of instruction.
6. Lecturers' enormous opportunities for making learning and teaching environment meaningful and effective. A lecturer cannot be a substitute of technology and hence he must not compromise his positive role in the classroom while using technological aids in the classroom.
7. Teachers or instructors should check process of students in multimedia as the ultimate goals of multimedia teaching is to promote students' motivation and learning interest, which can be a practical way to get them involved in the sex education.
8. Programme developers and implementers should sensitize men and women on the existence of gender disparity and the benefits of gender balance in matters related to reproductive health. This can be done through radio broadcasts, schools and churches.

REFERENCES

1. Adepofu, A. O. (2015). *Toward an internet-driven, theoretically-based, innovative approach to sex education*, *The Journal of Sex Research*, 38 (4), 324-332.
2. Allen, L. A. (2012) 'Pleasure has no passport': revisiting the potential of pleasure in sexuality education. *Sex Education*, 12(4), 455-468, DOI:10.1080/14681811.2012.677208.
3. Barak, T. & Fisher, D. T. (2015) *Social network correlates of risky sexual behaviour among adolescents in Bahir Darand Mecha Districts, North West Ethiopia: An institution-based study*. *Reproductive Health*, 15 (61), 1-8
4. Benson, E. O. & Whitworth, G. W. (2016) *Effects of Adolescents exposure to sexual contents through social media in Nigeria*. *Creativity Global Competitive Economies*.
5. Bialo, Z. & Sivin-Kachala, A. A. (2013) *Disclosing the trauma of child sexual abuse: A gender analysis*. *Journal of Loss and Trauma*, 10:5, 453-470.
6. Borzekowski, J. A. (2016) "Risky sexual behaviors in adolescents: the impact of social and cultural capital", *Master's degree thesis, Department of Sociology, CA State University, Sacramento, CA*.
7. Cardenas, H. (2014) *Life Stages, Gender and Fertility Behaviour in Bangladesh*. Dhaka:International Centre for Diarrhoeal Diseases Research, Bangladesh
8. Debra, S. (2014) *Teenage pregnancy: knowledge and attitude of adolescents in South-East Nigeria*. *Journal of College of Medicine*, 7(2):104-107.
9. Fields, C. (2016) *Access to mobile phone and premarital sexual relationship: A case study of the selected peri-urban areas of Munshiganj district, Bangladesh*. *Social Science Review*. 29(1), 73-88.
10. Folarin, G. B. (2016) *Analysis of the effects of social media sexting on adolescents and youths sexual behaviours and attitudes towards sexuality in Nigeria*. *International Journal of Innovative Research and Advanced Studies*, 4(1), 222-232
11. Fox, R. & Jones, K L. (2019) *The problem of social generations: A critique of the new emerging orthodoxy in youth studies*. *Journal of youth studies*, 18, 215-130
12. Goldman, N. (2016) *On the use of the mass media for important things*. *American Sociological Review*, 38, 164-181.
13. Hannafin, N. (2017) *Social media and sexual behaviour among adolescents* *Public Health Surveillance*, 3(2), 28.
14. Humphrey, V. (2016) *Sexuality of older adults and the Internet: From sex education to cybersex*, *Sexual and Relationship Therapy*, 18:3, 405-415,
15. Kearsley, K. (2014) *Sexual attitudes and behaviours associated with U.S early adolescent exposure to sexually explicit media*. *Communication Research*, 36(1), 129-151
16. Kelvin, L. (2019) *Lessons learned: European approaches to adolescent sexual behaviour and responsibility*. *Journal of sex education and Therapy*, 25(2/3)189-199.
17. Kelly, I. & Morgan-Kidd, G. (2017) *Theories of Mass Communication: An Introductory text*. Lagos: Gabi Concept Ltd.
18. Kendall, O. T. (2012) "Use of social networking websites among tertiary institution students in Oyo State, Nigeria", *M.Inf.Sc. project, Africa Regional Centre for Information Science, University of Ibadan*.
19. Kopena, F. (2013) *Family interactions and sex education in the home*, *Adolescence*, XXV (99): 573-582.
20. Lyons, C., Kysilka, G. & Pawlas, M. *Simulacra and Simulation*. (2016) (S.F. Glaser Trans.). Michigan: Michigan University Press.
21. Pascal, O. F. (2017) *Gender, Internet use, and sexual behaviour orientation among young Nigerians*. *Cyber psychology & Behavior*, 9(6),



742-752.

22. Peter, M. & Valkenburg, J. (2015) "Conceptualization of sexual orientation identity among sexual minorities: patterns across sexual and gender identity", *Journal of Bisexuality*, 14 (3/4), 433-456.
23. Mario, M. (2014) *Critical Social Theories: An Introduction (2nd ed.)*. London: Paradigm Publisher.
24. Moran, F.W. (2017) *Social media and online sexual predation in Benin city, Nigeria*. *Ilorin journal of sociology*, 9 (1), 14-27
25. Nwaizu, K. A. (2016) *Porn and sex education, porn as sex education*, *Porn Studies*. 1(1-2), 172-181.
26. Nwagwu, B. (2017) *New media interventions for adolescents reproductive and sexual health: evidence from Nigeria*. *International Conference on Communication, Media, Technology and Design, Istanbul*, 24-26 April.
27. Owell, M. (2011) *Sexuality Education in Nigeria: Evolution, Challenges and Prospects: Understanding Human Sexuality Seminar Series 3*, Lagos: African Regional Sexuality Resource Centre.
28. Rideout, R.L., Foehr, M. & Roberts, H. (2015) *Watching sex on television predicts adolescent initiation of sexual behaviour*, *Pediatrics.*, 114 (3), 280-289
29. Schalet, B. A. (2014) 'Say everything': exploring young people's suggestions for improving sexuality education. *Sex Education.*, 5(4)389-404.
30. Valkenburg, T. & Peter, H. (2018) *What is new media?* *New media institute*. Retrieved from; <http://www.newmedia.org/what-is-new-media.html>.
31. Yinka, M. (2012) *Online sexual activities and sexual risk-taking among adolescents and young adults in Lagos Metropolis, Nigeria*. *Africa Journal of Reproductive Health*, 16(2), 207-218.



IMPROVING STUDENTS' RESEARCH ACTIVITIES IN COLLABORATIVE LEARNING CONDITIONS

Boltaeva Z.Z.

Bukhara Engineering-Technological Institute

ANNOTATION

The article describes the scenario of a business game developed by the author, which creates the integration of technological and procedural approaches in teaching by creatively solving the assigned tasks.

KEY WORDS: *creative co-authorship, technological approach, benchmark results, procedural approach, systems analysis, individual research process, game modeling, stimulation system, originality of ideas*

The new socio-economic conditions for the development of Uzbekistan place high demands on the professional training of a competitive specialist who is capable of:

- Independently navigate the flow of changing information;
- Gain new knowledge and find the best options for its application;
- See prospects and plan strategies for the development of production, education and science;
- Implement and develop innovations.

An important condition for mastering these abilities is the involvement of students in the process of studying at higher educational institutions in research activities based on the creation of a collaborative environment. It is the research work of students that contributes to the formation of interest in educational, cognitive, creative and practical activities, increases educational motivation, creates conditions for social and professional growth, development of interest in the chosen profession, and allows for the development of creative and personal qualities of future specialists.

The educational reforms carried out today in the republic are particularly large-scale, where paramount importance is given to the issues of further improvement of vocational pedagogical education.

The development and implementation of modern pedagogical technologies, and the improvement of vocational pedagogical education is an important factor in the training of professional personnel with mass qualifications. Today, many innovations are being introduced into the education system, and they require an organized, systematic, mass approach to them. Innovation represents a long-term investment in the future. The innovative ability of the education system in Uzbekistan should also be manifested in the operational study and development of interactive teaching methods that have proven themselves in practice and the development of new teaching methods and techniques. Therefore, many methodological innovations are associated today with the use of interactive teaching methods. The essence of interactive learning is that the educational process is organized in such a way that almost all students are involved in the process of cognition and have the opportunity to understand and reflect on what they know and think. Such collaborative activity of students in the process of learning and mastering educational material means that everyone must make their individual contribution, in connection with which knowledge and ideas are exchanged. This happens in an atmosphere of goodwill and mutual support, which allows you to gain new knowledge and develop cognitive activity. Collaborative activities, in our opinion, focus on five main elements: positive interdependence; personal responsibility; facilitative interaction; teamwork skills; work in groups. In the process of dialogue learning, the dominance of either one speaker or one opinion over another is excluded. Here students learn to think critically, solve complex problems based on analysis and relevant information, weigh alternative opinions, and participate in discussions. To this end, in dialogue classes it is necessary to organize individual, pair and group work, use research projects, role-playing games, work with documents and sources of information, and use creative work. The use of interactive teaching methods makes it possible to activate and use the enormous educational potential of professional pedagogical training and introduce elements of independence into the educational process.

Interactive teaching methods provide a real opportunity to create an atmosphere of partnership in the classroom. The teacher teaches how to work in creative collaboration mode with students. Interactive lessons are not ready-made recipes for good



knowledge, but work in readiness mode for informed changes and making non-standard and responsible decisions. And this will allow the teacher:

- Ensure students' interest in the topic of the lesson;
- Achieve a more solid assimilation of educational material;
- Develop analytical (critical) thinking;
- To form professional and pedagogical skills;
- Create conditions for involving all students in active learning activities;
- Facilitate a favorable psychological microclimate in the study group.

In the process of dialogue learning, the dominance of either one speaker or one opinion over another is excluded. Here students learn to think critically, solve complex problems based on analysis and relevant information, weigh alternative opinions, and participate in discussions. To this end, in dialogue classes it is necessary to organize individual, pair and group work, use research projects, role-playing games, work with documents and sources of information, and use creative work.

The experience of introducing active learning methods into such traditional forms of classes as lectures, laboratory and practical work, coursework and diploma projects indicates the high effectiveness of these methods and their beneficial effect on improving the quality of training of specialists. But the same experience shows that the activation of traditional forms of training only partially solves the problem of improving the training of a modern engineer. The fact is that these forms, in principle, cover only two (out of three) levels of knowledge acquisition: the first, at which the student receives a description of the objects of his industry, and the second, at which he learns to solve individual practical problems associated with the creation and functioning of these objects.

However, traditional forms of training, except, perhaps, industrial practice, almost do not affect the level of training of a specialist, ensuring that he acquires the skills of the upcoming professional (production and design) activities within the walls of the institute. The difficulty in acquiring these skills is due to the fact that such activities, as a rule, are of a collective nature, i.e. Most real decisions are made in the process of interaction with work colleagues and subcontractors, whose interests may sometimes turn out to be different.

With a technological approach, educational material is presented in accordance with clearly presented educational goals, divided into separate modules, each of which is accompanied by text and adjustments about the progress of the lesson, and all educational work is aimed at achieving standard results. However, today this is not enough, since the importance of the development of human mental activity is increasing. The development of these human qualities is facilitated by a procedural approach, aimed not so much at the expected result, but at the development of productive thinking abilities. Possessing critical thinking, a person, when getting acquainted with any ideas, considers all the possible consequences of their implementation. We used the possibility of combining technological and procedural approaches to increase the efficiency of the educational process, and as an example we offer a scenario for a game lesson called "Progress".

The purpose of the lesson is - to study the main stages of work to improve the design and technical and economic indicators of a lathe.

The lesson is conducted using the example of improving the performance indicators of a large machine-building plant. As a result of the lesson, students should consolidate their knowledge of the design of a lathe, the features of its operation and materials processing technology, study the analytical dependencies that characterize the processing process on the machine, and the main features of brainstorming methods.

They must acquire the **skills**

- *Systemic, functional and economic analyzes of indicators characterizing the operation of the machine;
- *Development and application of criteria for evaluating technical solutions; application of the expert assessment method;
- *public speaking with motivated defense of proposed technical solutions.

In addition, in the process, students should gain an understanding of the principles of organizing the work of a creative team, the main stages of work to collectively solve a technical problem, the functional duties and responsibilities of the services of the chief mechanic and designer, as well as production managers.

Contents and procedure for conducting classes. During the classes, the problem of improving the design of a lathe is solved. The lesson is conducted in six stages.

**Scheme of The Lesson****Now we will consider in detail each stage of work in the lesson**

First stage. After familiarization with the purpose and objectives of the lesson, the leader introduces the students to the production situation in the machine shop, indicates the following information: 1) the number of machines in the workshop, their brief description; 2) the degree of equipment utilization, the availability of reserve capacity, the implementation of planned tasks; 3) nomenclature and volume of products; 4) labor needs, characteristics of the team.

Second Phase. Provides for conducting systemic, functional and cost analyzes of the operation of lathes. The stage begins with a system analysis of the lathe. Its performance as a technical system is determined, supersystems and subsystems are determined. Subsystems are analyzed, their classification into main and auxiliary is carried out, their mutual influence and interaction is considered. One or two subsystems are selected, the improvement of which is most promising. Next, a functional analysis of the system and subsystems is carried out. The characteristics of the starting material and the final product are given, and their influence on the processing process is analyzed. The functional analysis is completed by the selection of theoretical dependencies that describe the machining process on lathes. Cost analysis consists of determining the main expense items in the structure of product costs and the specific weight of each item.

Third Stage. Generating ideas for improving the machine. The Brainstorming method is used. The leader explains to the students the basic rules:

1. You can express any ideas - real, humorous, fantastic;
2. You can and should develop other people's ideas, but ideas should not be repeated.
3. Statements - in order of priority. The time for one statement is 1 minute.
4. You cannot criticize other people's ideas. The received ideas are written down on the board.



The Fourth Stage is Motivated Defense of the Best Technical Solutions. After the end of the third stage, students receive a task - everyone must choose the 8 best from all 15-35 ideas and prepare to defend one idea, in their opinion, the best. 3 – 5 students present the defense. The following issues are covered during the defense process:

- 1) what indicators of the system will improve and how much;
- 2) what resources are needed to implement the proposal;
- 3) can it be carried out by the enterprise, without stopping the workshop;
- 4) will working conditions improve?
- 5) how will the reliability and durability of the machine change? Disadvantages of the protected proposal.

Based on the results of defending and testing the results of student proposals, 7 best solutions are identified. At this stage, students are divided into teams - managers, mechanics and designers. Each team is led by a captain.

The Fifth Stage is the -selection of a rational technical solution and its public defense. The choice of a rational technical solution is made by each team using a simplified method of expert assessments.

The Sixth Stage is the development of criteria for evaluating technical solutions. After the teams are formed, they take the places allocated to them and begin work on drawing up criteria for evaluating technical solutions. At the same time, both criteria common to the enterprise as a whole are identified, as well as specific ones that take into account the role of the unit whose role the team plays.

Having identified 7 evaluation criteria, each team draws up a matrix of evaluations, where vertically - technical proposals, and horizontally - evaluation criteria.

All ideas are assessed on a five-point system. Once the team has identified the best idea, one of the team members immediately begins to prepare for a public defense. The duration of the defense report is up to 5 minutes; each of the opposing teams can ask the speaker two questions. The teacher sums up the results of the classes and notes the most active participants and the most original and interesting ideas.

Incentive System for Class Participants. Students' activities during classes are assessed at each stage, starting from the second, using a five-point system. The assessment takes into account the originality of ideas, activity, and validity of presentations. For violation of the first mode (hints, lateness, unscheduled answers, etc.), participants are fined 1-2 points. The teacher can reward the most active students with an additional number of points from his fund (from 1 to 2).

Conclusion. Due to the fact that there is not yet any established theory of management simulation games and other gaming methods, their creation is mainly an individual research process, and its results are significantly affected by the qualifications, talent, experience and intuition of the authors of the development. The most important problems solved in the process of developing a business game are the formation of its model, information and technical support, as well as taking into account the didactic and psychological aspects of game modeling.

Today's students are tomorrow's highly qualified personnel. And they will work for employers who expect from them the ability to work, effective professional qualified activity; creative thinking and problem-solving skills; effective fruitful work in groups, in teams; approach tasks with confidence and knowledge.

Используемая литература

1. Н. Сайидахмедов «Новые педагогические технологии». Ташкент. Молия. 2003 год.
2. Болтаева З.З. «Развитие науки и технологий». Научно-технический журнал. №2. Бухара. 2021.
3. Подласый И.П. Педагогика: 100 вопросов – 100 ответов: учеб. пособие для вузов. – М.: ВЛАДОС – пресс, 2004. 175с.
4. Болтаева З.З. Технологический и процессуальный подходы обучения на примере предмета «Методика профессионального образования «Молодой учёный» 2010 г. . Том II . № 11 (22) .
5. Педагогический энциклопедический словарь /Под ред. Б.М.Бим-Бада. М.: Научное издательство «Большая Российская энциклопедия», 2002. – 765 с



AYURVEDIC REVIEW ON NETRA RACHANA AND KRIYA SHAREERA

**Dr. Sachin A M¹, Dr. Veerayya R Hiremath²
Dr. Shashikala Khadabadi³, Dr. Gururaj Natikar⁴**

¹ PG Scholar, Dept. of Shalaky Tantra, SJGAMC, Koppal

² Professor & HOD, Dept. of Shalaky Tantra, SJGAMC, Koppal

³ Associate Professor, Dept. of Shalaky Tantra, SJGAMC, Koppal

⁴ Associate Professor, Dept. of Shalaky Tantra, SJGAMC, Koppal

ABSTRACT

Ayurveda includes an independent discipline called Shalaky Tantra, which focuses on treating sensitive areas above the clavicles, including the eyes. The history of Ayurveda shows that this branch of medicine had an extraordinary expansion from the time of the Vedas to the time of the Samhitas. The Uttara Tantra of Sushruta Samhita gives a significant description of the structure of the eye (Rachana Shareera), which explains the importance of the eye at the outset. The Samhitas also contain sparse references to the physiological aspects (Kriya Shareera) of the eye. An in-depth understanding of the anatomy and physiology of the human body is necessary for the diagnosis and treatment of all diseases. This article aims to bring together those components of Netra Rachana and Kriya Shareera from several classical texts.

KEYWORDS: Ayurveda, Netra, Rachana Shareera. Kriya Shareera

INTRODUCTION

Under the following topics, *Netra Rachana Shareera* addresses the structural elements of the eye : *Shareera – Anga – Pratyanga, Panchabhoutikatva of Netra, Size and shape of Netra, Parts of Netra, Akshi bandhana, Sira – Dhamani – Srotas, Peshi, Snayu, Growth and decline of Drishti. Netra Kriya Shareera* accounts for the functional aspects of the eye which can be understood through the following headings, *Indriyatha Sannikarsha, Roopaalochana, Chakshurbuddhi, Role of mind, Optical illusions and other inhibitory factors. Dosh, dhatu and mala* play a vital part in understanding both *Rachana and Kriya Shareera*. The cellular constituents *vata, pitta, and kapha*, when in balance, produce the "*tridhatu*," a three-way tissue or pillar that maintains life. However, the same three elements cause illness, mortality, and aging when they are aberrant.

DESCRIPTION

RACHANA SHAREERA OF NETRA SHAREERA – ANGA – PRATYANGA

- A fully developed foetus with all its parts is called as '*Shareera*' and it is composed of 6 *Angas* (parts), namely, 4 extremities, the trunk and the head. [SU. SHA. 5/3,4]
- Eyes and eyebrows are among the *Pratyangas* (subsidiary organs) which occur in pairs and Acharya Charaka opines that 2 orbits, 4 eyelids, and 2 pupils are among the 56 subsidiary organs which are adjoined with 6 major organs. [C. SHA. 7/11]

PANCHABHOUTIKATVA OF NETRA [SU. U. 1/11,12] [SU. SHA. 5/3]

Table – 1 Relation between parts of an eye and Panchamahabhuta			
MAHABHUTA	NETRA BHAGA	PART OF EYE	FUNCTION
<i>Prithvi</i>	<i>Pala</i>	Muscular Parts	Compaction
<i>Agni</i>	<i>Rakta</i>	Blood and Vessels	Metabolization
<i>Vayu</i>	<i>Krishna</i>	Black Portion	Division
<i>Jala</i>	<i>Sita</i>	White Portion	Moisturization
<i>Akasha</i>	<i>Ashru Marga</i>	Tear Channels	Development

SIZE AND SHAPE OF NETRA [SU. U. 1/10,13]

Eyeball measurement :

- Transverse / horizontal diameter – 2 *angulas* (about an inch)
- Sagittal / Antero-posterior diameter (depth) – the breadth of one's own thumb
- Circumference - two and a half *angulas*.

Shape :

- *Budbuda* – Water bubble
- *Suvritta* - Circular
- *Gosthanaakara* – Resembles the teat of a cow.

Dimension : [A. S. SHA. 8/36]

- *Krishna mandala* is 1/3rd of *netraayama* and also *Shukla mandala*.
- *Drishhti mandala* is 1/7th of the *Krishna mandala*.
- *Drushti mandala*'s shape is like a *masura* seed and is 1/9th of *Krishna mandala*.

PARTS OF NETRA

- The circular structures (*Mandala*), the joints (*Sandhi*) and the layers (*Patala*) which are five, six and six respectively constitutes the major parts of an eye. [SU. U. 1/14]
- *Indriyas* (sense organs) are formed from (the essence of materials presents in) *srotas* (channels) which transport *kapha*, *rakta* and the *mahabhutas*. [A. S. SHA. 5/48]



Figure – 01 Netra Rachana Shareera

MANDALA

- *Mandalas* are arranged one behind the other in order. [SU. U. 1/15]
- The *shukla mandala* is formed from the essence of *sleshma* and is paternal in origin, while the *krishna mandala* is from *rakta* (blood) and is maternal in origin; Middle portion the *dristimandala* is derived from both. [A. S. SHA. 5/49]

MANDALA	CORRELATION
<i>Pakshma</i>	Eyelashes
<i>Vartma</i>	Eyelids
<i>Shukla</i>	Conjunctiva, Sclera
<i>Krishna</i>	Cornea, Choroid
<i>Drishhti</i>	Pupil, Retina

SANDHI

Sandhis, serve as lines of demarcation of the *mandalas*. [SU. U. 1/16]



SANDHI	CORRELATION
<i>Pakshma-Vartmagata</i>	Lid margin
<i>Vartma-Shuklagata</i>	Fornix?
<i>Shukla-Krishnagata</i>	Limbus?
<i>Krishna-Drishtigata</i>	Free margins of Iris?
<i>Kaninika</i>	Inner canthus
<i>Apanga</i>	Outer canthus

PATALA

Of the *patalas*, 2 are in the *vartma mandala* (Eyelids) and 4 in the eye proper. The thickness of *patala* one-fifth of *Drishti mandala*. [SU. U. 1/17-19]

PATALA	COMPOSITION	CORRELATION
<i>Prathama</i>	<i>Teja + Jala</i>	Sclera, Conjunctiva, Cornea
<i>Dviteeya</i>	<i>Pishita</i>	Ciliary Muscles, Uveal Tract
<i>Tritiya</i>	<i>Meda</i>	Vitreous, Lens
<i>Chaturtha</i>	<i>Asthi</i>	Retina

AKSHI BANDHANA [SU. U. 1/19]

- All the parts of the eye are held together by some components. They are *sira* (veins), *kandara* (tendons), *medas* (fat) and *kapha*.
- *Kalakasthi* is a type of bone indicating its relationship with *krishna mandala*.
- *Sleshma* is the binding material in all joints.

MARMA [SU. SHA. 6/27]

- There are 107 *marmas* (vital points) in human body. Out of which 37 are present above the clavicle. *Marmas* that directly relate to eye are,
- *Apanga* - situated below the tips of the eyebrows and about the external corners of eyes. An injury to it causes blindness or defective vision.
- *Avarta* - situated above and below the eyebrows which results in blindness or impaired vision, if injured.
- *Shringataka* - the junction of the 4 *siras* (nerves) that supplies nutrition to nose, ears, eyes and tongue and proves fatal within the day.

SIRA [SU. SHA. 7/7]

- There are 700 *siras* in the human body, of which 40 are major. They are 10 each of *Vata*, *Pitta*, *Kapha* and *Rakta*. These further divide into 175.
- 8 of *vata*, 10 each of *pitta*, *kapha* and *rakthavaha* *siras* supplements the eye.
- Charaka explains, There are 56 *siras* in eyes, 2 each are responsible for lid movements and one each responsible in supplementing the *apanga sandhi*.

DHAMANI [SU. SHA. 9/5]

- *Dhamanis* in the human body originate from *nabhi* and are 24 in number. 10 of them have an upward course, 10 have a downward course and 4 have a transverse course.
- These 10 up-coursing *dhamanis*, reaching heart respectively ramify themselves into 3 branches, thus making 30 ramifications in all.
- Out of those 30, two *Rupavahi dhamanis* maintain visual perception and 2 *Ashruvahi dhamanis* regulate flow of tears.

SROTAS [C. V. 5/7-8]

- *Srotas* are channels that serve the purpose of circulation by conveying the *dhatus* (body-elements) undergoing metabolic processes.
- *Srotas* are innumerable and are described with reference to their boundaries and pathological characteristics. *Srotas* that directly relates to eye are,
- *Annavaha srotas* - *Viddha* or damage to it can make the person blind.
- *Raktavaha srotas* – Its damage causes redness of the eyes.



PESHI [SU. SHA. 5/37]

- The *Peshis* (muscles) number 500 in all. Of which 400 are in extremities, 66 in trunk and 34 in the above clavicle region in which 2 are situated in eyes.

SNAYU [A. S. SHA. 5/76]

- There are 900 *Snayus* (ligaments), out of which 600 are in extremities, 230 are in lower body and 70 in upper body. *Prithu* type of *snayu* is present in *Shiras*.

GROWTH AND DECLINE OF DRISHTI

Some of the classical references that discuss the growth and decline of eyes are,

- The *drushti* of a person doesn't go with the general expansion of the body. [SU. SHA. 4/60]
- Childhood, growth, complexion, ingenity, skin, semen, eyes, ears, mind and all sense acuities diminish in successive decades respectively which suggests that sight will deteriorate after 70 years of age. [A. S. SHA. 8/25]
- Acharya Sharngadhara opines that vision remains normal till the age of 60 and then deteriorates. [SHA. PU. 6/20]
- The *tejas* (light) present in the eyes combining with the light of its own nature present outside, becomes capable of functioning just as a sharp weapon coming in contact with stone (sharpner), By excess contact it gets destroyed. Though present in the midst of water, it does not lose its fiery nature just like *vidyut* (lightning) and *badava* (fire present in ocean). [A. S. SHA. 5/51]
- *Vata, Pitta, Kapha, Rakta* and *Rasa* are the five types of *dhamanis* in the *panchendriyas* that supply the *panchendriyartha* to the *Atma* throughout life. At the time of death, the respective *dhamanis* become separated from their respective *indriyas* and attain *panchatva*. [SU. SHA. 9/11]

KRIYA SHAREERA OF NETRA

PHYSIOLOGICAL UNDERSTANDING OF VISION

Functional aspect of *Netra* is better understood through the following headings,

Indriyaartha Sannikarsha (Image) *Roopaalochana* (Light) *Jnanotpatti* (Eye) →

❖ **Indriyaartha Sannikarsha** – Contact between eyes and objects :

- The process of gaining knowledge involves five main factors. Sense faculties, Sense materials, Sense organs, Sense objects, Sense perceptions. [C. SU. 8/3]

<i>Indriya</i>	<i>Chakshu</i>	Eye
<i>Indriya dravya</i>	<i>Jyoti</i>	Light
<i>Indriya adhishtana</i>	<i>Akshi</i>	Eyeball
<i>Indriya artha</i>	<i>Rupa</i>	Image, Colour
<i>Indriya buddhi</i>	<i>Chakshur buddhi</i>	Visual perception

- The five perceptions are the Visual perception etc. These perceptions are the results of the coordination of the senses, the sense-objects, mind and soul, they are fleeting and are of the nature of decisions. These are known as the five pentads (*Panchapanchaka*). [C. SU. 8/12]
- Particular sense organ perceives the same matter which forms the proper object of that sense organ. [SU. SHA. 1/15]

❖ **Roopaalochana and Jnanotpatti** – Analysis of images and Visual perception :

- Receiving and analysis of images is done by *pitta*, especially *alochaka* which is situated in the pupil (*Antah taraka*) [SU. 21/10] [A. H. SU. 12/14] [C. SU. 12/11]
- *Alochaka pitta* possesses *chakshu vaisheshika* and *buddhi vaisheshika*. [BH. SHA. 4/4]

Chakshu vaisheshika

- *Jnana Udirana* happens after the contact of *Atma, Mana, Indriya* and *Artha* – Then it reaches *Chitta* – Resulting in *Jnana Pranipata*. [C. SU. 11/20]
- Analysing the images one by one or collectively is based on, *Lakshana* (Details), *Samsthana* (Base), *Rupa* (Form/appearance), *Varna* (Colours) and *Swara* (Sounds) which is known as *Vaisheshika Jnana*. [BH. SHA. 4/4]

Buddhi vaisheshika

- *Buddhi vaisheshika* is situated in *shringataka* (between the two eyebrows) and ✓ Perceives minute details by *Jnana*



- ✓ Provides complete visual perception
- ✓ Records visual images and remembers these images for long time
- ✓ Recalls and recollects, when necessary
- ✓ Helps to foresee the future things [BH. SHA. 4/5]
- From among these each sense, predominant in one element in particular, contacts objects which have a similar predominance of that element, owing to innate affinity and ubiquity. [C. SU. 8/14]
- Theory of common origin (*Tulya Yoni*) forms the basis of sensory perceptions. The light which illuminates the objects and the eye that receives it, both are derived from *tejo mahabhuta*. Hence eye receives only *Rupa* (Visual perception) and nothing else.
- Dalhana, gives the example of water in the river moving to join the sea. The similarity is responsible for this attraction as similar things always go together. [SU. SHA. 1/15]

❖ **Role of Mind** : [C. SU. 8/7]

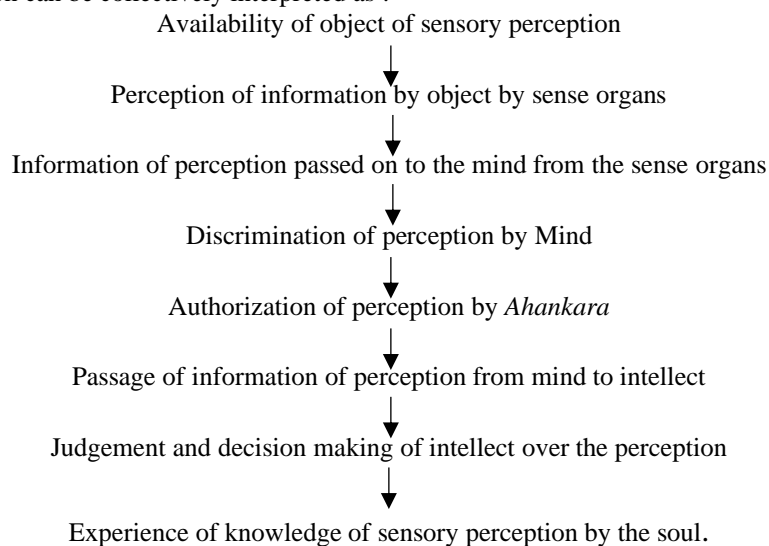
- Mind leads sense organs in contacting the sense-objects. The image that the mind perceives is a conceptual interpretation of it rather than an impression on the retina. Vision, therefore, is a process of mental interpretation.
- Vision depends on the mind's imagination. When the imagination is perfect, sight is good. Diversion of mind is one of the inhibitory factors of vision.

❖ **Optical illusions and other inhibitory factors** : [C. SU. 11/8]

Factors leading to failure of perceivable observation,

- *Ati Sannikarsha* - Very near
- *Ati Viprakarsha* - Too far
- *Avarana* – Obstruction
- *Karana Daurbalya* - Defect in organ
- *Mano Anavasthana* - Distracted mind
- *Samana Abhikara* – Similarity
- *Abhi bhava* – Overpowering
- *Ati Saukshmya* - Very minute

Sequence of Visual perception can be collectively interpreted as :



ROLE OF DOSHA, DHATU AND MALA

➤ **VATA** : [C. SU. 12/8] [C. CH. 28/9] [C. CH. 28/22,23]

- Regulation of sensory organs
- *Vyana vayu* helps in movement of eyelids (Constriction and Dilatation)
- *Prana vayu* supports vision
- If vitiated, prevents visual perception

➤ **PITTA** : [SU. SU. 21/10]

- *Pitta* is responsible for analysis of objects

➤ **KAPHA** : [A. H. SU. 12/17] [B. P. PU. 3/132] [C. SU. 17/60] [SU. SU. 21/14]



- *Tarpaka kapha* supplements nutrition through *Sneha*
- *Shleshaka kapha* lubricates joints
- RASA : [SHA. PU. 5/13,14]
 - Watery portion of eye is the *mala* of *rasa dhatu* or *kapha drava* or A type of *ranjaka pitta*
- RAKTA : [C. CH. 15/17] [SU. SU. 15/14] [SU. SU. 35/16] [C. V. 8/104]
 - *Sira* and *kandara* helps in binding of eyeball in the bony socket
 - Increase in *rakta dhatu* in *akshivaha siras* cause redness of eye
 - *Rakta* provides moisture and colour
- MAMSA : [C. V. 8/105] [SU. SHA. 5/38]
 - *Mamsa* provides *pushti* (health) and any reduction in the level of *mamsa dhatu* will lead to *netra glani*, weakness of eye
 - Components of the eye like *sira*, *kandara*, *snayu*, *asthi* and *sandhi* get stronger by the support of *mamsa dhatu*
- MEDA : [C. V. 8/106] [A. S. SU. 19/3]
 - *Meda* provides lubrication
 - *Snayu* and *sandhi* are the *upadhatu* of *meda*
 - 3rd *patala* of *Drishti* is made of *meda*
- ASTHI : [A. H. SU. 11/19]
 - *Pakshma* is the *mala* of *asthi dhatu*
 - 4th *patala* of *Drishti* is supported by *kalakasthi* (Dalhana)
- MAJJA : [SU. SU. 35/16] [A. H. SU. 11/19] [C. SU. 28/17] [SU. SU. 46/529]
 - *Majja dhatu* provides excellent eyes.
 - Heaviness and darkness of eye are the features of increase and decrease of *majja* respectively.
 - The oiliness in the discharges of eye is the *mala* of *majja*.
- SHUKRA : [C. V. 8/109] [C. CH. 15/3,4]
 - *Shukra dhatu* pleases eyes as it is filled with milk
 - One should increase *tejas* along with *shukra* for better vision.
- MALA : [A. S. SU. 19/7] [A. S. SU. 19/10]

The increase of *netragata mala* will result in :

 - *Bahulya* : Increase of discharges
 - *Dravata* : Increased liquidity exudates
 - *Kandu*, *Gourava* : Itching and heaviness of eye

Decrease of *netragata mala* will produce :

 - *Malayana Shosha* : The dryness of the eye
 - *Malayana Shunyatwa* : Lack of functions of vision
 - *Malayana Laghava* : The lightness

CONCLUSION

Ayurveda has the potential to gain more traction in the medical discipline of ophthalmology with further research and analysis of *Rachana* and *Kriya shareera* of *Netra*. Many eye disorders, their pathologies and treatment features, have been comprehensively discussed by the majority of Acharyas. It is crucial to understand the physiological and anatomical components in order to take both preventative and curative measures. Sushruta Samhita contains a significant portion of the anatomical explanation of the eye (a recitation of Acharya Videha's description), as does Ashtanga Hridaya and Ashtanga Sangraha. Charaka samhitas and other samhitas also have sporadic allusions. With regard to the *Kriya Shareera*, Acharya Bhela provides a unique point of reference for a dispersed interpretation of the *samhitas*.

BIBLIOGRAPHY

1. *Agnivesha and Charaka : Charaka Samhita with Chakrapanidatta's Ayurvedadeepika commentary edited by Vaidya Yadavji Trikamji Acharya, Published by Chaukhamba Surabharati Prakashana, Varanasi. Reprint Edition - 2014.*
2. *Sushruta : Sushruta Samhita with Dalhana's Nibandha Sangraha and Gayadas's Nyaya Chandrika Panjika Commentary edited by Vaidya Yadavji Trikamji Acharya, Published by Chaukhamba Surabharati Prakashana, Varanasi. Reprint Edition - 2017.*
3. *Vagbhata : Ashtanga Hridaya with Commentaries of Arunadatta's Sarvanga Sundara and Hemadri's Ayurveda Rasayana edited by Bhishagacharya Pandit Hari Sadashiva Shastri Paradakara. Published by Chaukhamba Surabharati Prakashana, Varanasi. Reprint Edition - 2017.*
4. *Vridha Vagbhata : Ashtanga Sangraha with Commentary of Indu's Shashilekha edited by Shivprasad Sharma. Published by Chowkhamba Sanskrit Series Office, Varanasi. Third Edition - 2012.*
5. *Sharngadhara : Sharngadhara Samhita with Adhamalla's Dipika and Kashirama's Goodharthadipika Commentary edited by Pandit Parashurama Shastri, Vidyasagar Published by Panduranga Jawaji - Nirnayasagara, Bombay. Edition - 1931.*



SJIF Impact Factor (2023): 8.574 | ISI I.F. Value: 1.241 | Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)

EPRA International Journal of Research and Development (IJRD)

Volume: 8 | Issue: 12 | December 2023

- Peer Reviewed Journal

6. *Bhela : Bhela Samhita with Dr. K. H. Krishnamurthy's English translation and commentary edited by Priya Vrat Sharma, Published by Chaukhamba Visvabharati, Varanasi. 1st Edition – 2000.*
7. *Sribhavamishra: Bhavaprakasha Sampoorna with Vishamasthala teeka edited with introduction and index by Pandit Sri Brahma Shankara Mishra. Published by Chowkhamba Sanskrit Series Office, Varanasi. 2nd Edition, 2002.*



DEVELOPMENT OF HERBAL GRAIN TABLETS WITH PESTICIDE, INSECTICIDE, AND ANTISEPTIC PROPERTIES USING NATURAL INGREDIENTS

Yogesh Bhimrao Yevale^{1*}, Gitesh Vinod Vyas², Anand Daulatrao Khendke³

¹ Department of Bachelor in Pharmacy, Faculty of Pharmacy, Dr. Babsaheb Technological University, Raigad, Lonere.

² Department of Pharmacology, Faculty of Pharmacognosy, Dr. Babsaheb Technological University, Raigad, Lonere.

³ Department of Bachelor in Pharmacy, Faculty of Pharmacy, Dr. Babsaheb Technological University, Raigad, Lonere

* Corresponding Author

ABSTRACT

The global demand for sustainable and environmentally friendly alternatives to synthetic pesticides, insecticides, and antiseptics has led to a renewed interest in harnessing the therapeutic properties of natural ingredients. This comprehensive study focuses on the formulation and development of herbal grain tablets enriched with pesticidal, insecticidal, and antiseptic attributes using readily available and eco-friendly components, including clove, bay leaf, cinnamon, garlic peel, neem leaves, and burned wood ash.^[1]

The study begins by exploring the traditional knowledge and historical uses of these natural ingredients, highlighting their potential for pest control and antiseptic applications. A detailed review of the phytochemical constituents in each ingredient underscores their diverse properties, ranging from antimicrobial and insect-repellent compounds to antibacterial and pesticidal agents.^[2]

The experimental section presents the step-by-step process of formulating the herbal grain tablets. This includes the preparation of the ingredients, extraction of active compounds, and their incorporation into the tablet matrix. The optimal ratios of each ingredient are determined to maximize efficacy, safety, and shelf life.^[3]

Subsequently, the tablets are subjected to a battery of quality control tests to ensure their safety for human use, including toxicity and irritation tests. The pesticidal and insecticidal properties are assessed through laboratory assays using common agricultural pests and insects.^[4]

Furthermore, the tablets' antiseptic attributes are tested against a panel of common pathogens, including bacteria and fungi, to gauge their potential as an eco-friendly disinfectant. The results highlight the effectiveness of the tablets in both pesticidal and antiseptic applications.^[5]

The study concludes with a discussion on the potential applications of these herbal grain tablets in agriculture, pest control, and sanitation. The tablets offer a promising alternative to synthetic chemicals, contributing to sustainable and environmentally responsible practices.^[6]

This research not only provides a detailed insight into the development of herbal grain tablets with pesticidal, insecticidal, and antiseptic properties but also underscores the significance of utilizing natural ingredients for a healthier and more sustainable future. The study's findings hold great promise for a wide range of applications, from agriculture to healthcare, highlighting the potential of these tablets to address various pressing issues.^[7]

KEYWORDS: Natural Ingredients, Pesticide Formulation, Insecticide Development, Antiseptic Tablet, Clove Extract, Bay Leaf Extract, Cinnamon Extract, Garlic Peel Extract, Neem Leaves Extract, Eco-friendly Pest Control, Botanical Pesticides, Herbal Antiseptic, Traditional Medicine, Pest Repellent Properties, Antibacterial Activity, Antifungal Activity, Sustainable Agriculture, Pest Management, Environmental-friendly Pesticides, Herbal Remedies.

Introduction

The rising concerns over the adverse effects of synthetic chemicals on the environment, human health, and sustainable agricultural practices have spurred an increased interest in the development of alternative, eco-friendly solutions. In this context, the formulation of herbal grain tablets with pesticidal, insecticidal, and antiseptic properties using a unique combination of natural ingredients has emerged as a promising avenue.^[8]

This comprehensive study delves into the intricate process of crafting these herbal grain tablets that can serve as a multi-purpose tool for pest control, insect repellency, and disinfection. The key natural ingredients that form the core of this study include clove, bay leaf, cinnamon, garlic peel, neem leaves, and burned wood ash.^[9]



Historical Significance

The historical use of herbs and plant materials in pest management and disinfection dates back centuries. Traditional knowledge systems across the globe have recognized the potent properties of various botanicals in addressing agricultural challenges and healthcare needs. Our research aims to build upon this historical wisdom by creating a modern, scientifically grounded formulation.^[10]

Phytochemical Riches

Each of the natural ingredients selected for this study is abundant in phytochemicals with proven pesticidal, insecticidal, and antiseptic properties. Clove (*Syzygium aromaticum*) is known for its high eugenol content, bay leaf (*Laurus nobilis*) contains linalool and eucalyptol, cinnamon (*Cinnamomum verum*) has cinnamaldehyde, garlic peel (*Allium sativum*) is rich in allicin, neem leaves (*Azadirachta indica*) possess azadirachtin, and burned wood ash has alkaline properties. These compounds have been studied for their potential applications in pest control and antimicrobial activities.^[11]

The Formulation Process

The formulation of the herbal grain tablets involves the extraction of active compounds from these natural ingredients and their incorporation into a tablet matrix. Finding the optimal ratios is a crucial step to ensure both efficacy and product stability. The study explores various extraction methods and tablet-forming techniques to develop a product that is both efficient and practical.^[12]

Quality Control and Safety

To assess the safety and viability of these tablets, a rigorous quality control regime has been established. This includes toxicity and irritation tests to ensure that the product is safe for human use. The meticulous approach taken in this aspect underscores the commitment to producing a solution that is not only effective but also free from harmful side effects.^[13]

Pesticidal and Antiseptic Efficacy

The study further investigates the pesticidal and antiseptic efficacy of the herbal grain tablets through laboratory assays. Common agricultural pests and insects are exposed to the tablets to gauge their impact. Similarly, a panel of pathogens, including bacteria and fungi, is subjected to the tablets to assess their antiseptic properties.^[14]

Promising Applications

The research concludes with a discussion on the promising applications of these herbal grain tablets in agriculture, pest control, and sanitation. The environmentally responsible and sustainable attributes of these tablets hold great promise for addressing various pressing issues in contemporary agriculture, pest management, and healthcare.^[15]

✓ Ingredients:

- Clove: 20%
- Bay Leaf: 15%
- Cinnamon: 10%
- Garlic Peel: 25%
- Neem Leaves: 15%
- Burned Wood Ash: 15%

✓ Equipment Needed

1. Mortar and Pestle
2. Weighing Scale
3. Mixing Bowl
4. Sieve
5. Tablet Press or Molds
6. Drying Rack or Dehydrator
7. Airtight Containers for Storage

✓ **Steps:****Formula**

Sr.No.	Ingredients	Quantity Taken [%]	Category
1	Clove	20 %	Antimicrobial
2	Bayleaf	15 %	Antibacterial
3	Cinnamon	10 %	Insect Repellent
4	Garlic Peel	25 %	Antimicrobial
5	Neem leaves	15 %	Antiseptic, Antioxidant
6	Burned Wood Ash	15 %	Stabiliser

• **Detailed information about Clove****Fig: 1.Clove**



1. Taxonomical Information

- Genus and species: Clove is derived from *Syzygium aromaticum*.^[16]
- Family: Myrtaceae.
- Description: Include details about the plant's characteristics, habitat, and geographical distribution.
- Plant parts used: Describe which parts of the clove plant are used in the formulation.

2. Pharmacological Research

- Active compounds: Identify and discuss the active compounds in clove, such as eugenol and others.
- Pharmacological properties: Explore the pharmacological effects of clove, such as its antimicrobial, anti-inflammatory, and antioxidant properties.^[17]
- Mechanisms of action: Explain how clove's active compounds work in the context of pest control and preservation in Grains Guard tablets.

3. Physiological Effects

- Discuss how the use of clove affects the physiology of grains or pests.
- Include information on its impact on grain preservation, pest mortality, and safety for human consumption.^[18]

4. Scientific Studies

- Summarize relevant scientific studies or experiments that have been conducted to assess the effectiveness of clove in Grains Guard tablets.
- Include data on dosage, application methods, and results of the experiments.

- **Detailed information about Bayleaf**

Fig:2.Bayleaf



1. Taxonomical Information

- Genus and species: Bay leaves are derived from the plant *Laurus nobilis*.
- Family: Lauraceae.
- Description: Bay laurel is a tree native to the Mediterranean region. It produces aromatic leaves widely used in culinary and herbal applications.
- Plant parts used: Bay leaves from the *Laurus nobilis* plant are commonly used in herbal formulations.^[19]

2. Pharmacological Research

- Active compounds: Bay leaves contain essential oils, including eucalyptol, cineole, and other phytochemicals.
- Pharmacological properties: Research has shown that bay leaves possess antimicrobial, anti-inflammatory, antioxidant, and potential insect-repellent properties.
- Mechanisms of action: Bay leaf's active compounds may act as repellents against pests and inhibit microbial growth, making them valuable in Grains Guard tablets for preservation.

3. Physiological Effects

- Preservation: Bay leaves may help preserve grains by acting as a natural insect repellent. They can deter pests and inhibit fungal growth, extending the shelf life of grains.
- Insect control: The aromatic compounds in bay leaves can deter insects, protecting stored grains from infestation.^[20]



4. Scientific Studies

- Summarize relevant scientific studies or experiments that have investigated the use of bay leaves in Grains Guard tablets.
- Discuss the dosage and application methods used in these studies, as well as the results obtained in terms of pest control and grain preservation.

- **Detailed information about Cinnamon**



Fig:3.Cinnamon

1. Taxonomical Information

- Genus and species: Cinnamon comes from several species, with *Cinnamomum verum* (Ceylon cinnamon) and *Cinnamomum cassia* (Cassia cinnamon) being the most common.
- Family: Lauraceae.
- Description: Cinnamon is obtained from the bark of evergreen trees and is native to South and Southeast Asia.

2. Pharmacological Research

- Active compounds: Cinnamon contains various active compounds, including cinnamaldehyde, cinnamic acid, and cinnamate esters.
- Pharmacological properties: Research has shown that cinnamon has antimicrobial, anti-inflammatory, antioxidant, and potential insect-repellent properties.^[21]
- Mechanisms of action: The active compounds in cinnamon may inhibit the growth of pests and fungi, making it valuable in Grains Guard tablets for pest control and preservation.

3. Physiological Effects

- Preservation: Cinnamon's natural compounds may help preserve grains by acting as insect repellents and inhibiting the growth of mold and fungi, thereby extending the shelf life of grains.
- Insect control: The aromatic properties of cinnamon are believed to deter pests, protecting stored grains from infestation.^[22]

4. Scientific Studies

- Summarize relevant scientific studies or experiments that have explored the use of cinnamon in Grains Guard tablets.
- Discuss the dosage and application methods used in these studies, as well as the results obtained in terms of pest control and grain preservation.

- **Detailed information about Garlic**



Fig:4.Garlic Peels



1. Taxonomical Information

- Genus and species: Allium
- Family: Liliaceae
- Plant parts used: Peel

2. Pharmacological Research

- Active compounds: Allicin, Alliin
- Pharmacological properties: Research has shown that bay leaves possess antimicrobial, anti-inflammatory, and antioxidant properties.^[23]
- Mechanisms of action: Antimicrobial

3. Physiological Effects

- Preservation: Shade to dry
- Insect control: Crawling & flying insects

4. Scientific Studies: It exhibit Antioxidant, antifungal, antimicrobial.

- **Detailed information about Neem leaves**



Fig:5.Neem Leaves

1. Taxonomical Information:

- Genus and species: Azadirachta indica
- Family: Maliaceae
- Plant parts used: Leaves

2. Pharmacological Research

- Active compounds: Nimbin, Salanin
- Pharmacological properties: Antimicrobial, Antiviral
- Mechanisms of action: Inhibit microbial growth

3. Physiological Effects

- Preservation: Away from direct sunlight & moisture

4. Scientific Studies

- Discuss the dosage, application methods, and results of the experiments in terms of pest control and grain preservation.^[24]

- **Detailed information about Burned Wood Ash**



Fig:6.Burned Wood Ash

1. Taxonomical Information

- Burned wood ash does not originate from a specific plant but is a product of combustion.
- It is primarily composed of minerals and trace elements from the wood that was burned.



2. Pharmacological Research

- Burned wood ash is not known for having specific pharmacological properties. However, its alkaline nature can have effects on pH levels in the environment where it's applied.
- It may influence the pH of the storage environment and affect the growth of pests and microorganisms.

3. Physiological Effects

- Preservation: Burned wood ash can be used to raise the pH level in stored grains, creating an environment less conducive to pest infestation and microbial growth.^[25]
- Insect control: Higher pH can deter insects by making the environment less suitable for their survival.

4. Scientific Studies

- Research may include studies that investigate the impact of burned wood ash on grain preservation and pest control.
- These studies can explore the dosage and application methods of burned wood ash in Grains Guard tablets and their results in terms of preserving grains and deterring pests.

It's important to note that research on the use of burned wood ash in herbal formulations for Grains Guard tablets may be limited compared to other more commonly studied natural ingredients. Scientific evidence and studies on the effectiveness, dosage, safety, and practical application of burned wood ash in this context will be crucial to establish its role in grain preservation and pest control.^[26]

- **The comparison between synthetic or artificial chemical formulations**



Fig:7.Marked Preparation

1. **Effectiveness:** Synthetic chemical formulations are often designed to be highly effective at preserving grains and repelling pests. They may have a more immediate and potent impact compared to herbal formulations. However, herbal formulations can also be effective, especially when properly researched and designed.^[27]
2. **Safety:** Synthetic chemicals can sometimes be harmful to humans and the environment if not used correctly. They may leave chemical residues on grains. Herbal formulations, on the other hand, are generally considered safer for human consumption and environmentally friendly.^[28]
3. **Residue and Contamination:** Synthetic chemicals can leave residues on grains that may pose health risks. In contrast, herbal formulations are less likely to leave harmful residues.
4. **Long-Term Effects:** Continuous use of synthetic chemicals can lead to pesticide resistance in pests and potentially harmful long-term consequences for the environment. Herbal formulations may have milder long-term effects.
5. **Environmental Impact:** Synthetic chemicals can harm beneficial insects, wildlife, and soil health. Herbal formulations are often biodegradable and less harmful to the environment.
6. **Regulation and Compliance:** Synthetic chemicals are typically subject to strict regulations and guidelines. Herbal formulations may have fewer regulatory hurdles.
7. **Cost and Availability:** Synthetic chemicals may be more affordable and widely available compared to some herbal ingredients.^[29]

In conclusion, the relative harm of synthetic chemical formulations versus herbal formulations for Grains Guard tablets depends on factors like formulation quality, proper usage, local regulations, and environmental concerns. A well-researched herbal formulation can be a safer and environmentally friendly alternative, but its effectiveness can vary depending on the specific ingredients and methods used.

- **Herbal formulations and synthetic products**

1. **Safety:** Herbal formulations are generally considered safer for human consumption and the environment. They are less likely to leave harmful chemical residues on grains or negatively impact health.
2. **Low Environmental Impact:** Herbal ingredients are often biodegradable and have a lower environmental footprint compared to synthetic chemicals, which can harm beneficial insects, wildlife, and soil health.^[30]
3. **Sustainability:** The use of natural ingredients supports sustainable agricultural practices, reducing the reliance on synthetic pesticides and chemicals.



4. **Reduced Pesticide Resistance:** Continuous use of synthetic pesticides can lead to pest resistance. Herbal formulations may have a different mode of action, making it less likely for pests to develop resistance.
5. **Health Benefits:** Some herbal ingredients used in Grains Guard tablets, such as neem and cloves, are known for their potential health benefits. These benefits may extend to the grains they protect.
6. **Cultural and Traditional Knowledge:** Many herbal ingredients have been used for centuries in traditional medicine and agriculture. They draw from the knowledge of indigenous and local communities.
7. **Consumer Demand:** There is a growing demand for natural and organic products. Herbal formulations align with consumer preferences for more natural and sustainable options.
8. **Compliance:** Herbal formulations may face fewer regulatory hurdles and can be easier to implement for farmers and small-scale producers.
9. **Customization:** Herbal formulations allow for flexibility in tailoring the formulation to specific grains and pest challenges. Synthetic chemicals often offer a one-size-fits-all approach.
10. **Holistic Approach:** Herbal formulations often take a holistic approach to pest control and grain preservation, considering the overall health of the environment and the people involved.

While herbal formulations have these advantages, it's essential to recognize that their effectiveness can vary depending on the specific ingredients used, formulation methods, and local conditions. Scientific research and testing are crucial to ensuring the efficacy of herbal Grains Guard tablets. Additionally, a combination of herbal and integrated pest management strategies may offer the most sustainable and effective approach to grain protection.^[31]

- **Advantages & Disadvantage**

Advantages

1. **Safety:** Natural ingredients are generally safer for human consumption and the environment compared to synthetic chemicals, reducing the risk of harmful residues on grains.
2. **Environmentally Friendly:** The use of natural ingredients has a lower environmental impact. They are biodegradable and less harmful to beneficial insects, wildlife, and soil health.^[32]
3. **Reduced Pest Resistance:** The combination of multiple natural ingredients can provide a diverse and complex set of repellent and preservative actions, making it less likely for pests to develop resistance.
4. **Sustainability:** The use of natural ingredients promotes sustainable agricultural practices, reducing reliance on synthetic pesticides and chemicals.^[33]

Results

Aspect Of Evaluation	Test Description	Evaluation Criteria & Result
1.Organoleptic Property	1.Odour & Flavour Assessment 2.Visual Inspection	Exhibit Characteristic Odour & Flavour. Expected Colour & Apperance.
2.Physical Property	1.Tablet Hardness Test 2.Tablet Friability Test	Withstand a certain amount of pressure without crumbling. Resist abrasion & not disintegrate easily.
3.Effectiveness	1.Efficacy against pests test.	Controlled experiment to assess the tablet's ability to protect grains from pests.
4.Stability	1.Shelf life testing	Evaluate tablet's stability under various environmental conditions overtime.
5.Microbiological Safety	1.Microbial testing	Free from haramfull microorganisms.
6.Chemical Composition	1.Chemical Analysis	Contain intended Ingredients in correct proportion.
7.Contaminant Test	1.Hevay metals & contaminants analysis	Free from haramfull level of heavy metal or contaminants.
8.Dissolution Characteristics.	1.Dissolution testing	Asses how well tablet dissolve in a simulated digestive environment.

Conclusion

Herbal Grains Guard tablets, incorporating a combination of natural ingredients, represent a promising and eco-friendly solution for the preservation of grains while mitigating the impact of pests and microbial spoilage.

TABLES AND FIGURES**Table 1 . Formula.**

Sr.No.	Ingredients	Quantity Taken [%]	Category
1	Clove	20 %	Antimicrobial
2	Bayleaf	15 %	Antibacterial
3	Cinnamon	10 %	Insect Repellent
4	Garlic Peel	25 %	Antimicrobial
5	Neem leaves	15 %	Antiseptic, Antioxidant
6	Burned Wood Ash	15 %	Stabiliser

Figure 1. Clove**Figure 2. Bayleaf****Figure 3. Cinnamon****Figure 4. Garlic****Figure 5. Neem leaves****Figure 6. Honey.****Figure 7. Marketed preparation****REFERENCES***Reference to a website*

1. Aioub A. A., El-Ashry R. M., Hashem A. S., Elesawy A. E., Elsobki A. E. (2021). Compatibility of entomopathogenic nematodes with insecticides against the cabbage white butterfly, *Pieris rapae* L.(Lepidoptera: Pieridae). Egypt. J. Biol. Pest Control 31, 1–12. doi: 10.1186/s41938-021-00498-z
2. Furiga A., Lonvaud-Funel A., Badet C. In vitro study of antioxidant capacity and antibacterial activity on oral anaerobes of a grape seed extract. Food Chem. 2009;113:1037–1040. doi: 10.1016/j.foodchem.2008.08.059.



3. Luque de Castro MD and Garcia-Ayuso LE. Soxhlet extraction of solid materials: An outdated technique with a promising innovative future. *Analytica Chimica Acta* 1998; 369: 1-10
4. Gupta R. C. (2014). "Rotenone," in *Encyclopedia of Toxicology*, 3rd Edn, ed. Philip W. (London: Elsevier;), 185–187.
5. Elmastas M., Telci İ., Akşit H., Erenler R. Comparison of total phenolic contents and antioxidant capacities in mint genotypes used as spices. *Turk. J. Bioch.* 2015;40:456–462. doi: 10.1515/tjb-2015-0034.
6. Veeran, S.; Shu, B.S.; Cui, G.F.; Fu, S.J.; Zhong, G.H. Curcumin induces autophagic cell death in *Spodoptera frugiperda* cells. *Pestic. Biochem. Physiol.* 2017, 139, 79–86.
7. W. S. Tavares, M. A. Costa, I. Cruz, R. D. Silveira, J. E. Serrao, and J. C. Zanuncio, "Selective effects of natural and synthetic insecticides on mortality of *Spodoptera frugiperda* (Lepidoptera: Noctuidae) and its predator *Eriopsis connexa* (coleoptera: coccinellidae)," *Journal of Environmental Science and Health Part B, Pesticides, Food Contaminants, and Agricultural Wastes*, vol. 45, no. 6, pp. 557–561, 2010.
8. Crippa, M.; Solazzo, E.; Guizzardi, D.; Monforti-Ferrario, F.; Tubiello, F.N.A.; Leip, A. Food systems are responsible for a third of global anthropogenic GHG emissions. *Nat. Food* 2021, 2, 198–209.
9. P. Nicolopoulou-Stamati, S. Maipas, C. Kotampasi, P. Stamatis and L. Hens. (2016). "Chemical Pesticides and Human Health: The Urgent Need for a New Concept in Agriculture". *Frontiers in Public Health*. 4, 148. Doi 10.3389/fpubh.2016.00148
10. Stern VM, Smith RF, van den Bosch R, Hagen KS. The integrated control concept. *Hilgardia*. 1959;29:81-101. DOI: 10.3733/nilg.v29n02p081
11. El-Saber Batiha, G.; Alkazmi, L.M.; Wasef, L.G.; Beshbishy, A.M.; Nadwa, E.H.; Rashwan, E.K. *Syzygium aromaticum* L. (Myrtaceae): Traditional uses, bioactive chemical constituents, pharmacological and toxicological activities. *Biomolecules* 2020, 10, 202.
12. Luque de Castro MD and Garcia-Ayuso LE. Soxhlet extraction of solid materials: An outdated technique with a promising innovative future. *Analytica Chimica Acta* 1998; 369: 1-10
13. WHO Expert committee on biological standardization, sixteenth report. World Health Organization; Geneva: 1963. Requirements for pertussis vaccine (requirements for biological substances No http://apps.who.int/iris/bitstream/handle/10665/40582/WHO_TRS_274.pdf;jsessionid=C809AD9B616C2E7032EA3D10BC21C70E?sequence=1 1963: Annex 1 (WHO Technical Report Series, No. 274.
14. Gupta R. C. (2014). "Rotenone," in *Encyclopedia of Toxicology*, 3rd Edn, ed. Philip W. (London: Elsevier;), 185–187.
15. Mason LJ, McDonough M. Biology, behavior, and ecology of stored grain and legume insects. *Stored Product Protection*. 2012;1:7
16. Vriens, J.; Nilius, B.; Vennekens, R. Herbal compounds and toxins modulating TRP channels. *Curr. Neuropharmacol.* 2008, 6, 79–96.
17. Munisa A., Parangtambung J. D. The effect of clove leaf methanol extract on the profiles of superoxide dismutase and malondialdehyde in the liver of rabbits under hypercholesterolemia condition. *Translational Biomedicine*. 2015;6(2):1–5.
18. el Euch S. K., Bouajila J., Bouzouita N. Chemical composition, biological and cytotoxic activities of *Cistus salvifolius* flower buds and leaves extracts. *Industrial Crops and Products*. 2015;76:1100–1105. doi: 10.1016/j.indcrop.2015.08.033.
19. Baranska, M.; Schulz, H.; Reitzenstein, S.; Uhlemann, U.; Strehle, M.A.; Krüger, H.; Quilitzsch, R.; Foley, W.; Popp, J. Vibrational spectroscopic studies to acquire a quality control method of eucalyptus essential oils. *Biopolymers* 2005, 78, 237–248.
20. Ibrahim M, Siddique S, Rehman K, Husnain M, Hussain A, Akash MSH, et al. Comprehensive analysis of phytochemical constituents and ethnopharmacological investigation of genus *Datura*. *Critical reviews™ in eukaryotic. Gene Expression*. 2018;28(3):223-276
21. Chen, L.L.; Shen, Y.C.; Ke, C.C.; Intiyaz, Z.; Chen, H.I.; Chang, C.H.; Lee, M.H. Efficacy of cinnamon patch treatment for alleviating symptoms of overactive bladder: A double-blind, randomized, placebo-controlled trial. *Phytomedicine* 2021, 80, 153380.
22. Vivas A.P.M., Migliari D.A. Cinnamon-induced oral mucosal contact reaction. *Open Dent. J.* 2015;9:257–259. doi: 10.2174/1874210601509010257.
23. Umukoro S., Okoh L., Igweze S.C., Ajayi A.M., Ben-Azu B. Protective effect of *Cyperus esculentus* (tiger nut) extract against scopolamine-induced memory loss and oxidative stress in mouse brain. *Drug Metab. Pers. Ther.* 2020;35 doi: 10.1515/dmpt-2020-0112.
24. Wolinsky, L.E.; Mania, S.; Nachnani, S.; Ling, S. The inhibiting effect of aqueous *Azadirachta indica* (Neem) extract upon bacterial properties influencing *in vitro* plaque formation. *J. Dent. Res.* 1996, 75, 816–822.
25. Daly, K.; Styles, D.; Lalor, S.; Wall, D.P. Phosphorus sorption, supply potential and availability in soils with contrasting parent material and soil chemical properties. *Eur. J. Soil Sci.* 2015, 66, 792–801.
26. Bakhom E.S., Amir A., Osama F., Adel M. Prediction Model for the Compressive Strength of Green Concrete Using Cement Kiln Dust and Fly Ash. *Sci. Rep.* 2023;13:1864. doi: 10.1038/s41598-023-28868-7.
27. Isman M.B. Botanical Insecticides in the Twenty-First Century-Fulfilling Their Promise? *Annu. Rev. Entomol.* 2020;65:233–249. doi: 10.1146/annurev-ento-011019-025010.
28. Gupta R. C. (2014). "Rotenone," in *Encyclopedia of Toxicology*, 3rd Edn, ed. Philip W. (London: Elsevier;), 185–187.
29. D. B. Lacy, W. Tepp, A. C. Cohen, B. R. DasGupta, R. C. Stevens. *Nature Struct. Biol.* 5, 898–902
30. (1998).
31. Veeran, S.; Shu, B.S.; Cui, G.F.; Fu, S.J.; Zhong, G.H. Curcumin induces autophagic cell death in *Spodoptera frugiperda* cells. *Pestic. Biochem. Physiol.* 2017, 139, 79–86.
32. Simpson, M. *Plant Systematics*, 3rd ed.; Academic Press: Cambridge, MA, USA, 2019; ISBN 9780128126288.
33. Gupta R. C. (2014). "Rotenone," in *Encyclopedia of Toxicology*, 3rd Edn, ed. Philip W. (London: Elsevier;), 185–187.
34. Morrow, J.G.; Huggins, D.R.; Carpenter-Boggs, L.A.; Reganold, J.P. Evaluating Measures to Assess Soil Health in Long-Term Agroecosystem Trials. *Soil Sci. Soc. Am. J.* 2016, 80, 450–462.



DYNAMIC LANGUAGE LEARNING FRAMEWORK (DL²F) INSTRUCTIONAL MODEL

Jhunisa Ann A. Merueña

*Philippine Normal University, ELE 808: Instructional Design and Evaluation in Language Education
Term 1 4.1*

1. RATIONALE

In response to the evolving landscape of language education, the "Dynamic Language Learning Framework" is conceived as a progressive pedagogical approach informed by key principles from notable works in the field. Inspired by the communicative language teaching philosophy proposed by Hymes (1971) and expanded upon by Canale and Swain (1980), this framework places effective communication at its core, emphasizing the development of communicative competence in authentic contexts.

The "Dynamic Language Learning Framework" is grounded in a communication-centric philosophy, positioning effective communication as the primary goal of language learning. Understanding that language serves as a tool for meaningful interaction, this model places a strong emphasis on the development of communicative competence in authentic contexts. Unlike conventional language approaches, the framework prioritizes real-life language use, exposing learners to everyday conversations, problem-solving scenarios, and cultural interactions. Recognizing the diverse needs, learning styles, and backgrounds of language learners, the model is designed to be adaptable and flexible. It accommodates a variety of teaching methods, materials, and assessment strategies to cater to the dynamic nature of language acquisition. Emphasizing the significance of collaboration, the framework fosters a collaborative learning environment, exposing students to diverse perspectives and language styles. Cultural integration is another integral aspect, extending beyond linguistic skills to encompass cultural nuances, traditions, and idiomatic expressions, promoting a holistic understanding of the target language. Finally, the framework embraces a philosophy of continuous learning and improvement, incorporating regular feedback, self-assessment, and opportunities for revision to foster a growth mindset among learners. This ensures that language proficiency is viewed as an ongoing and achievable journey rather than a fixed destination.

The implementation of the Dynamic Language Learning Framework involves a structured and student-centered approach. Authentic materials, diverse tasks, and technology integration serve as key components, ensuring that learners are exposed to language in various forms and are equipped with the skills necessary for real-world communication.

2. THE FRAMEWORK OF THE INSTRUCTIONAL DESIGN

2.1 Theory of Language

The "Dynamic Language Learning Framework" is inspired by the communicative language teaching (CLT) theory, a widely recognized approach in language education (Richards & Rodgers, 2014). Aligned with CLT principles, the framework prioritizes communication as the key objective of language learning (Hymes, 1971; Canale & Swain, 1980). This emphasis on meaningful interaction is a shared foundation between CLT and the framework.

In practice, the framework implements CLT principles by exposing learners to real-life scenarios and cultural interactions, fostering a contextual understanding of the target language. This mirrors CLT's recognition of the importance of genuine language contexts for effective acquisition. The framework's adaptability accommodates diverse teaching methods, materials, and assessment strategies, addressing the varied needs and learning styles of language learners (Larsen-Freeman & Anderson, 2011).

The collaborative learning environment promoted by the framework aligns with Vygotsky's (1978) social development theory, emphasizing the pivotal role of social interaction in language learning. Although not explicit in CLT, the framework integrates cultural dimensions, aligning with intercultural communicative competence goals (Byram, 2020). Learners explore cultural nuances, traditions, and idiomatic expressions for a holistic understanding of the target language.

Furthermore, the framework embraces continuous learning, aligning with reflective practice principles (Schön, 1986) and the encouragement of ongoing learning (Larsen-Freeman & Anderson, 2011). This continuous improvement approach instills a growth mindset, reinforcing the idea that language proficiency is a dynamic and ongoing journey.



In summary, the "Dynamic Language Learning Framework" is a learner-centered, communicative, and contextually relevant model, aligning with CLT's core tenets to empower learners for effective communication in real-life language situations.

2.2 Theory of Learning

The "Dynamic Language Learning Framework" aligns deeply with constructivist theories, particularly social and cognitive constructivism. Rooted in Vygotsky's social constructivism, the framework emphasizes collaborative learning through group activities and discussions, reflecting the social aspect of knowledge construction (Vygotsky, 1978). It also resonates with Piaget's cognitive constructivism by providing opportunities for learners to actively apply language skills in meaningful contexts.

The framework aligns with experiential learning theories, offering opportunities for learning through direct experiences. Exposing learners to authentic language use, cultural contexts, and collaborative tasks align with the idea of learning by doing and reflecting on experiences (Kolb, 1984).

Situated learning principles by Lave and Wenger find resonance in the framework's emphasis on real-life language use and cultural integration. Effective learning occurs when learners are immersed in authentic language-rich environments, mirroring situations where they will apply their language skills outside the classroom (Lave & Wenger, 1994).

The framework also aligns with task-based language teaching (TBLT), emphasizing engaging learners in tasks mirroring real-world language use, and promoting communication and problem-solving (Willis & Willis, 2007). In synthesizing these constructivist theories, the framework positions learners as active participants in their language development, embodying the belief that learning is a dynamic, individualized process shaped by both social interactions and personal cognitive processes.

2.3 Theory of Pedagogy

The "Dynamic Language Learning Framework" aligns with student-centered pedagogical approaches emphasizing active engagement, collaboration, and authentic learning experiences. Drawing from constructivist pedagogy, the framework reflects Dewey's (1916) and Piaget's (1971) principles, asserting that learners actively construct knowledge through interactions with their environment. This perspective is evident in the framework's focus on authentic language use, cultural integration, and continuous improvement.

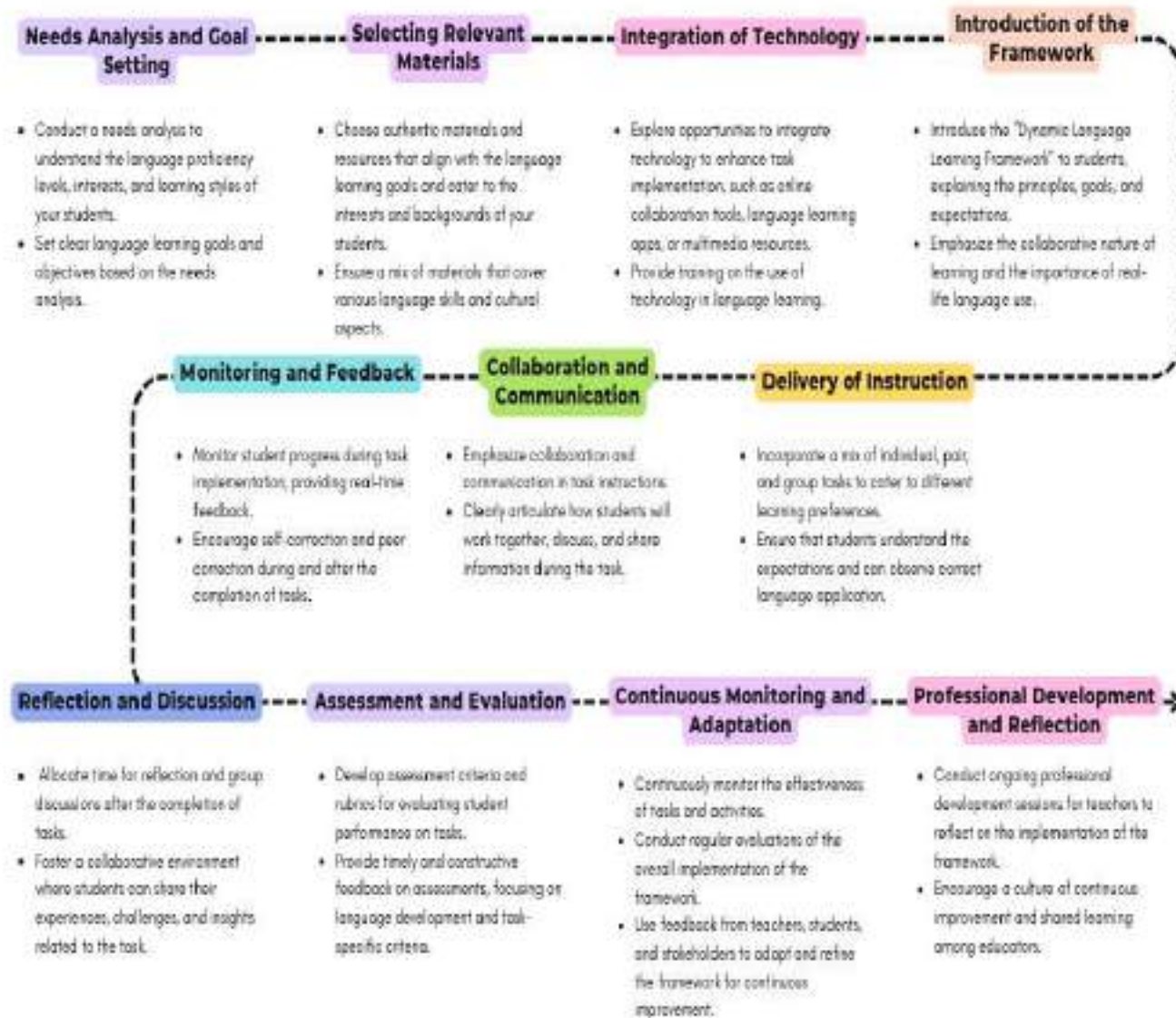
Alignment with Task-Based Language Teaching (TBLT), proposed by Willis and Willis (2007), is evident in the framework's emphasis on practical language application and communication through diverse tasks. The collaborative learning environment resonates with cooperative learning principles, fostering positive interdependence and individual accountability (Johnson & Johnson, 1999). Incorporating authentic language use and cultural integration aligns with experiential learning principles (Kolb, 1984), providing hands-on experiences and enhancing language proficiency.

Furthermore, the framework's focus on collaborative learning and real-life language use reflects principles found in the flipped classroom model (Bergmann & Sams, 2012) and communities of practice (Wenger, 1998). In synthesis, the "Dynamic Language Learning Framework" adopts a pedagogical stance promoting an interactive, student-centered, and experiential approach to language education, creating a dynamic and engaging learning environment.



3. VISUAL REPRESENTATION OF THE INSTRUCTIONAL MODEL

Dynamic Language Learning Framework (DL2F) Instructional Model



The implementation process of the "Dynamic Language Learning Framework" in language education is meticulously crafted to provide a comprehensive and engaging language learning experience. In adapting the framework to the current secondary school educational setting in the Philippines, a thoughtful alignment with the existing K-12 curriculum is paramount. This alignment ensures that the principles of the framework are tailored to meet the language learning goals outlined by the Department of Education (DepEd), addressing the unique linguistic, cultural, and communicative needs of Filipino students within the secondary school context.



A pivotal aspect of this adaptation is the selection of relevant materials, emphasizing the incorporation of authentic resources that reflect the rich tapestry of Philippine culture, history, and literature. Local literary works, films, and multimedia resources are seamlessly integrated to resonate with students, contributing to a deeper understanding of the Filipino language and culture.

Given the varied technology access in Philippine schools, a pragmatic approach to technology integration is essential. Strategies that maximize available resources, including low-bandwidth technologies, open-source software, and collaborative online platforms, are explored to accommodate the diverse technological landscape, ensuring accessibility for all students.

The introduction of the framework to students is facilitated through orientation sessions that underscore its relevance to real-world communication. This introduction serves as a foundational step towards creating a student-centered and participatory learning environment, aligning the framework with practical language skills needed for academic, social, and professional success.

Delivery of instruction within the framework is adeptly adapted to the multilingual setting of the Philippines. Acknowledging linguistic diversity, the curriculum leverages students' proficiency in multiple languages, incorporating multilingual approaches to foster language application across various spoken languages in the country. Task-based learning units are integrated into the curriculum, aligning seamlessly with the K-12 structure. For example, students might collaboratively create a podcast series discussing local cultural practices, integrating listening, speaking, and research skills.

Collaboration and communication are focal points, emphasized through group activities mirroring real-world language use, such as collaborative writing projects or virtual debates. Monitoring and feedback mechanisms are implemented with sensitivity to diverse linguistic and cultural backgrounds, providing differentiated support to foster an inclusive and supportive learning environment.

Reflection and discussion sessions offer opportunities for students to share their experiences, fostering a supportive learning community. Assessment and evaluation tools are thoughtfully developed to align with DepEd's national language proficiency standards. These tools measure not only linguistic accuracy but also cultural awareness, effective communication, and collaborative skills, ensuring a comprehensive understanding of students' language competencies.

Continuous monitoring and adaptation are integral, involving regular reviews of the framework's effectiveness. Adjustments are made based on student feedback and evolving educational needs. The integration of the framework extends to existing extracurricular activities, enhancing student engagement and participation. Ongoing professional development for teachers and collaborative practices among educators contribute to the framework's successful implementation in the Philippine secondary school context. In this way, the "Dynamic Language Learning Framework" becomes an adaptable and culturally relevant approach, seamlessly aligning with the national educational landscape and enriching the language learning experience for Filipino students.

CONCLUSION

To conclude, the meticulous adaptation and implementation of the "Dynamic Language Learning Framework" within the context of Philippine secondary schools offer a transformative and culturally enriched language learning experience. The framework's alignment with the K-12 curriculum, coupled with its tailored integration to meet the language learning goals outlined by the Department of Education (DepEd), underscores its responsiveness to the unique linguistic, cultural, and communicative needs of Filipino students. By selecting relevant materials that resonate with the rich tapestry of Philippine culture and history, integrating technology thoughtfully, and fostering a multilingual and task-based instructional approach, the framework becomes not only adaptable but also inherently aligned with the educational landscape of the Philippines.

The emphasis on collaboration, communication, and real-world language use serves as a foundation for a student-centered and participatory learning environment. Through continuous monitoring, feedback mechanisms, and reflective discussions, the framework fosters inclusivity and support for students with diverse linguistic and cultural backgrounds. The thoughtful development of assessment and evaluation tools ensures a comprehensive understanding of students' language competencies, going beyond linguistic accuracy to encompass cultural awareness and effective communication skills.

As the framework is seamlessly integrated into extracurricular activities, language clubs, cultural events, and contests further enrich the language learning journey, enhancing student engagement and participation. Ongoing professional development for teachers, coupled with collaborative practices among educators, contributes significantly to the sustained success of the framework in the Philippine secondary school context.

In essence, the "Dynamic Language Learning Framework" emerges as a dynamic, adaptable, and culturally relevant approach that aligns seamlessly with the national educational landscape. By enriching the language learning experience for Filipino students, the framework not only prepares them for effective communication in diverse linguistic settings but also fosters a deeper appreciation



for their cultural heritage. The thoughtful integration of this framework underscores its potential to be a cornerstone in the advancement of language education within the Philippine educational context.

REFERENCES

1. Bergmann, J., & Sams, A. (2012). *Flip your classroom: Reach every student in every class every day*. International Society for Technology in Education. <http://ci.nii.ac.jp/ncid/BB16100708>
2. Byram, M. (2020). *Teaching and assessing intercultural communicative competence*. *Multilingual Matters*. <https://doi.org/10.21832/byram0244>
3. Canale, M., & Swain, M. (1980). *Theoretical bases of communicative approaches to second language teaching and testing*. *Applied Linguistics*, 1(1), 1-47. <https://doi.org/10.1093/applin/i.1.1>
4. Dewey, J. (1916). *Democracy and education: An introduction to the philosophy of education*. Macmillan.
5. Hymes, D. (1971). *On communicative competence*. In Pride, J. B., & Holmes, J. (Eds.), *Sociolinguistics*. Harmondsworth: Penguin.
6. Johnson, D. W., & Johnson, R. T. (1999). *Learning together and alone: cooperative, competitive, and individualistic learning*. Prentice-Hall. <http://psycnet.apa.org/psycinfo/1986-98283-000>
7. Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Prentice-Hall. <http://ci.nii.ac.jp/ncid/BB1767575X>
8. Larsen-Freeman, D., & Anderson, M. (2011). *Techniques and principles in language teaching (Third ed.)*. Oxford University Press.
9. Lave, J., & Wenger, E. (1994). *Situated learning: legitimate peripheral participation*. *Man*, 29(2), 487. <https://doi.org/10.2307/2804509>
10. Piaget, J. (1971). *Science of Education and the psychology of the child*. *Journal of Architectural Education of the Association of Collegiate Schools of Architecture*, 25(4), 113. <https://doi.org/10.2307/1423801>
11. Richards, J. C., & Rodgers, T. S. (2014). *Approaches and methods in language teaching*. <https://doi.org/10.1017/9781009024532>
12. Schön, D. A. (1986). *The reflective practitioner: How professionals think in action*. *The Journal of Continuing Higher Education*, 34(3), 29-30. <https://doi.org/10.1080/07377366.1986.10401080>
13. Vygotsky, L. S. (1978). *Mind in society: the development of higher psychological processes*. Harvard University Press. <https://ci.nii.ac.jp/ncid/BA03570814>
14. Willis, J., & Willis, D. (2007). *Doing task-based teaching*. Oxford University Press. <http://archives.umc.edu.dz/handle/123456789/111138>
15. Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity*. Cambridge University Press.



THE SCIENTIFIC DESCRIPTION OF CONTENT, MANUSCRIPT, MODERN EDITIONS AND TRANSLATIONS OF THE BOOK NAMED "AL-AMSAL MIN AL-KITAB WAS-SUNNA"

Bahadirjon Azamov

PhD of International Islamic Academy of Uzbekistan, Teacher of Tashkent Islamic Institute named after Imam Bukhari

ABSTRACT

In this scientific article, the work entitled "Al-amsal min al-kitob was-sunna" (Parables from the Qur'an and Sunnah) written by the encyclopedist Abu Abdullah Muhammad ibn Ali Hakim Termizi was analyzed in terms of source studies.

The manuscripts and photocopies, along with two texts of comparative analysis prepared by Egyptian scholars Dr. Ali Muhammad Bijawi and Dr. Sayyid Jumayli, were provided. In addition, three modern copies published by Dr. Ahmad Abdurrahim Soyih, researcher Salim Mustafa Badri, and Syrian scholar Ali Ahmad Abdul-Al Tahtawiyy were also included. The qualities of these materials were reported.

Specifically, the manuscript copies of the work housed in the National Library of Paris, "Ashir Efendi" and "Esad Efendi" in Turkey, and "Al-jam'iyya al-Asiawiyya" in Calcutta, India were studied. Information regarding their age, the calligraphers who copied them, and their unique differences were revealed.

The parables from the Holy Qur'an and hadiths featured in the work were stated. Special attention was given to the third part of the work, which contains the parables of hukamo-mashoyikhs. It was discussed whether these are the original parables of Hakim Termizi or if they are parables he quoted from hukamo and mashoyikhs.

The number of parables in all three parts of the work was referenced, and the views of both foreign and local scholars were compared and analyzed. A final conclusion was drawn based on several modern editions of the work.

The work was also examined in detail, providing a scientific description of its rationale for writing, colophon, concluding part, structural framework, content, and essence. Furthermore, the work's scientific and moral significance in today's context was elucidated.

KEY WORDS: *Tibyan al-amsal, al-Kitab, sunnat, al-ghiza, ulu-l-albab, rasail, sahih, hadith, majmua, mutun, zarbulmasal, inner meaning, research.*

INTRODUCTION

The book named "Al-amsal min al-Kitab was-sunna" ("Parables from Quran and Sunnah") is one of the works which was written by Abu Abdullah Muhammad ibn Ali Hakim al-Termizi (820-932). In the work, the parables containing the advice, instructions and exemplary wisdom from several verses Hadiths and Holy Quran are distinguished, and the truths at their core are sharply explained and fluently manner. It can be considered an important source in the study of the verses found in Holy Quran and Hadith. Most researchers haven't had detailed information about this source until 1975, when Dr. Ali Muhammad Bijavi¹ (1321-1399) prepared a comparative text of it for publication. A.M. Bijavi, who conducted the first research on the study of this work, Bijavi compared several manuscripts and photocopies that were stored in the manuscript collections of the world, and based on them, he prepared a summary and comparative text of the work for publication in 1975. The researcher writes the following regard: "I have conducted research on this book, prepared it for publication and presented it to the dear readers. Unfortunately, until today, as far as I know, it was forgotten and no one tried to present it to people. Almost no one knows about him, only some authors who wrote works related to the genre of parables were satisfied with two lines of words about work of Khakim Termizi on this topic. For instance, the Egyptian scholar² Mahmud ibn Sharif mentioned this work under a slightly different name as "Rasail al-Khakim at-Termizi" ("The

¹ The name of this scientist is indicated as "Bajavi" in some Uzbek language studies (J. Hamrokulov, 2015:17). According to research, it turned out that it is more correct to call him "Bijavi". Because he is an Egyptian scholar. In the south-east of Egypt - on the coast of the Red Sea, there is a region called "Bija", whose inhabitants are given the nickname "Bijavi". Internet information in English about some of the scientist's researched books also confirms this. Based on these, it was recommended to give its ratio in the form of "Bijavi".

² When Mahmud ibn Sharif wrote the book Al-Amsol fil-Qur'an, he had not yet received his doctorate. For this reason, Ali Mohammad Bijavi did not call him a doctor in his research. During the study, it was revealed that he later received a doctorate degree, and all his subsequent books were written as "Doctor Mahmoud ibn Sharif". For this reason, his scientific degree was also indicated in the article.



treatises of Khakim Termizi") in his book "Al-Amsal fil-Quran" ("Parables in Quran") (M.Sharif, 2010:120). The famous commentator Abu Abdullah Muhammad ibn Ahmad Ansari Qurtubi (1214-1273) referred to and quoted this book in his work entitled as "Al-Jami' li ahkam Quran" ("The complex of Quranic Rulings").

MAIN PART

"Al-Amsol minal-Kitab was-sunna" is a source of Sufi interpretation and commentary of Hadiths, which is part of the Islamic sciences. Therefore, the author acted by the criteria of Islamic decency in writing a book, started the introduction with "Basmala", that is, Bismillahir Rahmanir Raheem, after asking for help from Allah, he wrote praises and salutations to Prophet Muhammad, peace be upon him. Then he explained the reason for writing the work as follows: "أما بعد فإنك سألتني عن شأن الأمثال وضربها للناس"

Meaning: "You asked me about parables and giving people a hard time..." (H. Termizi, 1975:1).

The main reason for writing is the work based on the words of Khakim Termizi which was the questions of the lovers of science at that time about the fable and its meaning. Then he was directed to the main goal and finished the book by explaining first some verses of Quran in the form of fables, then some fables from the Hadiths, and then some fables of the sages.

DISCUSSION

In the plot of the work, "Praise be to Allah that this book was completed with His support and grace." May God's blessings, mercy and forgiveness be upon the prophet of God, Muhammad, his wives, descendants and companions. May He make us among them with His bounty?" The plot continues with the following notes about the calligrapher himself: "The copying of this book to the end was carried out by Ali ibn Suleiman ibn Ahmad ibn Suleiman Murad al-Andalusia who was a servant in need of God's mercy. May Allah make this work beneficial for him, may he spread the knowledge in it, and may he become one of the followers of His Prophet with His grace and mercy. May he forgive his parents and all the ummah of Muhammad, peace be upon him!" (H. Termizi, 1975:352). The work "Al-Amsol minal kitab was-sunna" consists of three parts:

1. Aphorisms in the Holy Qur'an.
2. Anecdotes in Hadith Sharif and messages.
3. Adverbs in the sayings of sages.

In the third part, Khakim Termizi gives the wise sayings that he learned from the verses and hadiths as a result of the experience of scholars and masters. The proverbs in this section are attributed to a scholar and are not said to be "narrated by so-and-so". Therefore, some researchers, including Dr Ali Muhammad Bijavi, say that the parables in this part of the work are truths that Khakim Termizi personally realized, and the scholar expressed them in the form of proverbs (A. Bijavi, 1975:4). Nevertheless, in our opinion, it is incorrect to accept this idea completely. Although the parables are not attributed to a scientist, it does not mean that he is the author of all the parables. It is also possible that he used this method to avoid the length of the book. This is a common occurrence in classical sources. Some researchers such as Dr Muhammad Ibrahi Juyushiy, expressed similar opinions in his scientific research and put forward the opinion that the parables in this part are not only related to Khakim Termizi, but also to other ones (M. Juyushiy, 1980:78).

To determine the numerous of parables in the work, the three modern editions of the work are available today - the summary and comparative texts that prepared for publication by the Egyptian professors Ali Muhammad Bijavi (A. Bijavi, 1975) and Sayyid Jumayliy³ (S. Jumayli, 1987) and Sheikh Ali Ahmad Abdul-Al Tahtavi. They prepared a modern edition (A. Tahtoviy, 2006) which was a comparative study, and a number of verses, Hadiths, and proverbs were investigated one by one. Due to him, the author cited 29 parables from Holy Quran under 24 headings. These parables are described in the example of 36 verses (H. Termizi, 1975:4-30). He mentioned 32 parables on 27 topics from Hadith Sharif (H. Termizi, 1975:44).

As a result of studying the structure of the work, it was found that the volume of parables from verses and Hadiths mean that it is a very small part of the book, and it is equal to one-seventh of the parables narrated from scholars. This shows that a large part of the work consists of parables of scientists. It contains 116 wise words and proverbs. Other topics in this section are not presented in parable form. There are also 14 other topics in this section, which are not exactly parables but are listed under similar headings.

³ The ratio of the scientist is indicated as "Jamiliy" in some studies in the Uzbek language (J. Hamrokulov, 2015:17). According to research, it was found that he is "Jumayli". Because, in the book "al-Ejaz al-tibbi fil-Qur'an" (Medical miracles in the Qur'an) written by this scientist, his ratio is shown in the form of "al-Jumayli" (S. Jumayli, 1990). English internet information also says "Jumaili". Taking these into account, in the scientific article, its ratio was given as "Jumayli".



The work contains 169 verses and 74 Hadiths from 56 chapters of Holy Quran. So, in the book "Amsol" more than 179 verses are explained based on more than 160 verses and 70 Hadiths.

The most reliable manuscript copy of the work which was written in Moorish script, is kept in the National Library of Paris under inv. no. 5018. It is not in the form of a complete book, but it is included on the pages 141-184 of the numbered collection inv. № 21817, which consists of several manuscripts. It is a manuscript belonging to the 11th century (A. Bijavi, 1975:13). It began with the following sentences:

“...أما بعد فإنك سألتني عن شأن الأمثال وضربها للناس”.

Meaning: You asked me about parables and striking people...". From this, it can be understood that the work was written in response to the demands of science and fans. Such situation is often observed in classic works - they are written at the request of science lovers.

Another manuscript copy of his Nastaliq letter type is available in the "Eşir Efendi"⁴ Library in Asitane (Istanbul)⁵, Turkey, and it is kept inv. № 1479. It is not an independent work, but it is included on the pages 42-97 of the numbered collection inv. No. 21816, which consists of fine manuscripts. This copy differs from the previous ones in the presence of marginal notes. In his research, Dr Ali Muhammad Bijavi which was focused on a manuscript collection of containing the work "al-Amsol" and said, "This book (al-Amsol) is part of the collection compiled in Jame' al-mutun, which includes the manuscript works of Hakim al-Termizi. The front page of the collection contains as follows : "This collection contains twelve independent books that were written by Khakim Termizi." After this sentence, the names of these twelve books were given. The work "Al-Amsol min al-Kitab was-sunna" is listed in the eleventh place. After the names of the books, it is noted that "All these works were classified by well-known Abu Abdullah Muhammad ibn Ali Hakim al-Termizi (may God bless him and grant him peace)"⁶ (A. Bijavi, 1975:5/6). But A. Bijavi did not indicate where this complex is kept. It can be said that the collection are stored in the National Library of Paris under inv. No. 5018. That's why, according to the researched sources, it was determined that the complex containing the following twelve works of Khakim Termizi is kept only in the Paris fund ⁷(M.Juyushi, 1980:57). They are:

1. "Kitab as-solati wa maqasiduha"⁸ (Prayer and its goals).
2. "Al-haj wa asraruhu"⁹ (Hajj and its secrets).
3. "Al-ihiyat"¹⁰ (Beware of airy lust).
4. "Al-jumal al-lozimu marifatuha"¹¹ (Sentences to know).
5. "Al-furuq wa man'ut-taraduf"¹² (Declaration of differences in words and lack of synonym in them).
6. "Haqiqat al-Adamiyya"¹³ (The Truth of Humanity).
7. "Urs al-muwahhidin"¹⁴ (Wedding feast of Muwahhid-believers).
8. "Al-azou wan-nafs"¹⁵ (About the organs and the soul).

⁴ "Hurriyet" newspaper. (2012.21.03). Article titled "Where does the name Istanbul come from?" Turkey

⁵ This is how Dr. Ali Mohammad Bijavi wrote the name of the library in his research. Dr. Muhammad Ibrahim Juyushi wrote "As'ad Efendi" (Esad Efendi). Both scholars stated that they were in Istanbul. As a result of studies, it was found that "Esad Efendi" library was included in Suleymaniye library in 1918.

⁶ Ali Muhammad Bijavi. (1975). The introduction to the publication of Hakim Termizi's work "Al-Amsol minal-Kitab was-sunna". Cairo: Maktabatu Dar al-Turos.

⁷ Muhammad Ibrahim Juyushi. (1980). Al-Hakim at-Tirmidhi: his works and his opinion. Cairo: Dar an-nahda al-arabiyya.

⁸ In the work, one of the greatest prayers of the archons of Islam - prayer and its goals are described.

⁹ In this, the author covered the fifth pillar of Islam - Hajj prayer and its secrets and wisdom.

¹⁰ In the book, there is a detailed discussion about making worship impartial and guarding against selfishness.

¹¹ A small pamphlet of four pages. It contains some of Hakim Termizi's Pandu advices to the students of the path of Sufism. Each instruction and instruction is a sentence, for example, the first sentence consists of an instruction about faith. According to M. Juyushi, it is still in manuscript form. Even in recent research, no modern edition of it has been found.

¹² This book deals with virtuous deeds and morals and their opposites and differences between them. Imam Subkiy said about him, "In his chapter, there is no one like it, in which the author dwells on words that are close in meaning, such as mudarot and mudohana, muhaajja and mujodala, discussion and mughalaba, intisar and revenge, and explains the subtle differences between them."

¹³ The work describes the Sufi's struggle with his ego in overcoming the obstacles on the way to God Almighty. It teaches the vices of the heart, such as lust and pride, and their cures.

¹⁴ In this work of Hakim Termizi, it is mentioned about the perfect performance of ablution and prayer. He described the prayer as if it were a wedding feast. Just as various sweets and dishes are gathered on one table at a wedding, Allah has gathered several different prayers of the angels in one prayer for the believers.

¹⁵ In it, the author wrote about the qualities and names of the soul, the quality and state of the heart, and the quality of the soul.



9. Manozil al-ibad minal-ibada¹⁶ (The ranks of servants in worship).

10. Al-aql wal-hawa¹⁷ (About the mind and the air).

11. "Al-amsal minal-kitobi was-sunna" (Parables from Quran and Sunnah).

12. "Kitab al-Manhiyyat"¹⁸ (The Book of Returned Deeds). This work is also a unique source in its sphere.

The researcher also mentioned that there is a third manuscript copy of the work in the work "Dar al-kutub al-Misriya" (Egyptian House of Books) fund, but it was not used in the preparation of the summary-comparative text due to a number of errors" (A. Bijavi, 1975:13).

Another manuscript copy of the work is kept in the library of Al-jam'iyya al-Asiawiyya (Asiatic Society) in Calcutta, India. It is included on pages 1-81 of the complex numbered inv. No. 1056. The name of the book: "Tibyan al-amsol" (Exposition of Parables). Author: Hakim Termizi. Copy date: IX century BC. Copied in mixed mail. 81 pages in total. Size: 100x190.

The previous sentences of the text began with the words:

“فإنك سألتني عن تبيان الأمثال وضربها للناس...”

It can be obviously known that the work was recorded in the style of "Al-amsol" and "Tibyan al-amsol". Also at the end of this copy, there is a plot of the work, in which the copyist's notes are written.

The "Dar al-kutub al-Misriya" foundation in Cairo which is the capital of Arab Republic of Egypt, there are photocopies of manuscripts in these two libraries - Paris National Library (inv. № 5018), "Eshir Efendi" Library (inv. № 1479). In addition, in the fund of "Ma'had al-makhtutat al-arabiya" (Arabic Manuscripts Research Institute) in Cairo, a photo copy of the work numbered inv. № 3142 is stored. This manuscript is a photocopy of the manuscript numbered inv. No. (1)1056 in the library named "Al-jam'iyya al-Asiawiyya" in Calcutta, India. At the end of it, there are the following inscriptions: "The recording of this copy was completed on Monday, the 27th of the month of Rajab 1371 Hijri, on the 21st of April ¹⁹1952 in the library named "Al-jam'iyya al-Asiawiyya" in Calcutta."

The summary and comparative text of the work in a modern and elegant form was first prepared for publication in 1975 by the Egyptian professor Dr Ali Muhammad Bijavi. Bijavi prepared this comparative text for publication based on these two photocopies of the work that were kept in the "Dar al-kutub al-Misriya" fund in Cairo, and published in "Dar an-nahda" and "Maktabatu dorituros" publishing houses. In it, the researcher put the letter "A" on the digital copy of inv.№ 21817, and the letter "B" on the digital copy of inv.№ 21816 (A.Bijavi, 1975:13).

Before the summary and comparative text of the work, the researcher wrote a thirteen-page preface to it, describing the biography Khakim Termizi, scientific activities, the confessions of scholars about the author, the compositional structure of the work, various manuscripts, photocopies, and research methods. Also, in the preparation of the collective comparative text of the work, he explained the different places in the copies and the places of the text that need comment on the basis of authoritative dictionary books. As the reader to easily realize the commentaries of Khakim Termizi with mystical and inner meaning, he referred to other famous commentary books and explained the commentaries of the verses based on them. For instance: the verses in the work show the number of verses of which sura is in the link. In places where the meaning of the verses was given in the manuscript was incomplete, he added them to the end. Referring to Hadiths in the work named as "The collection of six authentic Hadiths"²⁰ (T. Jazzier, 2010:153), he mentioned which of them is mentioned under the text. He explained complicated words in Hadiths with common words in the link. He also mentioned the biographies of famous scientists whose names were mentioned in the work. In short, these works of the researcher served to develop the scientific value of this publication.

The overall comparative text consists of 352 pages, and at the end of the text of the work, in order to make it easier for users to search for topics, the following five appendices of the contents are prepared on 33 pages:

¹⁶ In this book, the worship levels of worshipers in religion are described, and proofs from the Qur'an and Sunnah are given for each level.

¹⁷ The theme of the work is the mind and the air, and the author says that there are fifty helpers of both the mind and the air. Both types are discussed in detail. In this version, only twenty types of intelligence are mentioned. It ends with a definition and statement of gratitude.

¹⁸ In this book, the author has compiled the hadiths of the author regarding the actions prohibited by the Sharia

¹⁹ Ma'had al-makhtutat al-arabiya. - Cairo. This information was prepared on the basis of a photocopy of the manuscript of "al-Amsol" stored in this Institute of Arabic Manuscripts.

²⁰ Ahl al-Sunnah and community scholars use this term to refer to six authentic hadith books. They are "Sahih Bukhari" of Imam Bukhari, "Sahih Muslim" of Imam Muslim, "Sunani Nasai" of Imam Nasai, "Sunani Abu Dawud" of Imam Abu Dawud, "Sunani Tirmizi" of Imam Termizi, "Sunani Ibn Majah" of Imam Ibn Majah. See: Tahir Jazairi. (2010). Taojiyuhun-nazar ila usuli-l-asar. Research by Abdulfattah Abu Gudda. Aleppo: Maktabatu-l-matbuoti-l-Islamiyya



1. Table of contents;
2. The indications of the place of the verses of Holy Quran in the work of the verses and on which pages of the work they are presented;
3. The text of Hadith in the work and from which pages they appear;
4. The pages where the work of famous persons are mentioned;
5. The list of sources and literature used in the research.

In the work, Bijavi considered that he used 22 authoritative sources that related to the sciences of the vocabulary, syrat, tafsir and Hadith (A. Bijavi, 1975:14).

The Egyptian scientist Dr Sayyid Jumayli (1948-2018) also prepared the summary and comparative text of the book "Amsol" for publication. The total pages of the text are 341 pages. It differs from the previous comparative text, because it does not provide information about manuscripts and other copies of the book. It contains the text of the work, followed by a brief description of the author and the book and short comments with links to obscure words and phrases in the text. The biographies of scientists that were mentioned in the book are also included. The information about Hadith narrators in the work is explained. At the end of the book, there is a table of contents of topics. It came out in 1987 in the publishing houses "Ibn Zaydun" in Beirut and "Osama" in Damascus. According to the following information, it can be assumed that the book was printed earlier in Egypt. Because, at the end of the preface which was written by Dr Sayyid Jumayli, as usual, the researcher and the author of the foreword are indicated as Dr Sayyid Jumayli in the city of Cairo, March 1985. Based on this indicator, it is not unlikely that the book was published in Cairo in 1985 (S. Jumayli, 1987:10).

It was said that the comparative texts prepared for publication by Dr Ali Muhammad Bijavi and Sayyid Jumayli were mostly limited to commenting on dictionaries and providing information about Hadith narrators and historical figures. This is not a review that fully reveals the author's purpose of the work to the reader. Above all, the goal of both researchers were not to interpret the work. This is evident from the fact that they did not change the name of the book, but only prepared its text for publication. If these texts were written as a commentary, the title of the book would certainly have indicated that it was a commentary.

As a result of the research, a modern edition of the work was prepared by another scholar, a Syrian judge, jurist, writer, author of many works on the sciences of Quran and Hadith, the chairman of the "Ahl al Qur'an wa sunna" society, Sheikh Ali Ahmad Abdul-Al Tahtawi (1909-1999). The publication is a wonderful book called "Sharhu kitab al-Amsal min as-sunna wal-Kitab lil-Hakim at-Termizi" (Commentary on the book "Al Amsal min as sunna wal Kitab" by Khakim Termizi²¹) which was published in Beirut, the capital of the Republic of Lebanon. It was come out in 2007 by "Dar al-kutubi-l-ilmia" printing house. However, this name is a modification of the source's original name. Beyond all, the name of the work is indicated in historical sources and manuscripts of the work in the form "Al-amsal min al-kitob was sunna". This means that the level and quality of the "scientific" work claimed to be the review is not satisfactory. This edition consists of 200 pages and is still available in bookstores in Egypt. Despite the fact that it was published eight years after the death of the author. This publisher noted that it was the first edition of the book (A. Tahtovi, 2006:2). It can be assumed that Sheikh Ali Ahmad Tahtovi prepared a draft copy of the commentary during his lifetime, but he died before he had time to edit and publish it. Or it was come out in Syria before but not widely distributed.

Maghreb professor Khalid Zahri mentioned in his research that the work "al-Amsol" was published in a modern form by two other researchers - Salim Mustafa Badri and Dr Ahmed Abdurrahim Soyih (1937-2011). Nevertheless, he strongly criticized both publications. For instance, the title "Research of Salim Mustafa Badri" is indicated, and although it is claimed to be a commentary on a copy which was published in 2002²² by the publishing house "Dar al-kutub al-ilmia" of Beirut. It is not worthy of this name at all, despite the fact that it is shown that the table of contents by verses, hadiths, places and famous persons and topics is attached, it does not have any scientific indicators except a list of titles. Also, H. Zahri warned Dr A.A. Soyih that he has a habit of appropriating the scientific works of other researchers, and was meant as his next "scientific research" (H. Zahri, 2013:85-88).

RESULT

It should be noted that if you read this book page by page, it becomes clear that it is not a commentary. Because it does not contain information even as much as the comments given in the above summary and comparative texts. There are only 15 footnotes in the entire book. The researcher wrote a two-page introduction to the book. He said that he had read the work, that he liked the style of the text, and that he had decided to publish it, reminding the readers that it had been posted. First of all, he called it "Ghiza al-Albab

²¹ Ali Ahmad Abdul-Al Tahtawy. (2006). *Book of Sharhu-l-Amsal minal-Kitab was-sunnah*. Beirut: Dar al-kutub al-ilmia.

²² Dr Khalid Zahri indicated that this study was published in 2002. On the Internet, a picture of the book is posted, and its publication date is written as 2003. See Salim Mustafa Badri's research. *Al-Amsal min al-Kitab was-sunnah. Al-Hakim at-Termizi*. - Beirut: Dar al-kutub al-ilmia, 2003. - 192 p. Maybe this is a reprint.



sharhu kitab al-Amsol" and later approved that this name will remain as above, and added valuable information about the meaning of the words "al-Ghiza", "al-Albab", "al-Amsol" in the previously chosen name. said that he took the information from the famous linguist and historian Ibn Manzur (1232-1311) dictionary named "Lison al-arab" (Arabic language)²³ and quoted it in the preface of the work (A. Tahtovi, 2006:3).

Sheikh Ali Ahmad Abdul-Al Tahtawi posted a deep scientific discussion about the meanings of these three words before the text of "al-Amsal". Also, the researcher opened a new title to the lexical debate of the word "al-albab" and cited 16 verses of Holy Quran in which the word "Ulu-l-albab", i.e., "owners of intelligence", is mentioned. According to him, it is indicated by which verse and surah they are. He also opened a new topic for the lexical debate of the word "Al-Amsal" and listed the 61 verses of Holy Quran in which the parables are mentioned. It is commendable that the researcher conducted in research of the scientific debate about these three words by summarizing them under five headings. This helps the reader to understand the title of the book and its main content. Nevertheless, this information is only primary one about the title of the book and its contents, as Sheikh Ali Ahmad himself called "Tamhid" i.e. "introductory part". As mentioned above, it is not quite correct to call the work a "commentary" because of the addition of these kinds of minor arguments. After all, the commentary was supposed to explain the meaning of words and sentences that are difficult to understand in the text of the work. Unfortunately, this is not the case in this review.

As mentioned above, since the writing of the work, it can be seen that many famous scholars have referred to it and quoted it, and its comparative texts and modern editions have been prepared.

This means that the scientific legacy of Khakim Termizi, namely the book "al-Amsal" was recognized by later scholars. It also shows that it has retained its scientific value throughout the centuries.

CONCLUSION

As a conclusion, it should be said that this work can be regarded as the first source that laid the foundation for elucidating the essence of the Qur'anic and hadith sciences - the essence of the verses in them. This is confirmed by the famous commentator Imam Qurtubi (1214-1273) who quoted it in his work on the science of exegesis. Although few scientific studies have been conducted on the work by Egyptian and Syrian scholars, and two comparative texts and three modern editions have been published, they can only be used by specialists who know the Arabic language.

According to the analysis of source studies of the work named "Al-Amsol min al-kitob was-sunna" by Khakim Termizi. It was found that the information presented so far in Arabic, Uzbek and other languages consists of brief and repeated notes. Moreover, when they were compared with the source, it was obtained a different result. This means that the work has not been sufficiently researched and scientifically studied in terms of textual studies and source studies yet. In 2017, a selective translation of the work was prepared for publication by a candidate of history, associate professor I.Usmanov. The parables from Quran and Hadith and the parables of sages were partially translated by him. Although the work has been briefly translated into Uzbek, it is selective in its own and the work is not fully covered.

This also imposes a great responsibility on Uzbek researchers who are descendants of the scholar - to prepare and publish a popular translation of the work in Uzbek, to convey its content to the next generation in a common language. To fulfil this task, B. Azamov who is a doctoral student of the International Islamic Academy of Uzbekistan, selected for his PhD dissertation a topic about "The source studies analysis of the work "Al-Amsol min al-Kitab was-sunna" by Khakim Termizi. During the process of research, the translation of the work was carried out in cooperation with A. Muratov. While being translated the work into Uzbek language, the summary and comparative text of Dr. Ali Muhammad Bijavi were taken as a basis. In the translation, a brief comment was given on some parts of the book that require an explanation without separating them from the text to make it easier for the reader. In rare places, extremely complex and hardly understandable expressions were not translated word to word but were contented with expressing their general content. The meanings of the verses in Uzbek were translated and interpreted based on the interpretations by Sheikh Muhammad Sadiq Muhammad Yusuf (may God have mercy on him) and Sheikh Abdulaziz Mansur. The title of the work was translated into Uzbek as "The parables from Quran and Hadith". It is currently being published by the "Zilal Bulak" publishing house under the project leadership of the Center of Islamic Civilization in Uzbekistan.

REFERENCES

1. Mahmud ibn Sharif. (2010). *Al-Amsal fil-Qur'an*. Beirut: Dar al-Hilal.
2. Muhammad ibn Ahmad Qurtubi. (2006). *Al-Jami' li ahkami-l-Qur'an*. Beirut: Muassasatur-Risala.

²³ Abul Fazl Muhammad ibn Mukarram ibn Manzur. (2009). *Lison al-arab*. Beirut: Dar al-kutub al-ilmiyya.



3. Ali Muhammad Bijavi. (1975). *Introduction to the publication of Hakim Termizi's "Al-Amsal minal-Kitab vas-sunna"*. Cairo: Maktabatu Dar at-turos.
4. Al-Hakim at-Tirmizi. (1975). *Al-Amsal minal-Kitab vas-sunna. Ali Muhammad Bijavi's research*. Cairo: Maktabatu Dar at-turos.
5. Muhammad Ibrahim Guyushi. (1980). *Al-Hakim at-Tirmizi: a study of his works and thoughts*. Cairo: Dar an-nahda al-arabiyya.
6. Al-Hakim at-Tirmizi. (1987). *Al-Amsol minal-Kitob vas-sunna. Sayyid Jumayli's research*. Beirut: Dar Ibn Zaidun.
7. Ali Ahmad Abdul-Al Tahtawi. (2006). *Sharhu kitab al-Amsal min as-sunna val-Kitab*. Lebanon: Dar al-kutub al-ilmiiya.
8. "Hürriyet" newspaper. (2012.21.03). Article titled "Where does the name 'Istanbul' come from". Turkey.
9. Tahir Jazairiy. (2010). *Tavjihun-nazar ila usulil-asar. Abdul Fattah Abu Ghudda's research*. Halab: Maktabatu-l-matbuat al-islamiyya.
10. Khalid Zahri. (2013). *Hakimu Khoroson va anis az-zamon. Rabot*: Dar al-Amon.
11. Abul Fazl Muhammad ibn Mukarram ibn Manzur. (2009). *Lison al-arab*. Beirut: Dar al-kutub al-ilmiiya.
12. Translator and commentator: Jalaliddin Hamraqulov. (2015). *Hajj and its secrets*. Tashkent: Mavaro'un-nahr.
13. Sayyid Jumaili. (1990). *Al-E'jaz at-tibbiy fil-Qur'an*. Beirut: Dar wa maktabat al-Hilol.
14. Saalim Mustafaa Badrii's research. (2003). *Al-Amsal minal-Kitab vas-sunna. Al-Hakim at-Tirmizi*. Beirut: Dar al-kutub al-ilmiiya.



THE FORMATION OF THE SCIENCE OF TAFSIR IN MAWARANNAHR

Dr. Davronbek Makhsudov

Professor of International Islamic Academy of Uzbekistan

ABSTRACT

Since the beginning of Islam, interpretation of the Qur'an has been one of the important issues. Mawarannahr became one of the centers of Qur'anic studies, i.e. the science of interpretation (tafsir), in the Middle Ages. In general, the books of tafsir written in Mawarannahr are not taught only in Central Asia, but also in other famous religious educational institutions of the Islamic world, including Al-Azhar (Egypt), Dar al-Ulum (India and Pakistan), Islamic higher education and scientific research institutions (Saudi Arabia, Iraq, etc.). These valuable works, written in Arabic, have been published again and again. They have taken a firm place among the works that are in the focus of the world's researchers. In the 9th century, muhaddiths such as Abd Ibn Humayd al-Keshi, Imam al-Bukhari, Imam al-Tirmidhi, Abu Abdullah al-Darimi started the tradition of writing naqli tafsir in Mawarannahr. In this article, the stages of emergence and development of the science of tafsir in Mawarannahr are scientifically analyzed. First of all, the emergence of the science of interpretation and its introduction into the region is discussed. The types of interpretation are touched upon. Tafsirs written by scholars of Mawarannahr and their specific aspects are revealed. Whether these commentaries have reached us or not, as well as information about their modern editions, is given.

KEY WORDS: Mawarannahr, Tafsir, Mufasssir, Ta'wil, Tafsir bir-Ra'y, Tafsir bil-Ma'thur, Naqli Tafsir.

The holy book of Muslims, the Qur'an, was revealed to Muhammad (PBUH) over a period of twenty-three years. It is divided into 30 juz's, the number of surahs in it is 114, and the verses are 6236. The text of the Qur'an contains 77,439 words, which are written in 323,671 letters. The Islamic science that specializes in the study of the Qur'an is called tafsir.

The word tafsir (plural tafsir) is derived from the root of the Arabic verb fasara, and in the dictionary it means "explain", "cover", "illuminate", and in religious interpretation, it means that a person understands the purpose of the Qur'an at the level of his mind and explains it to others. In a broader interpretation, tafsir is the science of understanding the Qur'an through the lens of vocabulary, nahw, sarf, explanation, usul fiqh and qira'at, sabab an-nuzul, nasikh and mansukh sciences, explaining its meanings, and deriving judgments and wisdom from them.

Interpretation and commentary of the Qur'an has been one of the most important issues since the beginning of Islam. First, Muhammad (PBUH) personally commented on the verses, then the Companions learned tafsir from him and then Tabiin, Tabaa Tabiin, and later mufasssirs were engaged in this activity. In the early Islamic era, tafsir was not a separate science, but developed within the hadith and became an independent science over time. During its development, it branched into several directions.

Tafsir is one of the most important religious sciences because it is the science of understanding and learning the meaning of the Qur'an. Its high importance is also mentioned in the main book of Islam. For example, the verse "This is a blessed Book which We have revealed to you O Prophet so that they may contemplate its verses, and people of reason may be mindful" (Sad: 29) was interpreted by the famous mufasssir Imam al-Qurtubi as "this verse contains proof of the importance of knowing the meanings of the Qur'an." Companion mufasssir Ibn Abbas "He grants wisdom to whoever He wills. And whoever is granted wisdom is certainly blessed with a great privilege. But none will be mindful of this except people of reason" (Baqara: 269) explained the word "wisdom" as "tafsir".

Therefore, it is natural that there are hundreds of interpretations (tafsirs) of the text of the Qur'an since the emergence of Islam. In this regard, it should not be forgotten that in addition to authoritative tafsirs accepted by the absolute majority, there are books of tafsir created by heretical groups.

Qur'anic studies, which is called "Ulum al-Qur'an" in Arabic or "Qur'anic Studies" or "Koranovedenie" ("Koranistika") in Western languages, is not only a separate science, but also a scientific direction that includes many fields. In the Middle Ages, nasikh and mansukh, the reason of the revelation, common and special, qualities of surah and verse, recitation, etc. were recognized as the sciences of the Qur'an. Today, the scientific study of the miracles embodied in the verses of the Qur'an, its aspects related to



medicine, astronomy, linguistics and other fields, based on logical knowledge, are also developing rapidly. It is currently impossible to define the scope of the Qur'anic studies. The rapid development of science and technology is giving impetus to the emergence of new directions in the field of Qur'anic studies.

Mawarannahr became one of the centers of Qur'an studies, i.e. the science of interpretation, in the Middle Ages. As one of the main reasons for this, it can be shown that the local population has been enlightened since ancient times, and because of this, they accepted the new religion relatively easily, and the intelligentsia brought this religion to the highest level of knowledge. The famous scholar Ibn Khaldun (732/1332-784/1382) also emphasized this point and noted that the presence of many learned people here contributed to the rapid development of Islamic culture and knowledge. This was also helped by the fact that the local people were allowed to translate the verses so that they could understand them more quickly.

The hadith collections of Imam al-Bukhari, Imam al-Tirmizi, Imam al-Darimi can be mentioned as the books containing the first tafsirs in Mawarannahr. After all, they have special chapters dedicated to Qur'anic interpretations. In this way, tafsir narratives were initially collected in hadith collections. Later, the science of interpretation was separated from hadiths and separate books were written.

It should be emphasized that the mufassirs of Mawarannahr were mainly representatives of the Hanafi sect. This is because this sect has deep roots in this area. In turn, the kings and generals from the Turkic tribes adhered to the traditionalist Hanafi sect and opposed various heresies and superstitions. Representatives of the Turkish Seljuk dynasty occupied Khurasan in 1040, and then Iran. In 1055, Baghdad also surrendered to them. In 1071, the rule of the Seljuks spread throughout Asia Minor. As they occupied the lands of the Arab caliphate, they themselves became defenders of Islam. Turkish kings such as the Karakhanids and Khorezmshahs also supported the Hanafi sect in their territories. As one of the consequences of this, the mufassirs remained loyal to this sect.

But there were also famous scholars of the Shafii sect in Mawarannahr. They also contributed to the development of the scientific and religious environment of Mawarannahr. Among the famous of such scholars, we can include al-Qaffal al-Shashi (291/904-365/976), Abul Hasan Qasim, Imam al-Taftazani (722/1322-794/1392). It is recorded in the sources that they were engaged in interpretation. It is important that the works of scholars of this sect have been taught in the educational institutions of Mawarannahr and other Muslim countries for centuries within the framework of subjects such as tafsir, aqeedah, and linguistics.

In general, the interpretations created in Mawarannahr have been taught not only in Central Asia, but also in other famous religious educational institutions of the Islamic world, including Al-Azhar (Egypt), Darul Ulum (India and Pakistan), Islamic higher education and scientific research institutions (Saudi Arabia, Iraq, etc. .). These valuable works written in Arabic have been published repeatedly in major scientific centers. They have taken a firm place among the works that are in the focus of the world's researchers.

The stages of development of the science of interpretation include several periods. The Prophet (PBUH) and the Companions, Tabiin, Tadwin and modern times are among them. Compilation of tafsir books began during the period of Tadwin, that is, the writing down of interpretations. As a result, two directions were formed in tafsir - naqli (tafsir bil-ma'thur) and aqli (at-tafsir bir-ra'y). The rapid development of the science of interpretation in Mawarannahr coincides with the period of Tadwin.

Interpreting a verse with another verse, according to the Sunnah, Sahabah, or the traditions of the Tabiin, is a naqli tafsir. One of the most famous such tafsir books created in Mawarannahr is the work "Bahr al-Ulum" (Sea of Knowledge) by Abul Lais al-Samarkandi (d. 373/983-4).

Famous narrative tafsirs written in Mawarannahr. In the 9th century, muhaddiths such as Abd Ibn Humayd al-Keshi, Imam al-Bukhari, Imam al-Tirmidhi, Abu Abdullah al-Darimi started the tradition of writing naqli tafsir in Mowarounnahr.

Abd ibn Humayd al-Keshi also had a book of tafsir in the naqli style. This tafsir, published in Beirut in 2004, consisting of a commentary on Surahs Al-Imran and Nisa, is considered one of the first naqli tafsirs in Mawarannahr. It is mentioned in the sources that Imam al-Bukhari has a book called al-Tafsir. However, it has not reached us. It is not known that al-Tirmidhi and al-Darimi wrote a book of tafsir. But based on the fact that the collections of hadiths compiled by them have separate chapters on the interpretation of the Qur'an and the verses in them are explained through the hadiths, it can be said that they were muhaddiths who interpreted them on the basis of narrations.

This tradition continued into the 10th century and beyond. Abu Ishaq al-Nasafi's manuscript has not been found, but it is claimed that he had a book called al-Tafsir, which may be a naqli tafsir. Abu Lays al-Samarkandi's "Bahr al-Ulum" used a lot of interpretations based on verses and hadiths. Although it is said that Abu Hafs Omar ibn Muhammad al-Hamazani al-Samarkandi also had a work called "al-Tafsir", it is difficult to give a clear opinion about what kind of tafsir it is because it has not reached us.



However, based on the views of that time and the scholar, it can be said that it was a narrative interpretation. It is noted that Abu Bakr al-Qaffal Muhammad ibn Ali al-Shashi from Tashkent has a commentary called “al-Tafsir al-Kabir”. Although its manuscript copy has not been preserved, but the quotations from it in some commentaries show that it is narrative-rational.

In the 13th-15th centuries, among other Islamic sciences, the science of tafsir also developed in Mawarannahr. However, as a result of the passage of time and the emergence of new fields in science and the increasing need for intellectual answers, it has not been established that there was a naqli tafsir written in the Mawarannahr region after the twelfth century. Based on the above, it can be noted that narrative interpretations were mainly created before the 12th century. In the later periods, more mental commentaries were written than narrative commentaries. There are several reasons for this.

First of all, by this time, narrative narrations were collected in hadith collections, musnads, and early tafsir books. As a result of the passage of time and the formation of authentic collections, even the narrators were not mentioned in the books. Because authentic hadiths have been separated, their narrators have been identified, and there was no need for it anymore. Instead, it became a habit to be content with expressions such as al-Bukhari, Muslim, al-Tirmidhi’s narration. At the same time, adding a series of narrators over time would increase the volume of the book. It can be said that this is the reason for the decline of narrative interpretations.

Secondly, in the course of the development of science, as a result of the emergence of new scientific fields, the increase of discoveries and inventions, there was a need to understand the Qur’an based on those sciences. For example, interpretations in areas such as jurisprudence, aqidah, philosophy, and mysticism, which are among the intellectual sciences, have increased. In addition, today there are cases of linking the meanings of the verses to the advancements of modern technology. As a result, many studies related to medicine, catastrophes, and physics related to Qur’anic studies are emerging.

Thirdly, not only non-Arabs, but also Arabs need to learn the language of the Qur’an, the meanings of its words, grammatical features, maturity and eloquence. This is because over time, there was a need to move away from the original language, to not understand some words or to understand them more deeply. Naturally, as a result of the study of these aspects by linguists, many linguistic interpretations of the Qur’an were created.

Famous intellectual tafsirs written in Mawarannahr. In the 10th century, complete intellectual commentaries began to appear in Mawarannahr. Mental interpretation refers to the interpretation of verses based on the rules of language, pronunciation and usage, maturity and eloquence, aqeedah, jurisprudence, and Sufism. Due to the wide use of intelligence and ijihad in this type of interpretation, it is called by such names as “rational interpretation”, “ijtihadi interpretation”, “interpretation with diraya (knowledge)”.

Mental interpretations began to multiply from the XI-XII centuries. This, on the one hand, shows the development of mental sciences at that time, and on the other hand, it indicates that mental examples were used more in controversial issues. Therefore, with the passage of time, the interpretation of the Qur’an based on reason, apart from narration, has become the demand of the times. These types of interpretations are divided into different directions, depending on the style, characteristics and the sciences advanced in them. Some of them focus more on nahw, others on aqeedah or philosophy, and still others on history and Israeliyot, that is, on the narrations of the People of the Book - Jews and Christians, all of which are considered permissible intellectual interpretations. The most famous of such tafsirs created in Mawarannahr are Imam al-Maturidi’s “Ta’wilat al-Qur’an”, Abul Barakat al-Nasafi’s “Madarik at-Tanzil wa Haqaiq al-Ta’wil”, and Mahmud al-Zamakhshari’s “al-Kashshaf”. Among intellectual commentaries, “al-Kashshaf” by al-Zamakhshari is considered one of the most notable works in the world that embodies the capabilities of the Arabic language.

It can be said that Abu Mansur al-Maturidi (d. 333/944) was one of the first mufasssirs in this direction. Based on the writing methods of his book “Ta’wilat Ahl al-Sunna” and the cases of interpretation of many verses, it can be called intellectual tafsir. For example, scholars ask intellectual questions in many places, give them logical answers and justify them with verses and hadiths. While commenting on Surah Fatiha, he quotes several verses and hadiths, but it can be observed that there are more intellectual explanations and interpretations compared to narration. More specifically, this interpretation consists of rational examples based on narrative evidence. This tafsir is one of the most famous works in the Islamic world.

Later, the tradition of intellectual commentary was continued by scholars such as Abu Hafs Umar al-Nasafi, Abu Nasr al-Haddadi al-Samarkandi, and Alauddin al-Samarkandi. In the commentary of Abu Hafs Umar al-Nasafi, special emphasis is placed on the Persian language.

Jorullah az-Zamakhshari, as a mature scholar who perfected intellectual knowledge, revealed the spiritual, lexical, and grammatical aspects of the Holy Qur’an at a highly professional level. This fact has been acknowledged by many mufasssirs over the centuries.



Tafsirs based on intellectual sciences can also be found in the works of scholars such as Abu Ali Ibn Sina and Muhammad ibn Abdurrahman az-Zahid al-Bukhari.

The tradition of creating intellectual interpretations in Mawarannahr was continued by scholars of later centuries. Among such scholars are Abul Barakat al-Nasafi (d. 710/1310), Jamaluddin al-Kashani (d. 731/1329-1330), Abul Fadail Muhammad al-Burhan al-Hanafi (d. 687/1289), Alauddin Abdulaziz al-Bukhari (d. 730/1330), Mas'ud Sa'duddin al-Taftazani (722/1322-794/1392), Alauddin Ali Mawlana al-Qushchi (1403-1474), Abul Qasim ibn Abu Bakr as-Samarkandi al-Bayani (lived in the 9th/15th century), Kamaluddin Hafiz al-Kohaki al-Tashqandi (1490-1572), and Muhammad al-Bukhari (d. 985/1578).

Abul Barakat al-Nasafi took intellectual and logical examples from his spiritual teacher al-Maturidi, thought-provoking methods in refuting sects, and skills in revealing the secrets of the Qur'an, balagha and fasaha of the Qur'an from az-Zamakhshari.

In Mawarannahr, among the intellectual interpretations, symbolic interpretations (ishari) are also developed. This can be seen in the example of al-Hakim al-Tirmidhi who lived in the 9th-10th centuries. In the book written by Allama, whose name remains unknown, there is a commentary on 80 words found in the Qur'an and the verses are explained in a mystical-allegory style. The books of Najmuddin Kubra (545-618/1150-1221), Jamaluddin al-Kashani, Khoja Porso (756-822/1355-1420), and Ya'qub Charkhi (1363-1447) can also be included among the ishari tafsirs. This shows that during the development of Sufi sects, Sufi interpretations also increased.

In general, there are so many intellectual commentaries created in Mawarannahr that most of them have not yet been fully studied and published.

REFERENCES

1. Maxsudov D. *Razvoite islamovedeniya (koranovedeniya) v Uzbekistane: istoriya i sovremennost'* //Chabarşy. Dintanu serijasy. – 2020. – T. 21. – №. 1. – C. 60-67.
2. Maxsudov D. *The development of transmitted and rational tafsirs* //The Light of Islam. – 2019. – T. 2019. – №. 1. – C. 9.
3. Makhsudov D. *Muslim world scientists of the temurids period* //The Light of Islam. – 2019. – T. 2019. – №. 3. – C. 4.
4. Islomov Z. *The role of the international Islamic academy of Uzbekistan in the development of Islamic studies* //The Light of Islam. – 2019. – T. 2019. – №. 1. – C. 1.
5. Arslonov Z. Z. *THE PLACE OF ALIKHANTORA SOGUNIY IN THE HISTORY OF EAST TURKESTAN* //Colloquium-journal. – Голопристанський міськрайонний центр зайнятості= Голопристанский районный центр занятости, 2020. – №. 24-2. – C. 9-11.
6. Islomov Z. *Codicological Analysis of Manuscripts of "Mukaddamatu-l-Adab" of Mahmud Zamakhshari in the Funds of the World* //The Light of Islam. – 2020. – T. 2020. – №. 2. – C. 30-36.
7. Islomov Z. *Source studies analysis of manuscripts of "muqaddimatu-ladab" in foreign archival funds* //The Light of Islam. – 2019. – T. 2019. – №. 4. – C. 41.
8. Islomov Z. et al. *WRITING DOWN OF HADITHS IN THE VII-VIII CENTURIES: APPROACHES AND METHODS* //PSYCHOLOGY AND EDUCATION. – 2021. – T. 58. – №. 1. – C. 5536-5545.
9. Maxsudov D. *Развитие исламоведения (корановедения) в Узбекистане: история и современность* //Вестник КазНУ, Серия Религиоведение. – 2020. – T. 21. – №. 1. – C. 60-67.
10. Islomov Z. *International Islamic Academy of Uzbekistan—a result of the reforms worth to the centuries* //The Light of Islam. – 2018. – T. 1. – №. 1.
11. Makhsudov D. *Manuscripts of abul barakat al-nasafi's works on furu'Al-Fiqh* //Asian Journal of Multidimensional Research. – 2023. – T. 12. – №. 1. – C. 31-34.
12. Mahsudov D. *IX-XV asrlarda Movarounnaxrda ёзилган тафсирларнинг хусусиятлари* //Молодой ученый. – 2020. – №. 14. – C. 311-314.
13. Makhsudov D. R. *Mufassirs of Mawarannahr* //ISJ Theoretical & Applied Science, 12 (80). – 2019. – C. 539-543.
14. Zokirjonugli Z. A. *Approaches to studying the scientific heritage of Alikhantora Soguni* //Asian Journal of Multidimensional Research. – 2022. – T. 1
15. Zokirjonugli Z. A. *APPROACHES TO STUDYING THE SCIENTIFIC HERITAGE OF ALIKHANTORA SOGUNI.*
16. Makhsudov D. R. *МУФАССИРЫ МАВЕРАННАХРА В СРЕДНИХ ВЕКАХ* //Theoretical & Applied Science. – 2019. – №. 12. – C. 539-543.
17. Makhsudov D. *A GENIUS OF THE WORLD* //Theoretical & Applied Science. – 2019. – №. 5. – C. 544-548.
18. Ugli A. Z. Z. *THE PLACE OF ALIKHANTORA SOGUNIY IN THE HISTORY OF EAST TURKESTAN* //Colloquium-journal. – Голопристанський міськрайонний центр зайнятості, 2020. – №. 24 (76). – C. 32-33.
19. Arslonov Z., Ergashev H. *ALIKHANTORA SOGUNIY'S VIEWS ON POLITICAL GOVERNANCE IN EAST TURKESTAN* //Студенческий вестник. – 2020. – №. 32-2. – C. 84-85.



UZBEK PROVERBS AND NATIONAL CHARACTER

Makhsudova Nilufar Abdurasulovna

Uzbekistan State World University, Uzbekistan

ABSTRACT

Proverbs carry an indelible trace of the national character, wisdom, and spirit of a nation therefore, in every proverb we can see the image of folk who created these proverbs. In the article through proverbs, features of Uzbek national character which appeared on the basis of immortal and tenacious Uzbek values are defined and elucidated. According to the author, such traits as collectivism, generosity, mercifulness, hospitality, discretion and love for children pertain to the nature of Uzbek ethnic group. Apart from this, the author discusses reasons for the formation such kind of formidable personality traits in Uzbeks.

KEYWORDS: proverbs, national character, generosity, collectivism, mercifulness, graciousness, hospitality, love of children.

Аннотация: Одним из источников национальной идентичности являются пословицы и поговорки. Пословицы несут в себе нестираемый печать национального характера, мудрости и духа нации, поэтому в каждой пословице можно увидеть образ народа, создавшего эти пословицы. В статье через пословицы определяются и раскрываются особенности узбекского национального характера, возникшие на основе бессмертных и живучих узбекских ценностей. По мнению автора, характеру узбекского этноса присущи такие черты, как коллективизм, щедрость, милосердие, гостеприимство, осмотнительность и любовь к детям. В статье ещё обсуждается причины возникновения вышеупомянутых черт характера у узбеков.

Ключевые слова: пословицы, национальный характер, щедрость, коллективизм, милосердие, гостеприимство, любовь к детям.

INTRODUCTION

There are different ethnical groups and nations in the world that have been living in diverse environmental conditions. Yet any of them are alike to each other because every nation has its traditions and customs which have been passed down from generation to generation for many centuries. It is noteworthy to mention that various factors had a profound impact on the formation of them. For instance, religion, belief, lifestyle, and natural conditions of the continent where people live. They, in turn, affected people's mentality, morality, outlook, and national character as well.

Every person, ethnical group, or nation has its character, more exactly, spiritual and moral world. Moral and spiritual world of a nation encompasses in itself such elements as national mentality, characteristic traits, behavior, traditions, values, and feelings that bind a nation together in a national unit. National character is the main component of the moral and spiritual world or precisely the nucleus of it. Up to now a lot of researches have been done on this topic and the authors of the researches tried to elucidate the term national character in their works. For instance, according to M. Kuranov national character is a set of qualities of many people that belong to one culture. [1, 14] Whereas, N. Jandaldin defines the national character as "a set of specific psychological traits that have become more or less characteristic of one or another socio-ethnic community in the specific economic, cultural, and natural conditions of its development" [2,122]. However, the definition given by V.G. Krisko is completer and more detailed: "national character is a set of stable psychological qualities that developed historically and they are moral manners and a conduct of behaviors that show nation's attitude towards social and living conditions, surroundings, labor, themselves and other ethnic groups, etc". [3, 55]

MATERIALS AND METHODS

It should be pointed out that national character is a relative concept because a characterization of a nation cannot be manifested in each member of the nation. For instance, in many sources it is said that French are flippant, the English – self-centered, the Russian - patient, etc. but we have already met courteous and deep-thinking French, selfless and dedicated English, and extremely impatient Russians ..." [4, 137]. Above mentioned information claims that national character is controversial and contradictory. Therefore, a Russian linguist S. G. Ter-Minasova suggests a list of sources where national character of a nation can be manifested. They are following:

1. International jokes;
2. Classical literature;
3. Folklore; [5, 20-25]



RESULTS

Proverbs being a part of folklore are regarded as vehicles of a nation's morality therefore, they are considered as means of transmitting moral ideas of previous ancestors, traditional wisdom and knowledge. Formerly having arisen in individual consciousness, proverbs in the course of time became a part of public consciousness. Expressing folk consciousness, they have remained as mirror reflection of the folk and its experience, world outlook, cultural and spiritual values. Thus, it is justifiable to determine national character of a nation via them.

Currently, there are a lot of dictionaries of Uzbek proverbs. But we collected data for analysis from "Ozbek xalq maqollari" (Uzbek folk proverbs) compiled by T. Mirzayev, A. Musakulov and B. Sarimsoqov (2003) and "Ma'nolar maxzani" (The treasure of meanings) by Sh Shomqsov and Sh Shorahmedov (2001). Due to the analysis of Uzbek proverbs, we identified the following characteristic features pertinent to Uzbek nation: Collectivism, generosity, hospitality, mercifulness and graciousness, discretion, and love for children.

DISCUSSION

Collectivism. A primary personality trait that refers to Uzbeks is collaborativeness. The principle of giving a group priority over each individual is crucial in Uzbek culture. This character can be manifested especially in wedding and funeral ceremonies, national holidays, hashar weeks, and in the process of cooking spring dish-sumalak. Hashar means a group of people who agree to perform some tasks together without any payment. It is voluntary collaborative labour type that was born in mahalla. Makhalla is another marker that shows Uzbeks' conformity and unity. Derived from the Arabic mahali, meaning "local" the term makhalla is formally used in Uzbekistan to mean neighbourhood, local community, or state administrative unit. Historically, each makhalla was managed by a group of recognized elders who were referred to as aksakals (which translates as "whitebeards"). After the independence of Uzbekistan, leaders of mahallas started typically to be elected by their communities but must then be officially approved/appointed as the leaders of their mahallas by city officials.

In Uzbek society makhalla is used by local people to describe community-based, informal economic practices [6, 91-58]. In this sense, makhalla denotes the means whereby people obtain access to public goods, services and social protection while bypassing the state. [7, 56]. Moreover, it is like a family where problems of each member are sorted out in conformity with makhalla members' decisions. What is more, it ensures mutual support among community members. For instance, housing construction, contribution to charity, and distributing funds to needy families, etc. Makhalla residents organize hashar for different purposes, such as constructing irrigation facilities, cleaning streets, asphaltting roads, building houses or mosques, organizing weddings, funerals, and circumcision feasts, and many other services not provided by the state. [7, 245]

Hashar tradition that urges people for collaboration, partnership, and unity is fixed in many Uzbek proverbs:

"Xashar -elga yarashar"

(Hashar is good for people);

"Xashar qildim uy qurdim, unda kop hikmat kordim"

(I built a house with the help of hashar and felt the tangible benefit of it);

"Xashar bilan bitmay qolgan ishim bitar,

Mensimagan oz oyogidan yitar".

(Unfinished works can be accomplished with the help of hashar

It would be bad for those who ignore it);

In Uzbek proverbs individualism has a negative connotation and is never approved by people. On the contrary, proverbs accentuate the benefits that come from collaboration and as well as the detrimental effects of individualism, uniqueness, eccentricity. For example:

Yolgiz otning changi chiqmas,

Changi chiqsa ham dong'i chiqmas.

(The dust of the only horse doesn't rise,

If its dust rises, the horse will not gain fame);

Birlashgan ozar,

Birlashmagan tozar.

(United we stand, divided we fall);

Bo'linganni bo'ri yer, ayrilganni – ayiq

(The wolf will eat who breaks away from the herd)

And the bear who are separated from it);

Yolg'iz daraxt o'rmon bolmas

(The only tree cannot form a forest);



Ikki sichqon biriksa,
Yo'lbars quyrug 'in kertar
(When two mice are united
They can even win over a tiger);
Ikki qo'l qilgan ishni
Bir q'ol qilolmas
(One hand cannot do what two hands do);
"Kuch birlikda"
(Unity is power or Strength is in unity).

Unlike Uzbek proverbs one can come across a lot of English proverbs that approve individualism. For instance:
He travels fastest who travels alone;
I am better off alone;
I love being free; it's the best way to be free;
Never forget that you are unique, just like everybody else;
Know thyself;
Self comes first;
Every tub must stand on its own bottom;
Self-preservation is the first law of nature
When everyone take cares of himself, care is taken of all;
God helps who helps themselves;
if you want a thing well done, do it yourself;
From above shown proverbs it can be derived that Englishmen tend to be self-reliant, and independent rather than collaborative. However, proverbs with such kind of content are not found in Uzbek language.

Generosity. Today, generosity is being considered as the first mark of a good person. Generosity expresses itself in various forms; for example, *hospitality, kindness, giving material aid or offering help by giving time or skill* (that we call now charity). When we picture the national identity of Uzbeks, the first two notions that spring to our mind are hospitality and generosity. They are for Uzbekistan are the values inherited from ancestors. To put it another way, these inherent virtues are in their blood.

Ils Laude Cirtautas in his article entitled "A survival and revival of traditional Uzbek values and customs: A view from the outside" states that early ancestors of Uzbeks - Bilga Kagan and Kul Tegin were willing to give financial support, help and kindness to his nation. He came to this conclusion by analyzing funeral inscriptions chiseled onto large stones left by them. For example, Bilga Kagan states the following expressing his obligation towards his people: "*For the sake of the Turk people, I didn't sleep at night, I didn't rest by day.*" Other lines describe his generosity: "*Having been seated (i.e. elected) as Kaghan, I gathered all the poor and destitute people together. I made the poor people wealthy and the few people numerous*". Like in the Kul Tegin inscription, a favorite phrase in the epic songs, symbolizing generosity is: "... *And he (the hero) gave clothes to those without clothes and horses to those without horses*". At the end of the article Ils Laude Cirtautas compares Turkic kagans with the king Beowulf who was the hero of the Old English epic song and comes to the conclusion that Beowulf gathered great treasure but "was unable to extend generosity and concern for his people's welfare". [8, 10]

This priceless tradition of generosity in Central Asia didn't cease to exist then, but it proceeded in the next centuries. For instance, Samanid rulers and affluent Samanids competed with each other to pay yearly kharaj (Tax on agrarian land owned by non-Muslim) of folk [9, p. 9]. Likewise, a great folk hero across Asia Tamerlane outscored others in the competition on generosity. His following statements prove the abovementioned thought: "*I donated a lot to help poor people and to build mosque, madrassah, hospice, caravanserai (caravan site) along the roadsides for travelers to rest and recover from the day's journey. I checked out every problematic issue thoroughly and I put all my effort into solving it impartially*". [10, 54] Regarding benevolence not only rulers but ordinary people also gained recognition and popularity among folk. For instance, according to sources a prominent savant, the founder of the Naqshbandiya Order Muhammad ibn Muhammad Bahouddin Naqshbandi al-Bukhari used to donate all his earnings to beggars and orphans. Another representative and successor of Naqshbandiya Order Khwaja Ahrar, who was one of the richest men in Central Asia in the 9th century used to spend most of his money on the needy. Most of his wealth was invested in *Waqf* (religious endowments) and was used for the poverty-stricken people. Furthermore, historians contend that when Umar Shaykh Mirzo demanded from residents of Tashkent to gather the amount of money equaled to 250000 dinars, Khwaja Ahrar payed all sum of money by himself. Apart from that, he gave away 70000 dinars to tax collectors. What is more, many madrassahs in Tashkent, Kabul, and Samarkand were built under his sponsorship. [9, 14]



The most admired and desired qualities that had earned unequivocal admiration of Central Asian thinkers, and writers were generosity and magnanimity. Therefore, generosity was praised a lot and shown as an example of virtuous conduct in the literature of ancient and medieval centuries in Central Asia. For instance, in the works of Alisher Navoi, Yusuf Has Hajib, Makhmud Yugnakiy, Munis, Khorasmi. morality that saturated with ideology of benevolence, generosity, kindness, and magnanimity is acclaimed. Here it is noteworthy to say that most Uzbek proverbs devoted to generosity appeared based on these sources as well as hadiths and holy Koran.

According to our analysis of two sources 147 proverbs devoted to generosity and greediness are found. In all of them generosity, openhandedness, and benevolence are emphasized as exemplary conduct, whereas stinginess is reputed as a repugnant vice:

“Baxilning bog‘ida sunbul ko‘karmas”.

(Nothing grows on stingy man’s land);

“Baxildan tosh soraguncha,

Gadoydan osh so‘ra”.

(It is better to ask for bread from a mendicant than corn from a greedy man);

“Maqtasang saxiyini maqta,

Toptasang baxilni topta”.

(Generous man be praised

Greedy man be neglected);

“Tog‘ belgisi tosh bilan,

Boy belgisi osh bilan”.

(The symbol of the mountain is rock, and the sign of a wealthy man is generosity);

“Saxiy or bo‘lmas,

Baxil bexishtga kirmas”.

(Good things come to those who are generous);

Hospitality: One of the main inherent features of the Uzbeks is hospitality and cordiality. Uzbek people adore guests so much that even dropping corn from the beak of a turtledove, standing a tealeaf or stem upright in tea, and seeing a road in a dream are thought to be a portent of the arrival of guests. [11, 212] In Uzbek culture anyone who steps the threshold of Uzbek’s house is considered to be holy and they must let any guest in the house and in every way show respect and hospitality. The main reason for this is that there is a belief among Uzbeks that a guest brings a *barakah* and a host’s generosity is an opportunity to accrue *thawab*. [12, 88]. This belief also reflected in Uzbek proverbs:

“Mehmon –otangday ulug‘”

(A guest is as sacred as your father);

“Mehmon kelgan uydan baraka arimaydi”.

When a guest comes (to you)

Good luck comes (with him);

It means, he should be considered a blessing, not a burden

“Mehmon kelgan uyning chirog‘i ravshan yonadi”.

(If a guest pays a visit, the light of the house gets brighter).

Elder people always admonish younger ones to prepare more food because unexpected guest may come at any time. Apart from this, there is a view in Uzbek culture that 2 portions of food can satisfy three people or there are five people’s *rizq* in three portions of food. Because of this faith, many inhabitants of Uzbekistan sheltered evacuated children from different parts of the world during World war II. The whole world witnessed how Uzbek nation generously shared the last piece of bread and surrounded them with warmth.

If a guest comes during the mealtime Uzbeks use phrase “Mother in law’s pet” towards him and as a sign of welcome and to make him less discomfort use saying “A good guest comes at mealtime”. It shows how Uzbek people are tolerant and hospitable.

In Uzbekistan when a guest visits your house, first, a host spreads a *dasturkhon* (tablecloth). *Dasturkhon* in Uzbek signifies both the physical table covering as well as what’s placed atop it-namely, the foods. [13, 10]. Along with bread, sweets, and fruits the guest is treated with national meal pilaf. The following proverbs reveal an invaluable tradition of the guest receiving in Uzbek culture: “Mehmon kelsa pastga tush, palov bermoq axdga tush”; “Mehmon ko‘rki dasturhon”; “Mehmonga osh qoy, Ikki qo‘lini bosh qo‘y”; “Osh mehmon bilan aziz; Yuzta siz-bizdan bitta jiz-biz yaxshi”. All of these proverbs are about the importance of feeding a guest.

Hospitality in Uzbek families is appreciated higher than the wealth of a table and the prosperity of the family. Turning away a guest at the door is considered a sin or disgrace to the family, kin and makhalla. Conscientious and dignified Uzbek people wishing to



perpetuate invaluable jewels of their culture fixed them into the following proverbs and sayings: “Borini bergan uyalmas”, “Qo‘noq ko‘nsa et pishar, et pishmasa bet pishar”, Qizil et ketar, qizargan bet qolar”. The meaning of the above-mentioned proverbs is that guests’ wellness and fullness are most crucial along with the notion that their mood must be maintained or uplifted at all costs. If not, it is a shame and it is worse than death.

Guest receiving differs in different parts of Uzbekistan. In Fergana Valley and Qashqadarya region neighbors, and relatives of a host bring meals as soon as they know about the guest’s visit. Russell Zanca describing Uzbek hospitality mentions that food appears out of nowhere when an unannounced guest shows up, especially in various regions of Andijon and Namangon (FV), involving other diners whom the guest would never have expected. [13, 10] Serving a whole sheep or goat to honor or welcome guests is still very much part of Qashqadaryo region’s culinary tradition. It is done by a host or host’s neighbor, or a relative. As a result of such kind of traditions the following proverb appeared: “Mehmon kirsas eshikdan, rizqi kelar teshikdan” (*Should a guest walk through the door, food will come through a hole in the floor*).

According to gems of wit that have been passed from our ancestors it is indecent to raise your voice, speak loud in an angry way, have a row with somebody, speak sarcastically with anybody, and bawl at your children in the presence of guests. Even it is immoral to say “scat” to your cat because it is thought that it can upset a guest. [14, 29] The following proverbs reveal such character of Uzbeks: “Mehmonning oldida mushugingni pisht dema” (Don’t say “scat” to your cat in the presence of your guest”, “Mehmonning itini tur dema” (Don’t say “scam” to guest’s dog), “Uyinga mehmon kelganda kapgiringni taqillatma” (Use kitchen utensil gently not to make sound).

There are several reasons for the formation such kind of conduct and behavior concerning hospitality in Uzbeks. Firstly, in the past Uzbekistan stood at the crossroads of the Great Silk Road. Its grand cities hosted thousands of road-weary tradesmen who sought refuge from the desert and the perils of the open road. These caravans would stay for days at a time. As a result, such decent morals as generosity, hospitality, and tolerance are molded in Uzbeks.

Secondly, many aspects of the code of conduct as well as customs and traditions still practiced today in Uzbekistan are rooted in Islamic culture. After converting to Islam radical changes occurred in the social life of people of Central Asia and of course, these changes were reflected in the literature. Thus, masterpieces of literature were created under the influence of Islamic culture as well as fiction of regional traditions.

Islamic hospitality means to give voluntarily and without compensation. Hospitality, an unconditional welcome of the guest, is made through acts, words, and objects. [15, 462] Welcoming guests starts with saying good and gentle words. Therefore, in Uzbek proverbs it said to treat your guest with kindness, though you don’t have anything to feed him (“Bug‘doy noning bolmasa, bug‘doy so‘zing bo‘lsin”, Issiq oshing bolmasa ham, iliq so‘zing bo‘lsin”).

According to Islamic tradition, hospitality implies three important components: the host, the guest, and Allah. God is hospitable, and people should show hospitality. All good deeds, including hospitality, will be rewarded by God in this life by giving barakah (blessing) to his wealth, health and increasing his rizq (sustenance). This idea is also expressed in following Uzbek proverb: “Mehmon kelgan uy barakali”.

If we take a glimpse at the literature of this nation in ancient and medieval centuries, we can surely notice that it was based on a canon of wisdom literature, generally called didactic literature. In this literature, generosity and hospitality are considered important features of cultivated man. Throughout centuries Uzbeks have been brought up and grown up by reading literature and oral folk tradition in which such invaluable moral features are exalted. Therefore, generosity and hospitality are fixed in Uzbeks’ personality.

Mercifulness and Graciousness

Mercifulness and graciousness of Uzbek people can be manifested in the relationship between neighbors, siblings, relatives, parents and children.

In Uzbek families children from their early childhood are brought up in the spirit of love and respect to their family members. Parents urge their elder children to be kind, supportive, merciful, and caring towards little ones, whereas little children are encouraged to be obedient and respectful to elder ones. In Uzbek families parents make their little children call their elder siblings as “aka”(elder brother), “opa” (elder sister). The following proverbs show tight –knit bond between siblings: “Jahl-og‘adan, uzr inidan” (Even if elder brother is angry with little one, he should forgive him), “Ota-hazina, aka-uka –tayanch” (A father is treasure, brothers are pillars to lean on), “Onangni kaftingda tutsang, singlingni boshingda tut” (If you hold your mother on the palm of your hand, your sister-on the top of your head).



Since the Uzbek community are built up on the principles of collectivism and collaboration, relationship between relatives is important. In many aspects of life, they rely on their relatives, and make important decisions in consultation with them. According to Uzbek proverbs familial bond is the strongest and the first who comes to help when you are in trouble is your relative: "Qorongida qichqirsang, qarindosh tovush berar", "Qon qarindosh-jon qarindosh".

Most Western travelers to the Turkic regions of Central Asia have been impressed by the dignified conduct of the local young in the presence of elders. This was especially observed among Uzbeks. [17, 2]. According to Uzbek traditions children are grown up with respect for their parents, grandparents, and all elders. Therefore, elders occupy a respected place among Uzbeks. Uzbeks are extremely fond of their elders. No negative attribute can be used to describe an elderly person. English expressions such as "silly old woman" are unheard of. In Uzbek folktales old women are not depicted as witches, living somewhere alone. A common attribute used towards elders is "nuroniy keksalar" (elders with faces shining with light). [16, 25-26].

Uzbeks also express high reverence for elders with numerous proverbial sayings: "Boshida qor-kongillari bahor" (On their head is snow (that's their grey hair) -In their hearts is spring), "Qari –uyning farishtasi, saranjomu saristasi" (Elders are angels of the house, and those who put everything in order) "Qari bilganni pari bilmas" (What elders know, fairies do not know), The latter proverb is originated from a legend that dates back many centuries. "According to this legend in ancient times, there was a custom to execute elders. One man loved his father very much so he hid him... Once a king sailed along the sea. Suddenly wind started to blow hard. They were hit by a terrible storm with strong winds and in a moment their ship was thrown to the bank. It was a land of fairies. As the king and his servants walked along the coast, they encountered a hill. From the top of the hill, they saw something glittering in the sea. It was an egg-size diamond. He ordered his servant to get it from the sea. Many of them dived but nobody got it. However, the wish to own the diamond did not get the king sleep. Then he announced to give half price of the diamond who get it, otherwise would be sentenced to death. Finally, the turn came to the man who hid his father. He could not help thinking about his death, that's why he came to his father and told him everything. At that time his father predicted that there was a tree near the sea and bird's nest on the branch of it. He said that the diamond in the sea was the reflection of the diamond in the nest. A gleam of hope awoke in the heart of the man. He followed what his father said, and found the diamond. Even the fairies of this land did not know anything about this diamond. The king asked the man how he knew about it. He had to tell the truth. Afterward, the king canceled his order about killing elders". [11, 438]

To get old, means to get wise. In Uzbek proverbs elders are teachers to listen: "Qariyani uy- maktab" (The house which has elder is school (It means that elders teach you a lot)), "Otang o'rgatsa dono bo'lasan (You will become wise if you obey to your father). Moreover, many Uzbek proverbs admonish the younger generation to have a high regard for elders. If so, god will bestow blessings upon him: "Sen siylasang qarini, Tangrim siylar barini" (if you show honor to elders, god will bestow his blessings upon you), "Qariyani hurmat qilgan baxtli bolur" (He who respects elder will be happy), "Qarining hurmati farz" (You must respect elders).

In Uzbek society the tradition of mercifulness and graciousness can be seen in the relationship between neighbors. Since Uzbeks have been living for thousands of years collectively in the communities, neighbors play a special role in their lives. This long-standing and priceless tradition is built up on the principles of mutual help, cordiality, respect, and generosity. Uzbeks believe that "a good neighborhood prolongs a life" (another version of this proverb is "You never get old if you have a good neighbor") because they always share happy moments of their life with them or it is the neighbor or relative who gives a helping hand in your time of need. The rituals of Uzbek people are not held with the participation of neighbors. In Uzbek makhallas no one can be indifferent if someone goes through a rough patch. This living tradition that has been passing for millennia is stamped on the following proverbs: "Yaxshi kunda yon qo'shnim, yomon kunda bor qo'shnim" (Neighbours are on your side in your good and bad times), "Qo'shni keldi-ko'mak keldi" (Neighbour helps in your time of need), "Qo'shningda bori-senda bor" (Neighbour shares with what he has) "Uzoqdagi qarindoshdan yaqindahi qo'shni yahshi" (A close neighbor is better than a faraway relative).

Uzbek proverbs admonish not to buy a house not knowing neighbors ("Hovli olma qo'shni ol") because if your neighbor is at peace with himself, you will also be at peace ("Qo'shning tinch-sen tinch").

The last thing that should be pointed out about traditions of good neighborliness in Uzbek culture is the obligations of neighbors. In addition to respecting and visiting neighbors, people are responsible for looking out for one another by collectively parenting children. Perhaps, it seems like meddling with others' private lives for people from an individualistic society, but in Uzbek culture seven neighbors are considered parents for a child ("Bir bolaga yeti qoshni ota-ona"). These traditions and rituals have been formed throughout the years and turned into the lifestyle of Uzbek nation.

One of the features referring to Uzbeks is "andishalilik" the meaning of which is difficult to convey with a single word in English. The concept "andisha" in Uzbek language is concerned with the following concepts:



1. Discretion and prudery
2. Respect and reverence
3. Patience and tolerance
4. Sagacity

For instance, some people act based on good judgement and understanding, even though someone hurts their feelings. They prefer to be patient, tolerant and preserve prudent silence. Here “andisha” emerged as a result of patience and tolerance. Some people call such kinds of people a coward. In response to these people, Uzbek nations use the following proverb: “Andishani otini qo’rqoq qo’yma” (don’t call delicacy cowardice).

Besides, in Uzbek culture “andisha” is developed because of high respect for somebody. The tradition of showing respect to young ones and respect and reverence to elders refers to Eastern culture in particular Uzbeks where this tradition is considered a core value. One of the priceless values in the Uzbek community is treating parents with utmost respect. For many centuries Uzbeks have been obeying the proverb “Ota –aql, ona- idrok” (A father is mind, a mother- reason). This proverb urges children to follow this belief. According to this proverb, a father is endless wit for his children. As well as he should set an example for them. In its turn, a child should be truly son of his father. As a father, a child also has some obligations towards his father. Looking straight at his father’s eyes, interrupting his sentence, going in front of him, extending his hand to reach over food before his father and not being obedient to him are considered immorality in Uzbek culture. Even getting to the rooftop of the house where a father sits is regarded as disrespect towards a father (“Ota o’tirgan uyning tomiga chiqma”- Don’t get to the rooftop of the house where your father sits). It is noteworthy to say that you cannot meet such kind of treatment toward fathers in Western countries because father and child relationship is based on the principles of democracy and individualism.

Thus, the abovementioned ideas prove that “andisha” can be developed as a result of high respect towards somebody. According to the paremiological fund of Uzbek language “andisha” can appear in the relationship between following people:

1. Parents and children: “Otangni ko’rsang otdan tush” (Get off a horse when you see a father), “Ota o’tirgan uyning tomiga chiqma” (Don’t get to the rooftop of the house where your father sits);
2. Teacher and student: “Ustozing tik qarasang to’zasan, hurmat qilsang asta asta o’zasan” (If you disrespect your teacher you will lose your reputation, if you respect, you will outperform him);
3. Between parents of daughter-in-law and son in-law: “Qudangdan qarz so’rama” (Do not ask for debt from the parents of the daughter-in-law or son-in-law)
4. Host and guest: “Mehmoning itini tur dema” ((Don’t say “scram” to guest’s dog);
5. Mother-in-law and Daughter-in-law: “Qizim senga aytaman, kelinim sen eshit” (I tell you daughter; daughter in-law should listen - This proverb urges daughter-in-law be sharp-witted because everything is not to be told straight to the face of daughter-in-law. She can grasp when it is said to others).

Love for Children: E. Allworth in his book “Modern Uzbeks” mentions basic traits of the Uzbek ethnic group and accentuates that Uzbeks have a great affection and love for children. [17, 272] The birth of a baby in Uzbek family is a great joy, happiness, and god’s blessing. As well as it is thought that it imbues and strengthens a family. In wedding ceremonies elders lift their hand in supplication and say “May your house be full of cries and smiles of babies”. It shows how Uzbek people are fond of children. Love for children is also expressed in Uzbek proverbs. Due to the analysis of the research 90 Uzbek proverbs with the same child are found in the paremiological fund of Uzbek language and we classified them into the following thematic groups:

1. **A child is precious and endearing:** “Bol shirin, boldan bola shirin” (Honey is sweet but a child is sweeter than honey), “Bola-xondan ulug’” (A child is greater than king), “Farzandim –asal qandim” (A child is my honey candy);
2. **A child is a wing and wealth of parents:** “Bolasi ko’p boy bo’lar, bolasi yo’q quruq soy” (He who has a lot of children is wealthy, he who does not have is a river without water), “Davlatning boshi farzand” (A child is a great wealth), “Olti og’illining olti arshda moli bor” (He who has six sons has wealth in six heavens);
3. **A child makes the man:** “Yigitning chirog’i-qizi bilan o’g’li” (Children are man’s lamp that illuminates road), “Odam mevasi-farzand” (The fruit of a man is a child), “Qo’y qo’zichog’i bilan chiroyli, xotin chaqalog’i bilan” (A sheep is beautiful with its lamb, woman –with baby);
4. **A child usually has a similar character or similar qualities to his or her parents:** “Ota qanday bo’lsa, farzand ham shunday bo’ladi” (Like mother, like daughter), “Daraxtiga ko’ra-mevasi, ota onasiga ko’ra-bolasi” (Apple doesn't fall far from the tree);
5. **Instructions to bring up a child:** “Bolani so’ksang beti qotar, ursang eti qotar” (Scolding hardens face and beating-skin- It means that if you constantly scold your children or use physical discipline for his bad behavior, soon this type of punishment will not work because it elevates a child’s aggression as well as diminish the quality of the parent-child relationship), “Boqsang botir qilasan, Tergasang –tentak” (If you pull up your child constantly, you will make him a daft);
6. **About good and bad children:** Apart from good characteristics of a child, you can also meet proverbs which accentuate negative personality traits. However, unlike other languages in Uzbek language negative features of a child is attributed to



“bad child”. To put another way, negative personality traits of a child is always followed with the same “bad child”. For instance, “Yaxshi o‘gil uy tuzar, yomon og‘il uy buzar” (A Good son build a house, a bad one destroys it), “Yaxshi o‘g‘ildan raxmat yetar, yomon o‘gildan –la‘nat” (Good child brings gratitude, bad one –curse).

7. **About only child:** “Yolg‘iz bola-boshga balo” (The only child troubles your head), “Yolg‘iz bola yig‘loq bolar, yolgiz tuya –baqiroq” (The only child is a cry-baby, the only camel-clamorous);
8. **About daughter and sons:** The research of Uzbek proverbs shows that in Uzbek society the position of men is higher than women. It should be noted that in Uzbek community sons are given preference over daughters because it is thought that boys are perpetrators of bloodline and responsible for passing down family tradition from generation to generation. These ideas are reflected in the following proverbs: “Qiyshiq bo‘lsa ham, yo‘l yahshi, Yomon bol‘sa ham –o‘gil” (A road is good even it is twisted, a son is good even he is bad), “To‘ng‘ich qiz bo‘lsa –bir davlat, o‘g‘il bo‘lsa –qo‘sha davlat” (It will be wealth, if your elder child is daughter, your wealth will double, if your elder child is son). It is a bitter truth that in the days of old it was considered unhappiness if a girl came into existence in the family. Even sometimes a woman who gave birth to a daughter was neglected and humiliated. The next proverbs below were created as a result of the abovementioned belief: “Qiz tug‘ildi-g‘am tug‘ildi” (Sorrow came as soon as the girl was born), “Yapaloq-yapaloq qor yog‘ar, yomon hotin qiz tug‘ar” (A bad woman gives birth to a daughter). However, you can also find a lot of proverbs opposed to the abovementioned proverbs: “Mol topmas yigit bo‘lmas, o‘g‘il topmas ayol bo‘lmas” (As there is no man who doesn’t accumulate wealth, there is no woman who does not give birth a son), “O‘g‘il yoqqan chiroqni, qiz ham yoqar” (Anything a man can do, a woman can do too), “Qiz bola uying ziyinati” (A girl is like embellishment of the house), “Qizi bor uy doim sarishta” (A house with a daughter is always tidy).

To recapitulate, it can be concluded that Uzbeks are child-loving nation. They are the Uzbeks who said “There are no strangers among children” (“Болаинг бегонаси бўлмайди”) and accepted 200 thousand children, who were deprived by World War II of their shelter, kith and kin. They shared with them the last piece of bread and warmed them with the kindness and warmth of their hearts. It is the Uzbek who wishes for the health of his child, even if that child is the black sheep of the family: “Yomon bo‘lsa ham omon bo‘lsin” (May he live long, even if he is lousy). Lastly, it is the Uzbek who having a lot of children, mentions the role of each child: “O‘nta bo‘lsa o‘rni bo‘lak” (Even if you have ten children, each of them has significance in the family).

CONCLUSION

Culture, traditions and national values of different nations differ from each other greatly. It is due to a number of factors: beliefs, religion, history, language, geographical locations, climate and etc. In its turn all of them are responsible for molding people, determine their behavior, way of life, outlook, mentality and national character.

National character is a set of stereotyped qualities attributed to one nation. The significance of studying national character is essential, because it impacts how people interact with each other, behavioral actions, and attitude towards different things. Thus, learning national character opens the door to the moral-spiritual world of a nation, so by going in depth of a nation’s soul you can avoid cultural misunderstanding.

One of the source objective information on national character is proverbs. In the proverb the experience, habits and traditions of a certain nation are reflected, that is why the study of the proverbs aids to get deeper into the essence of such notions as “national character”, “mentality”, “language picture of the world”. [19, 627] Analysis of Uzbek proverbs enabled us to determine such personal traits as collectivism, generosity, hospitality, mercifulness and graciousness, amicability, discretion, prudence and love of children pertain to Uzbek people. This mini research also proves that these features of Uzbeks exist in the paremiological fund of Uzbek language.

REFERENCES

1. Kuranov, M. (2005). *Milliy tarbiya. T.: Ma‘naviyat.* – 43 p.
2. Jandaldin, N. (1971). *Priroda natsional‘noy psixologii.- Alma-Ata.- 304 p.*
3. Krisko, V. G (2008). *Etnicheskaya psixologiya. – M.: Academia.- 320 p.*
4. Ter-Minasova, S. G. (2000). *Yazik and Mejkul‘turnaya kommunikatsiya. Moscow: Slovo. -624 p.*
5. Ter-Minasova, S. G. *In Search of National Character// The annual international academic conference, language and culture, 27-30 October. - p-20-25.*
6. Sievers, E. (2002). *Uzbekistan’s Mahalla: from Soviet to Absolutist Residential Community Associations//The Journal of International and Comparative Law at Chicago-Kent 2: 91-158*
7. Seiple, C. (2005) *Uzbekistan: Civil Society in the Heartland. Orbis Spring 2005: 245-259.*
8. Laude-Cirtautas, I. (2007). *A survival and revival of traditional uzbek values and customs: A view from the outside // “O‘zbekistonning islom tsivilizatsiyasi rivojiga qoshgan hissasi” nomli halqaro konferentsiya maruza va tabriklar tezislari tuplami. Toshkent-Samarqand: Imom Buhori respublika ilmiy- marifiy markazi.*



9. Matmurodova, M. (2006). *Sahovatli insonlar va salomatlikposbonlari: Metod.-bibliogr.qol./* Alisher Navoi nom. Ozbekiston Milliy k-nasi. - T.: Alisher Navoi nom. Ozbekiston Milliy k-nasi nashriyoti.
10. Temur, A. (2018). *Temur tuzuklari/ Alihontora Soʻgʻuni. Toshkent:Yoshlar nashriyot uyi.*
11. Shomakhshudov, Sh, Shorahmedov, Sh. (2001). *Ma'nolar Mahzani (Ozbek maqollarining izohli lugati). -T.: "Ozbekiston milliy entsiklopediyasi" davlat ilmiy nashriyoti.- 477 p*
12. Noor O'Neill Borbieva (2013) *Anxiety, order and the other: well-being among ethnic Kyrgyz and Uzbeks, Central Asian Survey, 32:4, 501-513, DOI: 10.1080/02634937.2013.863915.*
13. Zanca, R. (2003). " *Take! Take! Take!*" *Host-guest relations and all that food: Uzbek hospitality past and present. Anthropology of East Europe Review, 21(1), 8-16. Retrieved from <https://neiudc.neiu.edu/anth-pub/24/>.*
14. Makhmudov, K. (1989). - T., 1989. *Mehmonnoma. - 234 p.*
15. El-Sayed El-Aswad. (2015). *Hospitality (in Islam)// Encyclopedia of Islam and the Muslim World, 2nd edition.*
16. Laude-Cirtautas, I. (2015). *Central Asian Turkic Elders. Journal of Central and Inner Asian Dialogue. www.jciadinfo.org.*
17. Allworth, E. A. (1990). *The modern Uzbeks: From fourteenth century to the present. Hoover Press Publication 373.-423 p.*
18. Ibrahimoʻva Bayim F., Tarasova Fanuza H., Yarullina Olesya A., *Proverbs and Sayings as reflection of National Character (In The Context of Tatar and English Proverbs and Sayings)//REVISTA PUBLICANDO. - 2017. - Vol.4, Is.13. - P. 626-633.*
19. Mirzaev, T., Musoqulov, A., & Sarimsoqov, B. (2005). *Ozbek halq maqollari. Tashkent: "Sharq" nashriyoti-matbaa birlashmasi.-509 p.*



EXPRESSION OF SCIENCE FICTION GENRE FEATURES IN THE WORKS OF DAN BROWN

Niyazova Dilnoza¹, Safarova Zilola Tolibovna (PhD)²

¹Master Student of Bukhara State University

²Associate Professor of Bukhara State university

ABSTRACT

Dan Brown's novels such as "Digital Fortress", "Deception Point", "Angels and Demons" and "The Da Vinci Code" incorporate elements of science fiction within their techno-thriller frameworks. This article analyzes how Brown utilizes common science fiction tropes in his works including advanced technologies, future speculation, scientific themes, and creativity with established facts. It examines the style of the author to describe modern technologies and to create imaginative narratives around cryptography, bioengineering, space science, antimatter physics, blockchain AI and religious symbology. The integrated discussion of existing technologies and discoveries within creative fictional contexts reflects core science fiction features. Attention is given to Brown's role popularizing science speculation by rendering complex subjects accessibly. The analysis reveals Brown successfully hybridizing popular fiction genres by fusing science fiction conjectures with fast-paced adventure. His unique synthesis helps drive commercial success while exposure to forward-leaning technological speculation may potentially inspire readers towards STEM creativity.

KEYWORDS: Dan Brown, science fiction, techno-thriller, technology, symbology, cryptography, artificial intelligence

INTRODUCTION

Science fiction represents a literary genre speculating about the influence of scientific advances and imaginary technologies on individuals and societies [1]. Works explore the possibilities of undiscovered phenomena, futuristic innovations and paradigm-shifting discoveries, projecting contemporary trajectories forward while considering ramifications [2]. Creative extrapolation coupled with organized factual knowledge constitutes a core appeal of science fiction alongside sublime wonder about discovering the unknown [3]. As Clarke's third law states: "Any sufficiently advanced technology is indistinguishable from magic" [4]. This fusion of technological speculation with allegorical storytelling offers authors imaginative latitude while embedding substantive themes [5].

Dan Brown's blockbuster novels such as Digital Fortress, Deception Point, Angels & Demons and The Da Vinci Code exhibit notable science fiction elements within their unique blend of mystery, puzzle solving and conspiracy theorizing known as the "techno-thriller" genre [6]. This article analyzes key manifestations of science fiction features in Brown's work including.

METHODS

This study performs a qualitative textual analysis on four Dan Brown novels highlighting science fiction genre components: Digital Fortress, Angels & Demons, Deception Point and The Da Vinci Code. Published between 1998-2009, these works constitute Brown's major outputs bringing him commercial success and cultural prominence. The analysis specifically isolates and examines key science fiction literary elements including:

- Speculation on existing or near-future technologies;
- Extrapolation of technological or scientific trends;
- Incorporation of real-world technologies, discoveries and theories into fictional narratives;
- Use of creativity to expand on established facts and accepted histories;
- Experimentation with substituting spiritual or mystical explanations for scientific phenomena.

The examinations trace how Brown weaves technological speculation with suspenseful plotting and embedded clues. It tracks specific examples of science fiction techniques identified through close reading, cataloguing manifestations across the different novels selected.

Interpretations contextualize the identified examples in discussing how Brown adapts science fiction within techno-thriller adventures more broadly. Comparisons identify overlapping patterns in his integration of science speculation across novels. Attention is given to choices potentially revealing Brown's artistic vision or objectives.



By cataloguing and discussing key examples systematically across texts, the analysis aims to elucidate Brown's broader utilization of science fiction in his signature works. Findings provide the basis for assessing how successfully Brown fuses speculative scientific content with commercial fiction.

RESULTS

Analysis reveals Dan Brown's extensive incorporation of science fiction literary elements across his major works including:

- Extrapolation of existing technologies like cryptography, robotics, and antimatter;
- Thought experiments on advances like quantum computing, synthetic biology, nanotechnology and blockchain AI;
- Imaginative narratives built around space science, bioengineering ethics, AI, and religious history;
- Blending established facts with creative rearrangements of accepted timelines regarding technological progress;
- Substitution of spiritual explanations for physical phenomena involving secret esoteric traditions.

These manifestations reflect core science fiction techniques adapted to propel Brown's puzzle-driven, controversial explorations of concealed knowledge upending traditional assumptions. Technological speculations enable the challenging of dominant paradigms regarding issues like faith and human origins.

DISCUSSION

The integrated analysis surfaces insights on how Dan Brown successfully hybridizes science fiction speculation with history, puzzle-solving, and controversy:

Brown's captivating thrillers harness science fiction's alluring promise of revelation about society's secrets. By speculating on advances like AI, biometrics, and quantum computing, he engineer anticipation that something profound yet undiscovered is being divulged just beyond the frontier of current comprehension. Technological extrapolation supports challenging traditional assumptions around faith origins, human history and the roots of social power structures.

Blending factual references with imaginative reinterpretations of scientific development timelines sustains dramatic tension underpinning his provocative historical revisions. Cryptographic coding puzzles mirror this creative decoding of dominant historical "encryption" around issues like Jesus Christ's bloodline. Science fiction provides literary license to rearrange timelines in support of technology-facilitated paradigm shifts.

Rendering complex subject matter like antimatter physics or bioengineering accessibly for mainstream audiences reflects science fiction's tradition of popularizing science speculation. Like Michael Crichton, Brown translates specialty knowledge into mass engagement through frame-narrative thrillers valuing entertainment. Flagging real-world technologies like blockchain or quantum computing spreads public awareness in digestible formats, potentially inspiring downstream innovation.

Yet Brown outpaces most science fiction peers in commercial success, a remarkable feat given literary markets typically deem the genre marginal. Fusing technological speculation with religious controversies and conspiracy theories around faith foundations triggers recurring high-interest debates from the bestseller list to the big screen. Hybridizing science fiction with other popular genres creates a compellingly consumable form of future visioning integrated with present-day cultural tensions.

Finally, while strained credibility regarding theological claims has fueled criticisms, Brown faithfully adheres to science fiction's charter permitting imaginative reinterpretations of accepted realities. His alternative chronologies challenge conventions across history, technology philosophy in ways aligned with science fiction's mission to expand perspectives on human civilization's trajectory. Reshuffling timelines feeds a dialectic testing the strength of dominant paradigms.

CONCLUSION

In conclusion, Dan Brown's unique fusion of science speculation with history, puzzle-solving and controversy in his signature thrillers exemplifies science fiction's potential as a powerful lens for examining society's assumptions regarding knowledge origins and technological impacts. His commercially successful stylistic hybrids reflect one model science fiction may adapt to expand engagement - inviting audiences to re-examine dominant paradigms in light of emerging discoveries and unconventional perspectives. While his historical claims prove divisively contentious, Brown's skill integrating technological speculation into page-turning adventures with embedded clues and cryptographic mysteries represents a creative formula blending entertainment with existential questions—an alluring recipe reaching millions.



REFERENCES

1. Roberts, Adam. *The History of Science Fiction*. Palgrave Macmillan, 2016.
2. Gunn, James, and Matthew Candelaria, editors. *Speculations on Speculation: Theories of Science Fiction*. Scarecrow Press, 2005.
3. Safarova, Z. (2023). EDUCATION IN SHARLOTTE BRONTE'S "JEYN EYRE". ЦЕНТР НАУЧНЫХ ПУБЛИКАЦИЙ (*buxdu.uz*), 32(32).
4. Clarke, Arthur C. "Hazards of Prophecy: The Failure of Imagination." *Profiles of the Future: An Enquiry into the Limits of the Possible*, Harper & Row, 1962, pp. 14-21.
5. Tolibovna, S. Z. (2023). "Longing" as a main theme in english and Uzbek bildungsromans. *Asian Journal Of Multidimensional Research*, 12(8), 11-15.
6. Safarova, Z. (2022). CH. Dikkansning "Denik Kopper |+ Ild" asarida "Tarbiya ramanlari" ga xos xususiyatlar tahlili. ЦЕНТР НАУЧНЫХ ПУБЛИКАЦИЙ (*buxdu.uz*), 22(22).
7. Tolibovna, S. Z. (2022). Analysis of abandoned and orphan heroes in JK rowling's "garry potter". *ACADEMICIA: An International Multidisciplinary Research Journal*, 12(5), 401-405.
8. Clarke, Arthur C. "Clarke's Third Law." Retrieved from <https://www.dictionary.com/browse/clarke-third-law>
9. Nudelman, Rafail. "Science Fiction and the Prediction of the Future." *Foundation*, vol. 16, no. 2, 1987, pp. 5-20.
10. Safarova, Z. (2020). Ingliza va Ozbek maqollarida yetim va yetimlik tushunchalari talqini. ЦЕНТР НАУЧНЫХ ПУБЛИКАЦИЙ (*buxdu.uz*), 1(1).
11. Safarova, Z. (2022). A realistic artistic depiction of the lives of orphans in Dickens's novel *Oliver Twist*. ЦЕНТР НАУЧНЫХ ПУБЛИКАЦИЙ (*buxdu.uz*), 13(13).
12. Hayward, Philip, and Lydia Ruffles. "The Techno-Thriller." *The Cambridge Companion to Crime Fiction*, edited by Martin Priestman, Cambridge University Press, 2003, pp. 173-190.



A REVIEW ON INTEGRATING ARTIFICIAL INTELLIGENCE INTO DRUG DEVELOPMENT: REVOLUTIONIZING THE PHARMACEUTICAL LANDSCAPE

**Oza Vrushant Pranay, Dr. Anuradha P. Prajapati, Mrs. Bhoomi S. Patel,
Dr. Sachin B. Narkhede, Dr. Shailesh Luhar**

Smt B.N.B Swaminarayan Pharmacy College, Salvav-Vapi, India

Article DOI: <https://doi.org/10.36713/epra15249>

DOI No: 10.36713/epra15249

ABSTRACT

AI revolutionizes pharmaceuticals by expediting drug discovery through data analysis, predicting candidates, and enabling medication repurposing. It extends to manufacturing, ensuring quality, reducing waste, and optimizing production. AI enhances supply chain management, predicting demand and preventing shortages. Its continuous learning adapts to evolving data, aligning drug development with the latest advancements. This synergy promises efficient, personalized, and effective pharmaceutical processes, heralding a transformative era for improved patient outcomes and advanced healthcare solutions.

KEY WORDS: *Artificial intelligence (AI), Pharmaceutical industry, Drug development, Continuous learning, Supply chain optimization.*

INTRODUCTION

Artificial intelligence (AI) is increasingly being used in numerous sectors of society, including the pharmaceutical business. In this review, we emphasize the application of artificial intelligence (AI) in several areas of the pharmaceutical business, such as drug research and development, medication repurposing, improving pharmaceutical productivity, and clinical trials, among others; such use decreases the need for human intervention.

Artificial intelligence (AI) is the computer simulation of the human intelligence process. Acquiring knowledge, formulating rules for interpreting the information, reaching approximate or definite conclusions, and self-correction are all part of the process. The advancement of AI can be viewed as a two-edged sword: many fear that it will endanger their jobs; on the other hand, every advancement in AI is applauded because it is believed to substantially contribute to the welfare of society. AI is utilized in a variety of industries, from developing new instructional approaches to automating commercial processes. Adoption of AI in the drug development process has progressed from hype to hope. This review discusses the potential applications of AI in the drug development pipeline in drug development strategies and processes, pharmaceutical R&D efficiency and attrition, and collaborations between AI and pharmaceutical businesses. ⁽¹⁾⁽²⁾

AI in the lifecycle of Pharmaceutical Product

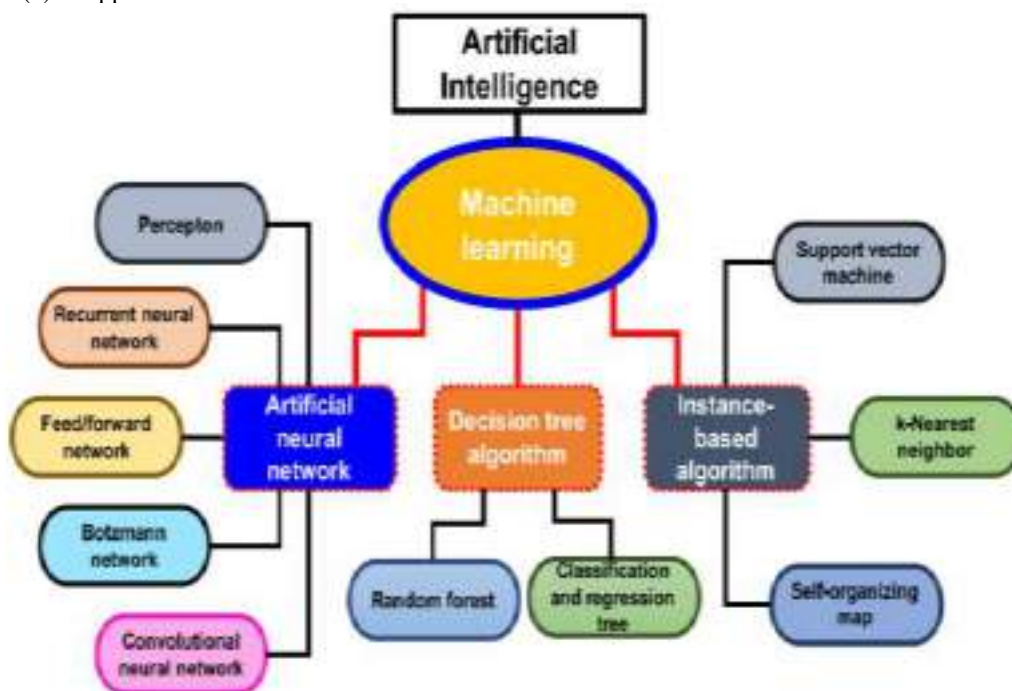
The integration of artificial intelligence (AI) in the pharmaceutical industry has emerged as a transformative force, revolutionizing the entire drug development process from the laboratory to patient care. AI's impact is particularly noteworthy in rational drug design, a critical phase where novel therapeutic agents are conceived.

Moreover, AI plays a pivotal role in decision-making throughout the drug development pipeline. E-VAI, an analytical and decision-making AI platform developed by Eularis, exemplifies this by utilizing ML algorithms and a user-friendly interface. This platform creates analytical roadmaps based on factors such as competitors, key stakeholders, and existing market share. By predicting key drivers in pharmaceutical sales, E-VAI empowers marketing executives to make informed decisions, strategically allocate resources, and optimize market share. This predictive capability is instrumental in reversing poor sales trends and enables executives to anticipate where to make strategic investments. ^(3,4)

Beyond drug development, AI contributes significantly to personalized medicine by assisting in the determination of the right therapy for individual patients. Through the analysis of vast datasets, AI can identify treatment options tailored to a patient's genetic makeup, improving treatment outcomes, and minimizing adverse effects. ⁽⁴⁾

Examples of method domains of AI**1. Artificial intelligence:****(A) Machine learning:**

- I. Artificial neural network
 - (a) Perceptron
 - (b) Recurrent neural network
 - (c) Feed/forward network
 - (d) Botzmann network
 - (e) Convolutional neural network
- II. Decision tree algorithm
 - (a) Random forest
 - (b) Classification and regression tree
- III. Instance based algorithm
 - (a) Self-organizing map
 - (b) K-nearest neighbor
 - (c) Support vector machine

**Figure 1: Examples of Method Domains of AI****Drug Development Process**

The feedback-driven drug development method begins with existing results gathered from a variety of sources, including high-throughput compound and fragment screening, computational modelling, and literature information. In this method, induction and deduction are alternated. This inductive-deductive cycle finally results in hit and lead compounds that are optimized. The automation of specific stages of the drug development cycle lowers randomness and errors while increasing drug development efficiency. De novo design methodologies necessitate organic chemistry understanding for in silico compound synthesis and virtual screening models that serve as surrogates for biochemical and biological efficacy and toxicity studies. Finally, active learning algorithms enable the discovery of new or unique compounds with promising anti-disease activity. ⁽⁵⁾

.A chemical with a reactive functional group and atoms that interact with the active site of a biological target is referred to as a building block. This active site is a specific location within the biological target to which the chemical (or substratum) attaches via interaction forces. The binding of a substrate to an active site can be represented by 'lock and key' or "induced-fit" models. ⁽⁶⁾

R&D Efficiency and Attrition Rate in Drug Development

In the complex landscape of pharmaceutical drug development, the pursuit of innovation is hindered by an alarming decline in research and development (R&D) efficiency. Despite the strict adherence to well-established drug-likeness guidelines, pharmaceutical companies are grappling with substantial challenges, and the ramifications are evident in the diminishing rate of new drugs approved by the FDA per billion dollars spent on R&D.

The cost of bringing a new drug to market has skyrocketed from \$800 million in 2001 to an estimated \$3 billion today. This escalating cost encompasses the entire spectrum of drug development, factoring in the failures that occur at various stages. The average estimate reflects the financial burden required to usher a new drug into the clinical setting. The worrisome trend of declining drug approvals per billion dollars spent on R&D prompted a comprehensive analysis by Scannell et al. The findings distilled the key factors contributing to R&D inefficiency into four categories: the 'better than Beatles problem,' the 'cautious regulator problem,' the 'throw money at it' tendency, and the 'basic-research-brute-force' bias. ⁽⁷⁾

Attrition rates in drug development present another formidable challenge. First-in-human trials conducted by ten established pharmaceutical companies between 1991 and 2000 revealed a success rate of merely 11%. A staggering 62% of new chemical entities in Phase IIb and Phase III clinical trials do not reach the clinic. The predominant causes of attrition in late-stage clinical development include issues related to clinical safety and efficacy, formulation, pharmacokinetics, bioavailability, and toxicity. ⁽⁸⁾⁽⁹⁻¹⁴⁾

Use AI in Drug Discovery

The enormous chemical space, which contains more than 10⁶⁰ compounds, promotes the development of a huge number of pharmacological molecules. However, the lack of new technology constrains the medication development process, making it a time-consuming and costly endeavour that can be addressed by applying AI. AI can identify hit and lead compounds, as well as providing faster validation of the drug target and optimization of drug structure design. ⁽¹⁵⁾⁽¹⁶⁾ Numerous in silico methods for virtual screening compounds from virtual chemical spaces, as well as structure and ligand-based methodologies, allow better profile analysis, faster elimination of nonlead compounds, and therapeutic molecule selection at a lower cost. ⁽¹⁷⁾

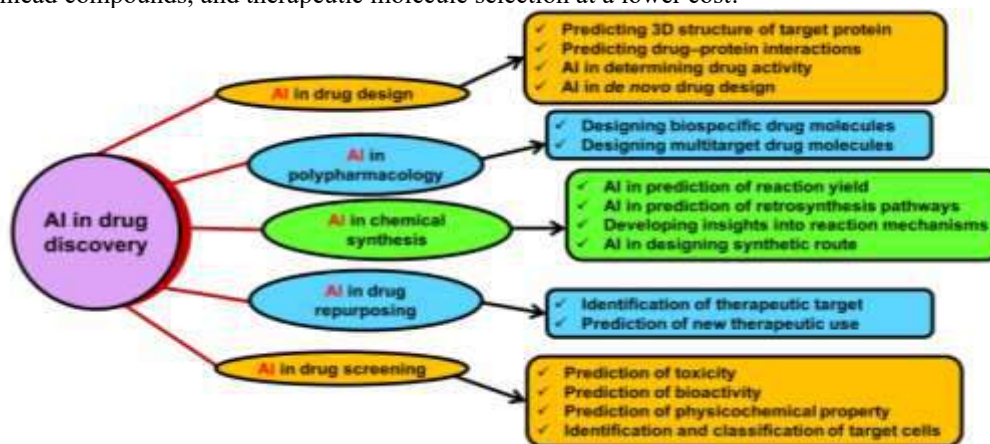


Figure 2: Role of Artificial Intelligence (AI) in Drug Discovery

AI in Drug Screening ⁽¹⁸⁻¹⁹⁾

The process of researching and developing a medicine can take a decade and cost an average of \$2.8 billion. Even still, nine out of ten medicinal molecules fail Phase II clinical studies and are not approved by regulatory authorities. Algorithms like Nearest-Neighbor classifiers, RF, extreme learning machines, SVMs, and deep neural networks (DNNs) are used for VS and can predict in vivo activity and toxicity.

A. Prediction of the Physicochemical Properties

Physicochemical features of the medication, such as solubility, partition coefficient (logP), degree of ionization, and intrinsic permeability, have an indirect effect on its pharmacokinetics and target receptor family and must thus be addressed when creating a new medicine. Physicochemical qualities can be predicted using a variety of AI-based methods.



B. Prediction of Bioactivity

The affinity of drug molecules for the target protein or receptor determines their efficacy. Drug molecules that do not bind with or have affinity for the targeted protein will not be able to provide the therapeutic response.

C. Prediction of Toxicity

To avoid hazardous effects, it is critical to forecast the toxicity of any therapeutic molecule. Cell-based in vitro assays are frequently employed as preliminary investigations, followed by animal experiments to determine a compound's toxicity, raising the cost of drug research. Toxtree, LimTox, pkCSM, admetSAR, and other web-based applications are available to help minimize costs. The different AI tools used in drug discovery are listed in Table 1.

TABLE 1: Different AI tools used in drug discovery

Sr no.	Tools	Details
1	DeepChem	MLP model that uses a python-based AI system to find a suitable candidate in drug discovery
2	DeepTox	Software that predicts the toxicity of total of 12 000 drugs
3	DeepNeuralNetQSAR	Python-based system driven by computational tools that aid detection of the molecular activity of compounds
4	ORGANIC	A molecular generation tool that helps to create molecules with desired properties
5	PotentialNet	Uses NNs to predict binding affinity of ligands

AI in designing drug molecules ⁽²⁰⁻²²⁾

A. Prediction of the target protein structure

It is critical to assign the correct target while creating a pharmacological molecule for successful treatment. Numerous proteins are involved in the disease's development and, in certain situations, are overexpressed.

B. Predicting drug-protein interactions

Drug-protein interactions are critical to the effectiveness of a therapy. Predicting a medication's interaction with a receptor or protein is critical for understanding its efficacy and effectiveness, allowing drug repurposing, and preventing polypharmacology.

AI-based advanced applications ⁽²³⁻²⁸⁾

1. AI-based nanorobots for drug delivery
2. AI in combination drug delivery and synergism/antagonism prediction
3. AI emergence in nanomedicine

Challenges ⁽²⁹⁾

In the realm of AI and machine learning applications within the pharmaceutical industry, significant strides have been made; however, the practical implementation and seamless integration of these technologies into the drug discovery process remain formidable challenges. One primary obstacle lies in the inefficient integration of diverse datasets, encompassing raw data, processed data, metadata, and candidate data. The absence of a standardized method for collecting and collating these datasets impedes efficient analysis, hindering the accuracy of machine learning algorithms. Addressing this issue necessitates the development of more effective methods for integrating diverse data into repositories before embarking on the drug discovery journey.

Future Scope ⁽³⁰⁾

The main potential of AI in the pharmaceutical industry is to reduce costs and increase efficiency. Extensive research has demonstrated that dynamic learning can distinguish profoundly exact AI models while using half or less information than traditional AI and information subsampling approaches. Although the reason for this increased productivity is not fully understood, it appears that reduced repetition and predisposition, as well as gaining more significant information to traverse choice limits, are key components in this improved execution.

1. **Accelerated Drug Discovery:** AI has the potential to significantly expedite the drug discovery phase by predicting and identifying potential drug candidates more efficiently.

2. **Precision Medicine and Personalized Treatment:** AI's ability to analyze large-scale patient data, including genomics, proteomics, and clinical records, facilitates the emergence of personalized medicine.

3. **Optimized Clinical Trials:** AI can streamline and optimize clinical trial processes, from patient recruitment to protocol design and monitoring. Predictive analytics can help identify suitable patient populations, reducing trial costs and timelines.



- 4. Drug Repurposing:** AI algorithms excel in identifying potential alternative uses for existing drugs. By analyzing large-scale biological and clinical datasets, AI can uncover new therapeutic indications for drugs already approved for other conditions.
- 5. AI-Integrated Biomarker Discovery:** Biomarkers play a crucial role in disease diagnosis, prognosis, and treatment response.
- 6. Drug Safety and Toxicity Prediction:** AI models can predict potential safety issues and toxicity early in the drug development process, reducing the risk of adverse effects during clinical trials or post-market.
- 7. AI-Driven Drug Manufacturing and Supply Chain Optimization:** AI can optimize drug manufacturing processes, ensuring quality control, minimizing waste, and enhancing overall efficiency.
- 8. Continuous Learning and Adaptation:** The dynamic nature of AI allows for continuous learning and adaptation based on real-world data.

As the synergy between AI and drug development continues to evolve, the potential for innovation and improvement in patient outcomes becomes increasingly promising.

CONCLUSION

In conclusion, the symbiotic relationship between artificial intelligence (AI) and the pharmaceutical industry heralds a transformative era. AI expedites drug discovery, enabling rapid identification of candidates and repurposing existing medications. Its integration in manufacturing optimizes processes, ensuring quality and efficiency, while in the supply chain, AI predicts demand and prevents shortages. The dynamic learning capability of AI aligns drug development with evolving knowledge, promising innovation, efficiency, and personalized healthcare. As AI technologies advance, the pharmaceutical landscape stands on the cusp of significant improvements, offering a future characterized by cutting-edge solutions and enhanced patient outcomes.

REFERENCES

- Mak, K. K., & Pichika, M. R. (2019). *Artificial intelligence in drug development: present status and future prospects*. *Drug discovery today*, 24(3), 773-780.
- Paul, D., Sanap, G., Shenoy, S., Kalyane, D., Kalia, K., & Tekade, R. K. (2021). *Artificial intelligence in drug discovery and development*. *Drug discovery today*, 26(1), 80.
- Mishra, V. (2018). *Artificial intelligence: the beginning of a new era in pharmacy profession*. *Asian Journal of Pharmaceutics (AJP)*, 12(02).
- Duch, W., Swaminathan, K., & Meller, J. (2007). *Artificial intelligence approaches for rational drug design and discovery*. *Current pharmaceutical design*, 13(14), 1497-1508.
- Fleming, N. (2018). *How artificial intelligence is changing drug discovery*. *Nature*, 557(7706), S55-S55.
- Yuan, Y., Pei, J., & Lai, L. (2011). *LigBuilder 2: a practical de novo drug design approach*. *Journal of chemical information and modeling*, 51(5), 1083-1091.
- Zhu, T., Cao, S., Su, P. C., Patel, R., Shah, D., Chokshi, H. B., ... & Hevener, K. E. (2013). *Hit identification and optimization in virtual screening: Practical recommendations based on a critical literature analysis: Miniperspective*. *Journal of medicinal chemistry*, 56(17), 6560-6572.
- Anderson, A. C. (2012). *Structure-based functional design of drugs: from target to lead compound*. *Molecular Profiling: Methods and Protocols*, 359-366.
- Hall, D. R., Ngan, C. H., Zerbe, B. S., Kozakov, D., & Vajda, S. (2012). *Hot spot analysis for driving the development of hits into leads in fragment-based drug discovery*. *Journal of chemical information and modeling*, 52(1), 199-209.
- Alanine, A., Nettekoven, M., Roberts, E., & Thomas, A. W. (2003). *Lead generation-enhancing the success of drug discovery by investing in the hit to lead process*. *Combinatorial chemistry & high throughput screening*, 6(1), 51-66.
- DiMasi, J. A., Grabowski, H. G., & Hansen, R. W. (2015). *The cost of drug development*. *New England Journal of Medicine*, 372(20), 1972-1972.
- Scannell, J. W., Blanckley, A., Boldon, H., & Warrington, B. (2012). *Diagnosing the decline in pharmaceutical R&D efficiency*. *Nature reviews Drug discovery*, 11(3), 191-200.
- Reddy, A. S., & Zhang, S. (2013). *Polypharmacology: drug discovery for the future*. *Expert review of clinical pharmacology*, 6(1), 41-47.
- Tormay, P. (2015). *Big data in pharmaceutical R&D: creating a sustainable R&D engine*. *Pharmaceutical medicine*, 29(2), 87-92.
- Zang, Q., Mansouri, K., Williams, A. J., Judson, R. S., Allen, D. G., Casey, W. M., & Kleinstreuer, N. C. (2017). *In silico prediction of physicochemical properties of environmental chemicals using molecular fingerprints and machine learning*. *Journal of chemical information and modeling*, 57(1), 36-49.
- Yang, X., Wang, Y., Byrne, R., Schneider, G., & Yang, S. (2019). *Concepts of artificial intelligence for computer-assisted drug discovery*. *Chemical reviews*, 119(18), 10520-10594.
- Hessler, G., & Baringhaus, K. H. (2018). *Artificial intelligence in drug design*. *Molecules*, 23(10), 2520.



18. Rupp, M., Körner, R., & Tetko, I. V. (2010). Estimation of acid dissociation constants using graph kernels. *Molecular Informatics*, 29(10), 731-740.
19. Öztürk, H., Özgür, A., & Ozkirimli, E. (2018). DeepDTA: deep drug–target binding affinity prediction. *Bioinformatics*, 34(17), i821-i829.
20. Lounkine, E., Keiser, M. J., Whitebread, S., Mikhailov, D., Hamon, J., Jenkins, J. L., ... & Urban, L. (2012). Large-scale prediction and testing of drug activity on side-effect targets. *Nature*, 486(7403), 361-367.
21. Feng, Q., Dueva, E., Cherkasov, A., & Ester, M. (2018). Padme: A deep learning-based framework for drug-target interaction prediction. *arXiv preprint arXiv:1807.09741*.
22. Karimi, M., Wu, D., Wang, Z., & Shen, Y. (2019). DeepAffinity: interpretable deep learning of compound–protein affinity through unified recurrent and convolutional neural networks. *Bioinformatics*, 35(18), 3329-3338.
23. Hassanzadeh, P., Atyabi, F., & Dinarvand, R. (2019). The significance of artificial intelligence in drug delivery system design. *Advanced drug delivery reviews*, 151, 169-190.
24. Fu, J., & Yan, H. (2012). Controlled drug release by a nanorobot. *Nature biotechnology*, 30(5), 407-408.
25. Calzolari, D., Bruschi, S., Coquin, L., Schofield, J., Feala, J. D., Reed, J. C., ... & Paternostro, G. (2008). Search algorithms as a framework for the optimization of drug combinations. *PLoS computational biology*, 4(12), e1000249.
26. Calzolari, D., Bruschi, S., Coquin, L., Schofield, J., Feala, J. D., Reed, J. C., ... & Paternostro, G. (2008). Search algorithms as a framework for the optimization of drug combinations. *PLoS computational biology*, 4(12), e1000249.
27. Tsigelny, I. F. (2019). Artificial intelligence in drug combination therapy. *Briefings in bioinformatics*, 20(4), 1434-1448.
28. Sacha, G. M., & Varona, P. (2013). Artificial intelligence in nanotechnology. *Nanotechnology*, 24(45), 452002.
29. Henstock, P. V. (2019). Artificial intelligence for pharma: time for internal investment. *Trends in pharmacological sciences*, 40(8), 543-546.
30. Chan, H. S., Shan, H., Dahoun, T., Vogel, H., & Yuan, S. (2019). Advancing drug discovery via artificial intelligence. *Trends in pharmacological sciences*, 40(8), 592-604.



THE IMPORTANCE OF THE FAMILY INSTITUTE AND EDUCATIONAL SYSTEM IN IMPROVING THE POLITICAL AND LEGAL CONSCIOUSNESS OF YOUNG PEOPLE

Yuldashev Doniyor Ikhtiyor ugli

Base Doctorate, National University of Uzbekistan named after Mirzo Ulugbek

ANNOTATION

In the article, the author examines the role of family and education as the main educational institution influencing the formation of legal culture and the spiritual and moral development of the younger generation. It is noted that it is necessary to form the legal consciousness of the younger generation from an early age, because it is in childhood that the child is especially susceptible to the assimilation of moral norms and requirements.

KEYWORDS: *family, state, information space, politics, education, morality, law, generation, legal awareness, culture, spirituality, youth.*

State policy in the interests of children is a priority area of activity of State authorities and according to the general constitutional principles that are the legal basis for parent-child relations, motherhood and childhood, the family are protected by the State. The legal norm of the Family Code is fundamental, which states that family legislation proceeds from the need to strengthen the family, build family relations based on feelings of mutual love and respect, mutual assistance and responsibility to the family of all its members.

The moral consciousness of a person is formed throughout the life of a person in the process of upbringing and education, as well as in the process of affirming and developing views and, in essence, are the normative expression of such views.

Education is a multi-intensive, multidimensional concept. It is a process of purposeful and systematic impact on the physical, moral, intellectual, and aesthetic development of a person in order to prepare her for family, social, productive, and cultural life. Education involves the formation of significant qualities among young people, starting from an early age, and a willingness to realize them in the interests of society and the state.

Legal education is a process by which the legal consciousness of citizens is formed. Legal consciousness should manifest itself not only in law-abiding, but also in legal activity, in the full and effective use of legal means in practice, in an effort to establish legal principles as the highest values of civilization in any case. The practical orientation of the legal education of a citizen presupposes the assimilation of legal knowledge, the ability to use them competently at the initial level, and the result in any case should be the development of an internal need to resolve issues and conflicts on the basis of the law.

Education is always associated with the development of a kind of scale of values. The basis for moral education is moral norms, traditions, values, and for legal education is law and laws. The process of moral and legal education of the younger generation forms an inextricable link between themselves and is interconnected with general education.

At the present stage of society's development, the problem of moral and legal education of the younger generation is very acute. The need to study the process of formation of moral values is associated with objective reasons: the lack of formation of traditions of civic education in modern society, the blurring of a social idea that could lead to a change in attitude to the problems of becoming a citizen's personality integrated into the multicultural space of the country. The negative processes of a social and economic nature accompanying the transformations carried out in the country have significantly weakened, first of all, the parent family as a social institution, which previously most consistently and reliably protected the lives and health of children and adolescents, ensuring their intellectual and moral development. It can be stated that it was the destruction of the parental family that significantly influenced the growth of juvenile delinquency.



Unfortunately, families do not always perform their functions. In such cases, the problem of the antisocial role of the family arises. Antisocial families are unable to provide their members with security, necessary living conditions and mutual assistance, and moral values are incorrectly presented in such families. In antisocial families, systematic drunkenness prevails, often a joint father and mother, a depraved lifestyle of parents, sometimes involving children in it. In such families, the basic duties of the subject of educational activity are grossly neglected, expressed in the application of unacceptable (in legal and moral terms) methods of upbringing and treatment to the child and including all types of mental, physical and sexual violence against children. Intra-family relationships are built in such a way that they cause significant harm to the spiritual and physical development of the child.

Unfortunately, the problem of child abuse in the family is one of the most serious problems of modern society. It is very relevant for many countries. Many children face the problem of violence in their own family. In relation to them, such sophisticated forms of cruelty as insults, humiliation, beatings, and gross coercion to illegal behavior are manifested. It is not uncommon for children to be kicked out of the house, deprived of food, and the opportunity to communicate with friends. Incorrect forms of child rearing, humiliation of their human dignity, mental and physical violence can also be traced in preschool institutions, educational institutions, orphanages and boarding schools, special educational institutions.

The problem of criminalization of the youth environment causes serious concern in our society, remains extremely relevant and acute for criminology, since juvenile delinquency often develops into recidivism, is an adult "reserve"; in the structure of juvenile delinquency, the proportion of serious and especially serious crimes remains high, the proportion of crimes committed in the group is significant. Youth crime covers all major youth groups, both in socio-demographic and territorial aspects.

Violence, penetrating into the life of a family, cannot but have a detrimental effect on the younger generation, namely, it causes serious mental and moral injuries to children, generates a chain reaction of illegal behavior. Children are the most vulnerable social group due to their age. The vulnerability of children to violence is explained by their physical, mental and social immaturity, as well as their dependent, subordinate position in relation to adults, whether they are parents, guardians, educators, teachers. Depending on their attitude towards the child, he feels either protected or not.

All of the above confirms that the family, destroyed by the constant conflicts and cruelty that arise in it, ceases to perform the functions of a child's upbringing and protection center. A significant proportion of minors who have become victims of abuse between the ages of 14 and 18 have stable deviations in the emotional-volitional, value-normative and psychological spheres of personality.

Analytical studies have shown that, despite the efforts made by States to combat violence against children, much remains to be done: the main focus should be on preventing violence, researching the symptoms and consequences of violence, and providing specific assistance to victims. All sectors of society must engage in an active struggle to ensure the protection of children from all forms of violence against children.

Unfortunately, it is worth noting that today the lives of many children around the world are filled with violence and sometimes violence awaits them in their own home, where it is not visible, where it is hidden from public view.

In modern conditions of increasing foreign economic challenges and threats, the main task of society and the state is seen not only in improving the level and quality of life of the population, stabilizing public relations by ensuring the interests of the least protected categories of the population, which include families with children, but also in improving the moral character of the national family. This is extremely important today, when due to the ongoing socio-economic, cultural, educational, spiritual and ethnic stratification of society, a variety of ideas about the individual and society have arisen, various group, class and personal interests have collided, and the influence of the family, as the main social institution responsible for personality formation, is weakening.

Unfortunately, the family often not only cannot, but also does not want to control his behavior, takes care of him, and finally, just loves him. The control over difficult families of the state and society should be constant and effective, and work with them should be carried out exclusively in the interests of children. The police and social services can apply certain legal education measures to such families; educational institutions, for their part, can intensify individual work with parents in the field of legal education.

Currently, a huge amount of information is falling on a child from birth: the media, the Internet - all this rather contributes to the erosion of moral norms, it is also worrying that the negative influence of the Internet threatens the child's mental state and forces us to think very seriously about the problem of effective moral education of children. One of the most important and difficult tasks facing the state is to improve the conditions of family upbringing of children and adolescents with deviant behavior.



The problems of family and social education of the younger generations have always been, to one degree or another, the focus of scientific, religious and philosophical research. They have not lost their relevance at the present time. The deepening contradictions of the modern communicative situation in the context of globalization and the formation of a new world order focus the attention of public thought on human problems, historical and cultural continuity, civil and national cultural identity. The special relevance of the study of these problems is explained by the dynamics of the defining features of social reality, the increase in the volume of knowledge, the development of which is hampered by their number and completely new directions of their practical use. In addition, the virtualization of the communicative space of modern civilization forces a new understanding of the ongoing changes in socio-cultural reality; first of all, this concerns the causes and features of social and spiritual instability that occurs during the transition to a new world order. In modern conditions, the peculiarities of the development of social processes are associated not only with global transformations and crises of the historical and cultural development of modern civilization and tension in the field of international relations, but also with insufficient knowledge of the general state of socio-cultural processes of the coming post-globalization period. Analyzing the main features of the modern civilizational development and the consequences of their impact on humans from the point of view of national security, it is necessary to pay attention, on the one hand, to the positive trends in the development of modern civilization, which is recorded in sufficient detail in the National Security Strategy. Secondly, specifically socio-cultural processes are taking place in conditions of fundamental changes in the general civilizational order, such as information overabundance, the "communicative revolution", globalization, a powerful impulse in the spread of the global Internet system, the marginalization of culture, an increase in the number of forms and directions of institutional anomie, the spread of destructive religious movements that reinforce the tendency to expand types of deviant behavior. Thirdly, the weakening of the role of the family and family education in the implementation of the process of spiritual and moral continuity and the formation of value consciousness of the younger generations brought young people face to face with the problem of their own choice of value orientations and life attitudes, because they often did not have the opportunity to rely on the socio-cultural experience of older generations. Not always successful attempts to modernize education and the transformation of the system of cultural codes have caused a critical weakening of the moral and normative regulation of behavior and the preservation of the foundations of ethno-cultural and civic identity.

Educational policy is one of the most important components of state policy. It is a tool for ensuring fundamental rights and freedoms of the individual, increasing the pace of socio-economic and scientific and technical development, humanization of society, and cultural growth.

Education is one of the most important factors in the formation of a new quality of the economy of the state and society as a whole, therefore its importance in the modern world is constantly increasing. Education has become firmly part of the main priorities of our society and the state, and its role is growing along with the growing influence of human capital.

The primary task of educational policy is to achieve modern quality of education, its compliance with the current and long-term needs of the individual, society and the state.

The main modern trends in world development that cause significant changes in the education system include:

- Acceleration of the pace of development of society and, as a result, the need to prepare people for life in rapidly changing conditions;
- The transition to a post-industrial, information society, a significant expansion of the scale of intercultural interaction, in connection with which the factors of sociability and tolerance are of particular importance;
- The emergence and growth of global problems that can be solved only as a result of cooperation within the international community, which requires the formation of modern thinking among the younger generation;
- The democratization of society, the expansion of opportunities for political and social choice, which necessitates an increase in the level of readiness of citizens for such a choice;
- Dynamic economic development, increased competition, reduction of the sphere of unskilled and low-skilled labor, deep structural changes in the field of employment, determining the constant need for professional development and retraining of employees, the growth of their professional mobility;
- The growing importance of human capital, which in developed countries accounts for 70-80% of the national wealth, which determines the intensive, outstripping development of education for both young people and adults.

Assessing the results of the conducted research from the point of view of national security, it should be recognized that young people studying in secondary vocational schools require much more attention from society, educational institutions and politicians. Firstly, young men studying in the system of secondary vocational educational institutions are the main contingent of recruits to the ranks of the armed forces, which, naturally, implies a fairly large amount of knowledge, skills and abilities in handling modern military equipment, their preparedness to understand political events, and an assessment of their importance for their country. Secondly, the trends in the development of society are such that the country has begun to experience an acute shortage of qualified young middle-



level personnel, i.e. workers with secondary vocational education. Obviously, high labor productivity in the field of production is possible primarily where the employee is aware of not only the material value of his mental and physical costs in production. For him, an important incentive for high-performance work is an understanding of the social significance of the efforts expended, an attitude towards the country in which he lives, respect for its historical and cultural roots, i.e. manifested in the civic activity of the younger generation.

REFERENCES

1. Berdikulova S.A *Philosophical Aspects of the Study Spiritual Culture of the Person in Society. American Journal of Science and Learning for Development. Impact Factor: SJIF 2023:5.349 ISSN 2835-2157. Volume 2 | No 2 | February-2023. pp 16-20.*
2. Berdikulova S.A., Karimov O.M. *Influence of the internet system on youth spiritual education. Uzbek Scholar Journal Volume- 20, September, 2023. 24-26 Pp*
3. Farxodjonova N. *Features of modernization and integration of national culture //Scientific and Technical Journal of Namangan Institute of Engineering and Technology. – 2019. – Т. 1. – №. 2. – С. 167-172.*
4. Бердикулова С.А. *Демократическое обновление страны: трансформация социальных норм. Гражданское общество (Фуқаролик жамияти). – Тошкент, 2022. Volume 19.- Issue № 4 (72). – Б. 71-73.*
5. Ergashev I. *Civil society and youth //Science and Education. – 2021. – Т. 2. – №. 2. – С. 282-284.*
6. Бердикулова С.А. *Ижтимоий нормаларни такомиллаштиришнинг стратегик аҳамияти. НамДУ илмий ахборотномаси. – Наманган, 2020. – №5. – Б. 147-151 б.*
7. Ergashev I., Farxodjonova N. *Integration of national culture in the process of globalization //Journal of Critical Reviews. – 2020. – Т. 7. – №. 2. – С. 477.*
8. Berdikulova S.A *Social norms as a mechanism for regulating social consciousness in the context of globalization. ISJ Theoretical & Applied Science. Philadelphia, USA. Impact Factor = 4.9. 01. 2020. (81), 744-746*
9. Berdikulova G.A. *DEPENDENCE OF SOCIAL KNOWLEDGE AND INNOVATION. American Journal of Research in Humanities and Social Sciences. Impact Factor: SJIF=7.855. Volume 7, December, 2022. Pp.89-93. <https://americanjournal.org/index.php/ajrhss/article/view/301>*
10. Ibodulla E. *SOCIO-PEDAGOGIC FOUNDATIONS OF THE FORMATION OF YOUTH POLITICAL CULTURE //The XX International Scientific and Practical Conference «Ways of distance learning development in current conditions», May 22–24, Munich, Germany. 432 p. – С. 311.*
11. Berdikulova G.A. *DIALECTICS OF CONSCIOUSNESS AND UNCONSCIOUSNESS IN THE PRESENCE OF MAN "Экономика и социум" №12(91) 2021/143-145 стр.*
12. Ulmasovich Y. S. *Technological Approach to the Development of Altruistic Qualities in Pupils Today's Innovative Requirement //Central Asian Journal of Literature, Philosophy and Culture. – 2022. – Т. 3. – №. 10. – С. 97-101.*
13. Ibodulla E., Makhmudovich S. M., Oynisa M. *The role of constructive ideas in the formation social-political consciousness of youth and social progression in Uzbekistan //International Journal of Advanced Science and Technology. – 2019. – Т. 28. – №. 14. – С. 19-23.*



CRITICLE REVIEW ON DARUNAKA WSR TO TWAK SHAREERA

Vaidya. Gagana V N¹, Dr. Veerayya R Hiremath², Dr. Gururaj N³

¹PG.Scholar, Dept.of shalakya tantra, SJGAMC, Koppal

²Professor and HOD, Dept.of shalakya tantra, SJGAMC, Koppal

³Assosiate, Dept.of shalakya tantra, SJGAMC, Koppal

ABSTRACT

Darunaka is caused by vitiation of either Kapha and vata dosha and it is characterized by Kandu, Kesha bhumi rukshata (roughness), keshachyuti (hair fall) and twaksphutana (scaly flakes) in head region. Based on signs and symptoms it can be correlated to dandruff characterized by scaly flakes, roughness, itching, hair fall. Treatment includes External shampoo applications, Creams, oils etc., it is a persistent and relapsing scalp disorder that affects approximately 50% of the general adult population worldwide. Ayurveda explains various treatment modalities of darunaka which includes Various lepas, Taila application etc., though it seems to be simple but the in dept knowledge is required regarding nidhana panchaka, chikitsa, here is an attempt made to achieve that.

KEY WORDS- Darunaka, Nidhana panchaka, chikitsa, Dandruff

INTRODUCTION

Shalakya tantra is one among Ashtanga's of Ayurveda and which deals with the diseases of head and neck (Shravana, Nayana, Vadana, Ghrana). Head is considered as uttamanga(AH.SU.1/5). In ayurveda head is said to be root of prana(AH.SU.12/4) and the sadya pranahara marmas are also present in the head region(SU.SHA.6/9), hence it should be protected(AH.U.24/59) and treated as early as possible. Increasing urbanization and industrialization have greater danger due to air pollution, contamination of water, liberation of toxic, allergic and poisonous things that causes disorders of shiras.

Darunaka is defined as mastakajata kshudra roga visheshaha¹, categorized under kshudra rogas by sushrutacharya(SU.NI.13/3) and Kapala gata rogas by vagbhatacharya(AH.U.23/23). Darunaka, caused due to vitiation of Vata and Kapha dosha along with pitta and rakta dosha which is characterized by kandu (itching), Kesha bhumi rukshata (roughness), keshachyuti (hair fall) and twak sphutana (scaly flakes) in head region (SU.NI.13/35). The chikitsa includes snehana, swedana, abhyanga, siravyadha, avapeedana nasya, shirobasti, prakshalana(SU.CHI.20/30) and lepa(AH.U.24/26,27).

Darunaka can be correlated to Seborrhea Dermatitis, it consists of a dry form (simple dandruff), with small dry to thick powdery scales and little to no erythema, and an oily form, with greasy or oily scales and crusts on an erythematous base associated with itching, dryness mainly on scalp which is commonly called as Dandruff², it is a persistent and relapsing scalp disorder that affects approximately 50% of the general adult population worldwide³.

Its having more of cosmetic significance and it affects almost everyone at least once in their life time, most probably from the puberty stage to adulthood. Shampooing and Coal tar preparations are the main line of treatment. Widely there is use of 2% Ketoconazole and 2.5% Selenium Sulfide, Zinc pyrithion in shampoo base. Long term usage of shampoos can cause skin irritation, dry skin, allergic reaction, rashes etc. and the cost is also high.

REVIEW OF LITERATURE

The review of the literature is as follows

1. Shira Kapala twak shareera
2. Darunaka vyadhi

1. SHIRA KAPALA TWAK

Nirukti - The word 'Twak'⁴ or skin is derived from the root Twacha.

त्वचति संवृणोति मेदशोणित्वादिकमिति।⁵

Meaning that Twak is the covering of the body which covers the fat, blood tissue; muscle tissue etc.



Historical review

Charma and Asrgdhara are the synonyms of Twak. The word 'Twak' is mentioned for the first time in the Vedas. The Rigveda talks about certain diseases manifesting on skin giving them the name of Twak rogas such as Kushta, Shwitra etc.

Some references are found in the Ayurvedic treatises regarding the formation and development of Twak from the stage of fetus itself. According to Sushruta twak is formed at the time of garbha similar to the cream when the milk is boiled and allowed to cool by itself. The development of skin actually begins simultaneously with the formation of the zygote. Vagbhata states that the Twak is completely formed by the sixth month(AH.SHA.1/57) of embryonic life.

Sushruta has mentioned twacha is a seat of vaata(SU.SHA.1/57) and also Sparshanendriya (sense of touch) and its quality Sparsha (touch) in relation to twacha(SU.SH.1/19).

As per Vagbhata twak is formed during the time of Raktadhatu parinama. The seven layers of Twak are formed, after the Dhatu parinama, when Rakta converts into Mamsadhatu(AH.SHA.3/8).

In Ayurveda, Rakta (blood tissue) Mamsa (muscle tissue), Majja (bone- marrow), guda (anus), etc., originate from the mother and hence they are known as matruja bhavas (maternal elements) Twak also considered as Matruja bhava(CHA.SHA.3/6).

Almost all the ancient scholars consider Twak as an upadhatu of Mamsa. An upadhatu is identical with a dhatu which is not subject to any transformation and it supports the body. Updhatus are the by - products of dhatu parinama. Twak is an upadhatu or associate tissue of Mamsa dhatu (Muscle tissue)(CHA.CHI.15/18,19).

Twak shareera

According to our ancient scholars, there are two opinions regarding the number of layers of the skin. Charaka and ashtanga sangraha kara told that it has six layers(CHA.SHA.7/4),(AS.SHA5/24).

1.Udakadhara: This is the external layer bearing lymph.

2.Asrgdhara: It is the second layer and bearing blood capillaries.

3.Thritiya: Sidma and Kilasa are the diseases occurring in this layer.

4.Chaturti: The fourth layer is the seat for the manifestation of dadru and Kushta.

5.Panchami: The fifth layer is the seat for the manifestation of alaji and vidradhi.

6.Shashti: The sixth layer is that by the excision of which the vision becomes blurred and the individual feels darkness.

According to Vagbhata and Sushruta, seven layers are explained in the skin. These layers are described from the exterior to the interior, i.e., 7th layer, which is the innermost (SU.SHA.4/4) explained in table1.

In Pratyakshashareera of Gananatha Sena detailed description about Twak ,he said that it protects and covers the entire body and the seat of Sparshanendriya. Sweat glands with their ducts, hairs, and hair follicles are embedded in the Twak. It is divided in to external and internal layers. The external layer is very thin and responsible for color and luster. Blisters are formed in this layer when it contacts with fire. The internal layer is thick which protects the body. Ducts of sweat glands, sebaceous glands and sensory nerve endings are situated in this layer.

Functions of Twak

1.Protective: Twak protects the body from loss of body fluids. Being an upadhatu it supports the body.

2.Sensory: Twak is the seat of Sparshanendriya.

3.Absorption: Twak is the seat of Bhrajakapitta.

According to Sushruta, pitta which is located in the skin, is called as Bhrajakagni and it enables the digestion of substances used for Abhyanga, Pariseka, Lepana etc.

According to Dalhana this Bhrajakapitta is situated in the Bahyatwak and is responsible for the digestion of dravyas applied to the skin(SU.SU.21/10)

**Table No. 1 - Showing Layers of skin as mentioned in ayurveda.**

Sl. No	Layers	Thickness	Common Diseases Occurring
1.	Avabhasini	1/8 th of vrihi	Sidma, Padma, Kantaka
2.	Lohita	1/6 th of vrihi	Tilakalaka, Nycha, Vyanga
3.	Shweta	1/12 th vrihi	Charmadala, Ajagallika, Masaka
4.	Tamra	1/8 th of vrihi	Kilasa, Kushta
5.	Vedini	1/5 th of vrihi	Kushta, Visarpa
6.	Rohini	1 vrihi	Granthi, Apachi, Arbuda
7.	Mamsadhara	2 vrihi	Bhagandara, Vidradhi, Arshas

2. DARUNAKA VYADHI**Darunaka nirukti:**

The word Darunaka is derived from the verb, Darayati⁶ = 'Splitting' or tearing or difficult to tolerate. Dhalana says Daruna means Kathina (SU.NI.13/35), difficult to bear or tolerate. Darunaka is a Kapala roga (Disease of the scalp). Kapala is the region which covers the skull. It is not counted in shiroroga but explained as Kapalaroga by Vagbhata and Sharangadhara⁷ and as Kshudraroga by Sushruta, Bhavaprakasha⁸, Madhavanidana⁹, Yogaratnakara¹⁰, Bhaishajya Ratnavali¹¹, Chakradatta¹². All the Acharyas have the same opinion about the seat of this disease, which is Kapala.

1. NIDHANA

Sl.no	Table No. 2 - Showing Nidanas of Darunaka	Ch ¹³	Vag ¹⁴	
Aharajanidana				
01	Amlaaharaatisevana (Excessive intake of sour food)	+	-	
02	Atisheetambusevana (Excessive intake or use of cold water)	+	+	
03	Dushtama (Indigestion)	+	+	
04	Guru ahara (Intake of heavy food)	+	-	
05	Haritha aharaatisevana (Excess intake of green leafy vegetable)	+	-	
06	Himaahara (Intake of cold food)	+	-	
Viharajanidana				
07	Atapaathisevana (Exposure to hot weather)	+	-	
08	Atiswapna (Excessive sleeping)	-	+	
09	Diva Swapna (sleeping during day time)	+	-	
10	Jagarana (Night vigil)	+	-	
11	Praagvata- (Exposure to east wind)	+	+	
12	Rajahasavana (Exposure to dust)	+	-	
Related to Vegas				
13	Athi maithuna (Excessive sexual indulgence)	+	-	
14	Bhaspanigraha (Suppression of tears)	+	+	
15	Rodana (Excessive weeping)	+	+	
16	Vegadharana (Suppression of urges)	+	+	
Defective hygiene				
17	Abhyangadvesa (Absence of Oiling)	-	+	+
18	Mrjadvesa (Improper cleaning)	-	+	+
Psychological factor				
19	Manastapa (Mental agony)	+	+	+



2.SAMPRAPTI

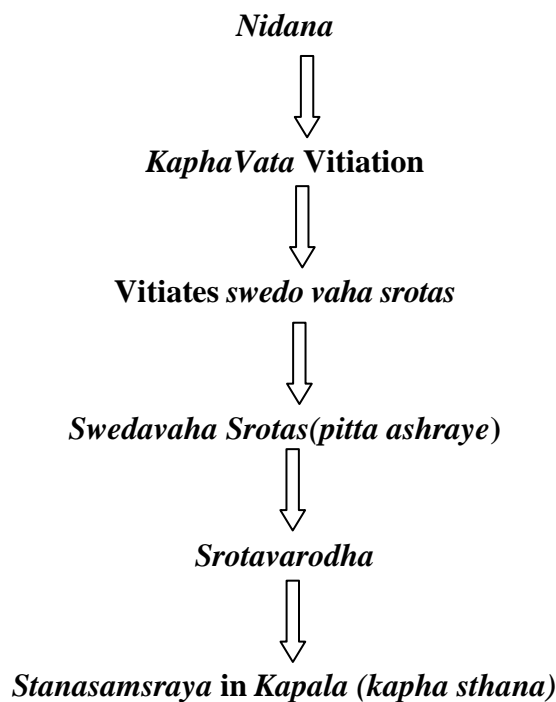
The formation of any disease takes place only when there is a combination of vitiated Dosha with Dushya in srotas. This Dosha Dushya Sammurchana is explained under Samprapti.

As per etiology, mainly Kapha and Vata get vitiated. The association of Pitta and Rakta is mentioned by Videhacharya(SU.NI.13/35 TEEKA). Twak is formed from Raktadhatu during the time of Dhatu parinama. According to Ashrya Ashrayi bhava of Dosha and Dushya, the Pitta dosha is related with Dushya Rakta(AH.SU.11/26). The Bhrajakapitta is located in the skin. So, when the pitta is vitiated in Darunaka, Rakta is also vitiated. Here the Sannikrishta nidana is the vitiation of Kapha and Vaata.

The vitiated Doshas circulate through the blood vessels and reach the scalp. The vitiation and circulation of Doshas contribute in the progression of disease through Chaya, Prakopa and Prasara stages of the diseases, later in Sthana samshraya or stage of manifestation, Dosha interacts with Dushya(SU.SU.21/37). The Doshas Kapha, Vata and Pitta interact with the Dushyas rasa, Rakta at Kapala in the disease Darunaka.As a result, the vitiated Kapha and Vata produce Kandu, Keshachyuti, Swapa, Rookshata and Twak sphutana, and manifest the disease Darunaka

The swedo vaha moola is loma kupa (root of hairs)(CHA.VI.5/8). The main srotas vitiated here is Swedovahi srotas. The Swedavahi srothodushti karana will be ati vyayama,santapa,sheeta ushna krama sevana,krodha ,shoka, bhaya and this will be almost related to shiroroga nidhana.(CHA.VI.5/22) lakshanas like itching, dryness of the skin, abnormalities of touch sensation etc. will be developed. These symptoms are seen in Vyakta stage and the disease Darunaka is manifested. The main Doshas vitiated in Darunaka is Kapha and Vata. These vitiated Doshas vitiate Rakta dhatu. In all types of diseases related to head, vitiation of Rakta is an invariable cause. These in turn vitiate Rasa and Swedovaha srotas.The vitiated Kapha gets accumulates in Srotas by Vataprakopa and Srotavarodha occurs. Sthanasamsraya of this disease takes place in the Kapala and thus Darunaka get manifested.

Flow chart– 1: Showing the Samprapti of Darunak



Causes Darunaka

SAMPRAPTI GHATAKA

Dosha	: Kapha vata, pitta rakta
Dushya	: Twak,Rakta,
Srotas	: Swedavaha, Rasavaha,Raktavaha
Adhistana	: Kapala
Vyakthastana	: Kapala



3.PURVA RUPA

Purva rupa denotes the symptoms that manifest incompletely before the Vyaktaavastha. No reference is available regarding purva rupa of Darunaka in the classics

4.RUPA

1.दारुणा कण्डुरा रूक्षा केशभूमिः प्रपाट्यते |

कफवातप्रकोपेण विद्याददारुणकं तु तम् ||३५|| (SU.NI.13/35)

2.कण्डूकेशच्युतिस्वापरौक्ष्यकृत् स्फुटनं त्वचः||२३||

सुसूक्ष्मं कफवाताभ्यां विद्याददारुणकं तु तत् (AH.U.23/23)

Kandu (Itching), *Keshachyuti* (falling of hair), *Swapa* (abnormalities of touch sensation), *Rookshata* (roughness or dryness of the skin) and *Twak Sphutana* (breaking or cracking of the skin) are the cardinal symptoms of the disease *Darunaka*. Different Acharyas opinion is shown in table.

Table No. 3 - Showing Lakshanas of Darunaka in different Ayurvedic classics

Lakshanas	AH.U.23	AS.U.27	SU.NI.13	Y. R ¹⁰	M.N ⁹	B. P ⁸
<i>Kandu</i>	+	+	+	+	+	+
<i>Kesha chyuti</i>	+	+	+	+	+	+
<i>Swapa</i>	+	+	-	-	-	-
<i>Rukshata</i>	+	+	+	+	+	+
<i>Tvaksphutana</i>	+	+	-	-	-	-
<i>Daruna</i>	-	-	+	+	+	+
<i>Daha</i>	-	-	-	-	-	-
<i>Raga</i>	-	-	-	-	-	-
<i>Gaurava</i>	-	-	-	-	-	-
<i>Toda</i>	-	-	-	-	-	-

Kandu is a symptom which is closely related to *Kaphadosha* and it has an important role in the pathogenesis of *Darunaka*. *Kandu* is one of the *karmas* of diseased *Kapha dosha*. This is due to the factors like accumulation of malas on the scalp and the excessive secretion of sweat etc.

Kesha chyuti is caused by vitiated *Pitta* in association with *Vata*. The hair falling in *Darunaka* may occur in Lack of *Snigdghata* due to vitiated *Vata*, the hair becomes dull and rough. Owing to their abnormal dryness they become friable, short and thin and easily fallout.

Swapa or abnormality of touch sensation means temporary or partial loss of sensation which is resulted due to vitiation of abnormal *Vata*.

Rookshata is a *Vata* predominant disorder. *Abhyanga dvesa* and other *Vatavitiating nidanas* can lead to roughness of scalp. *Sushruta* had quoted *Darunaka* as *Kathina*, *Karkasha*. This may be due to the symptom roughness produced by this disease.

Twak sphutana is breaking or splitting of scalp is one of the symptoms of *Darunaka*. It occurs owing to scratching and abnormal keratinization of epidermis. It is the result of the vitiated *Vatadosha*.

5.UPASHAYA AND ANUPASHAYA

No particular description is available in the classics about the *Upashaya* and *Anupashaya*. As per the *Samprapti Vata-kapha harachikitsa* is *Upashaya*.



SADHYASADHYATA

In *Vagbhata* nine *kapalagata rogas* are mentioned. *Darunaka* is one of the *Kapalagata rogas*. It is *sadhya*

VYAVACHHEDAKA NIDANA

Darunaka can be differentiated among *Kapala vyadhis* especially from *Indralupta*.

Table No. 4 - Showing the Vyavachhedaka Nidana of Darunaka and Indraluptha

Sl.no	<i>Darunaka</i>	<i>Indralupta</i> ¹⁵
1.	The region of the hair loss has no specific shape; it spreads all over head.	The region of the hair loss has specific shape.
2..	<i>Kesha patana</i> is less and gradual.	<i>Kesha patana</i> is more and rapid.
3.	<i>Kesha patana</i> occurs only on scalp.	<i>Kesha patana</i> from head bearded area.
4.	<i>Kandu</i> is more.	<i>Kandu</i> is less.
5.	<i>Twak sputana</i> is main.	<i>Twak sputana</i> is absent

PREVENTION

Maintenance of personal hygiene is the most important of this disease.

Recurrence rate increases if proper hygiene is neglected.

Acharya Sushruta had given importance for maintaining personal hygiene in his *nidanastana*.

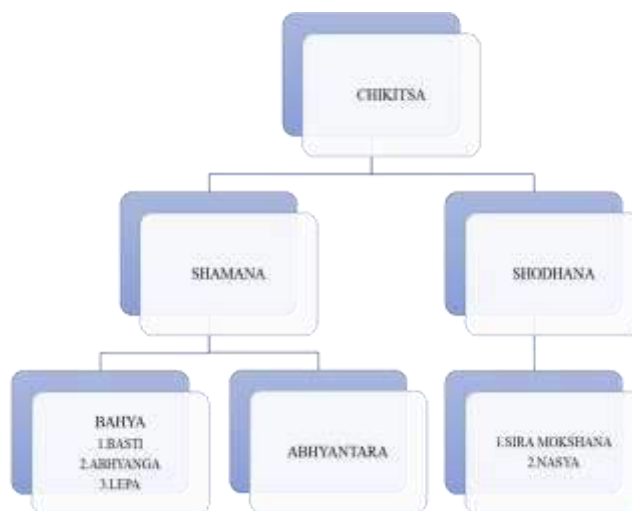
Acharya Charaka (CHA.SU.5/85-88) had stated the importance of regular usage of oil and washing the scalp can prevent *Darunaka* to a great extent.

CHIKITSA VIVECHANA

In the *Ayurvedic* literature references regarding the dietary measures, medicaments and various treatment modalities for *Darunaka* are explained by different *Acharyas*.

The treatment principles mentioned are *Siravyadha* (*Raktamokshana*), *Shiro abhyanga*, *Nasya*, *Shirolepana*, *Shiropakshalana* and *Shirobasti*. In this study *Shiro abhyanga* was taken for evaluation.

Flow chart. 2 – Showing treatment principles



1. Shamanoushadhi

a. Shiro abhyanga

1. *Malatyadi taila*:¹⁶ *Taila* is to be prepared with *malati*, *Mandura*, *Bringaraja*, *Uthphala*, *Sariva*, *Triphala* and applied on scalp.

2. *Bhringaraja taila*:¹⁷ *Taila* is to be prepared with *Bhringaraja*, *Lohakitta*, *Triphala*, and *Sariva* and applied on the scalp.

3. *Prapoundareeka taila*:¹⁸ *taila* is to be prepared with *triphala*, *pundareeka*

4. *Gunja taila*¹⁹ - *Taila* prepared using *gunja*

**b. Shiro lepana²⁰.**

1. Past of Priyal seeds, Yasti, Kushta, Masha, Sarshapa and honey and applied on the scalp.

2. Past of Mango seeds, unripen Haritaki and milk, and applied on the scalp.

3. Khakhasabeejadilepa.²¹

4. Kodrava palaala siddha mashi lepa²²

c. Shiropakshalana: (SU.CHI.20/30) Ksharambuprakshalana

2. SHODHANA

Siramokshana (SU.CHI.20/29) After sneha and sweda karmas of moordha, Raktamokshana by Siravyadha in lalata²³ region.

Nasya: Nasya with Prapoundarika taila.

PATHYA AND APATHYA

Pathya apathyas explained for shiroroga can be applied even for darunaka which are listed below

Table No. 5 - Showing Pathyapathya for Shiroroga / Darunaka

PATHYA ²⁴					
Aharaja		Upacharaja		AushadhiVarga	
01.	Shastikashali	01.	Swedana	01.	Purana gritha
02.	Ksheera	02.	Nasya	02.	Patola
03.	DhanvaMamsa	03.	Dhumapana	03.	Shigru
04.	Amra	04.	Virechana	04.	Draksha
05.	Amalaki	05.	Lepa	05.	Vastuka
06.	Dadhima	06.	Seka	06.	Karavellaka
07.	Matulunga	07.	Langana	07.	Haritaki
08.	Taila	08.	Shirobasti	08.	Kushta
09.	Takra	09.	Raktamokshana	09.	Bhrungaraja
10.	Kanjika	10.	Agnikarma	10.	Kumari
11.	Narikelam	11.	Upanaha	11.	Musta
12.	Yusha			12.	Ushira
	Viharaja			13.	Gandasara (chandana)
01.	Chandrika (moonlight)			14.	Karpura
APATHYA ²⁵					
Aharaja		Viharaja		Viharaja	
01.	Ksheera	01.	Kshavatu	04.	Vibudhajalamajjana
02.	Jala	02.	Jrumba	05.	Danthakasta
03.	Virudha anna	03.	Bhaspa nigraha, nidra,	06.	Divaswapana

CONCLUSION

Darunaka is a kapalagata and kshudra roga caused by vaata and kapha along with pitta and rakta. It is characterized by kandu, keshachyuti, twak sphutana, kasha Bhoomi rookshata in scalp region. The features of darunaka can be correlated with seborrheic dermatitis (dandruff) it is a form of fungal infection because itching, scaly flakes, and hair fall are the main symptoms in both.

Hence understanding of darunaka by basic principles of ayurveda is most important in treating it effectively. This article will be helpful in knowing basic principles of darunaka like nidhana panchaka in deeper aspects with valid references.

REFERENCES

1. Raja Radhakanth deva: Shabdha kalpa Druma, volume 3, Naga Publications Dehli, Second Edition on 2003, Page number 705.
2. W. Mitchell Sams, jr, M.D. And Peter j. Lynch: Principles and Practice Of Dermatology, Second First published in 1996, Published by Churchill Livingstone, Newyork, 35 th chapter Localized Eczematous Disease, Page number 441.
3. Luis.J. Borda & Tongyuc: Seborrheic Dermatitis and Dandruff, A comprehensive review by Department of dermatology and cutaneous surgery, University of Miami miller school of medicine, USA-December 2015.
4. Sri taranath tarka Vachaspati: Vachaspatyam, a comprehensive samskruta dictionary, compiles by sri taranatha tarkavachaspati, Chaukamba Publication, Varanasi, vol 5, page number 3557.
5. Raja radha kanta deva: Shabda kalpa druma vol 2, Chaukamba Publication, Varanasi, page number 666.
6. Sri taranath tarka Vachaspati: Vachaspatyam, a comprehensive samskruta dictionary, compiles by sri taranatha tarkavachaspati, Chaukamba Publication, Varanasi, vol 5, page number 3557.



7. *Sharangadhara: Sharangadhara Samhita, With the commentaries Adhamalla's Dipika And Kasirama's Gudhartha- Dipika, Edited with foot notes by Pandit parasuramasastri, Vidyasagar, Chaukamba Publication, New Delhi, Prathama kanda, shiroroga sankya , sloka 151-152, page 116*
8. *Sri bhavamishra, bhava prakasha, edited with the vidyotini hindi commentary by pandit sri brahma Sankara misra. vol 2, choukamba Sanskrit bhawan, Varanasi edition 2013, Madhyama khanda ,kshudra roga adhikara ,sloka 15, page 585.*
9. *sri madhavakara, Madhava nidhana, with madhukosha commentary, by sri Vijaya rakshita and srikanthadatta, choukamba Sanskrit sansthana, Varanasi, edition , reprint-2012, kshudra roga nidhana, sloka 30th, page 306.*
10. *sri yoga ratnakara, Yoga ratnakara, edited by dr. asha kumari and dr. premvati Tiwari, choukambha vishwabharati , part 2 , Varanasi, first edition -2010, 62nd adhyaya, 30th sloka, page -982*
11. *shri Govinda das, bhaishajya ratnavali, volume 3, edited by bhishgratna shri brahma shankara Mishra, chouwkamba Sanskrit sansthana, Varanasi, edition reprint-2014, chapter 60, kshudraroga adhikara, sloka 56, page 176.*
12. *sri chakrapani, chakra datta dr, indradev tripati, choukambha Sanskrit bhavana, Varanasi, 3rd edition 1997, kshudra roga chikitsa, page 311*
13. *Charaka: charaka Samhita revised by charaka and dridabala of chakra datta, edited by Vaidya Yadav ji trikam ji acharya, Chaukamba publications . Varanasi, Edition; Reprint, 2014, sutra sthana, 17th chapter, 8th & 11th sloka, page no.99.*
14. *Vagbhata: Ashtanga Hrudaya with the Commentaries Sarvangasundara of Arunadatta and Ayurvedarasayana of hemadri, Annotated by Dr Anna Moreswar Kunte and Krsna Ramachandra Sastri Navre, Edited by Pt Hari Sadasiva Sastri Paradakara, Chaukamaba Sanskrit Sansthan, Edition Reprint 2012, Uttara sthana, 23rd chapter, 1-2 sloka, Page number 858.*
15. *Charaka: charaka Samhita revised by charaka and dridabala of chakra datta, edited by Vaidya Yadav ji trikam ji acharya, Chaukamba publications . Varanasi, Edition; Reprint, 2014, chikitsa sthana, 15th chapter , 18th & 19th sloka, page no.515.*
16. *sri chakrapani, chakra datta dr, indradev tripati, choukambha Sanskrit bhavana, Varanasi, 3rd edition 1997, kshudra roga chikitsa, sloka 94, page 319*
17. *sri chakrapani, chakra datta dr, indradev tripati, choukambha Sanskrit bhavana, Varanasi, 3rd edition 1997, kshudra roga chikitsa, sloka 91, page 319*
18. *sri chakrapani, chakra datta dr, indradev tripati, choukambha Sanskrit bhavana, Varanasi, 3rd edition 1997, kshudra roga chikitsa, sloka 92-93, page 319*
19. *sri bhava Mishra, bhava prakasha, edited by bramha Sankara Mishra, vol 2, choukambha adhishtana , Varanasi, edition 2013, kshudra roga dhikara, sloka 18th, page 585.*
20. *Sharangadhara: Sharangadhara Samhita, With the commentaries Adhamalla's Dipika And Kasirama's Gudhartha- Dipika, Edited with foot notes by Pandit parasuramasastri, Vidyasagar, Chaukamba Publication, New Delhi, Prathama kanda, lepa vidhi adhyaya, page 355*
21. *Sharangadhara: Sharangadhara Samhita, With the commentaries Adhamalla's Dipika And Kasirama's Gudhartha- Dipika, Edited with foot notes by Pandit parasuramasastri, Vidyasagar, Chaukamba Publication, New Delhi, Prathama kanda, lepa vidhi adhyaya , sloka 18-19, page 357*
22. *Shodala: Gadani-graha with The Vidyotini Hindi Commentary, Part-3, from Shalaky to Panchakarma, by Sri Indradeva Tripati, Edited by Sri Ganga Sahaya Pandeya, Chaukamba Sanskrit sansthana, Varanasi, Edition: Reprint, 2011, Shirorogadhikara, 83 sloka number, Page number 26.*
23. *sri madhavakara, Madhava nidhana, with madhukosha commentary, by sri Vijaya rakshita and srikanthadatta, choukamba Sanskrit sansthana, Varanasi, edition , reprint-2012, kshudra roga nidhana, sloka 30th, page 306.*
24. *yoga ratnakara, yoga ratnakara, edited by dr. asha kumari, choukamba visvabharati, Varanasi, first edition 2010 66th chapter, sloka 81-83, page 1065*
25. *yoga ratnakara, yoga ratnakara, edited by dr. asha kumari, choukamba visvabharati, Varanasi, first edition 2010, 66th chapter, sloka 84, page 1066.*



FORMATION OF ECO-FRIENDLY FLOOR CLEANER PHENYL USING HERBAL INGREDIENTS

Sima Lahu Rathod^{1*}, Gitesh Vinod Vyas², Anand Daulatrao Khendke³

¹Student of Bachelor in Pharmacy, Faculty of Pharmacy, Dr.Babsaheb Ambedkar Tecnological University, Raigad, Lonere.

²Department of Pharmacology, Faculty of Pharmacognosy, Dr.Babsaheb Ambedkar Tecnological University, Raigad, Lonere.

³Student of Bachelor in Pharmacy, Faculty of Pharmacy, Dr.Babsaheb Ambedkar Tecnological University, Raigad, Lonere.

*Corresponding Author

ABSTRACT

In response to the growing demand for eco-friendly household cleaning products, this study explores the development of a novel floor cleaner formulation. Neem, known for its natural antibacterial properties, is combined with crystal salt, camphor, and alum to create a sustainable and effective cleaning solution.^{[1][1]} The research focuses on optimizing the formulation to balance cleaning efficacy with minimal environmental impact. The study examines the synergistic effects of these ingredients on floor cleanliness, odor control, and antibacterial properties. The results demonstrate the potential of this formulation to offer an environmentally responsible alternative to traditional floor cleaning products, promoting sustainable and healthier living spaces. This research contributes to the ongoing efforts to reduce the ecological footprint of household cleaning while maintaining performance standards.

KEYWORDS: Floor cleaner, Phenyl, Neem, Crystal salt, Camphor, Alum, Formulation, Eco-friendly, Cleaning solution, Natural ingredients, Household cleaning, Sustainable cleaning, Herbal cleaner, Green cleaning, Chemical-free, Environmental impact, Antimicrobial properties, Cleaning efficacy, Biodegradable, Non-toxic cleaning.

1. INTRODUCTION

Household cleaning products play a pivotal role in maintaining cleanliness and hygiene within our living spaces. However, the conventional chemical-laden formulations often pose significant environmental and health concerns. In response to this challenge, the quest for sustainable and eco-friendly cleaning solutions has gained momentum in recent years. In this context, our study delves into the development of a floor cleaner formulation that leverages the remarkable properties of natural ingredients – neem, crystal salt, camphor, and alum. These ingredients, deeply rooted in traditional knowledge and natural remedies, hold the promise of transforming the way we clean our floors. Neem, revered for its potent antibacterial and antifungal properties, takes center stage, and when combined with crystal salt, camphor, and alum, an intriguing synergy emerges. Our research aims to not only explore the efficacy of this formulation in floor cleaning but also its potential to minimize the environmental footprint of such products. This article unfolds the journey of formulating a neem-based floor cleaner (phenyl) that not only offers robust cleaning power but also aligns with the ever-growing global demand for sustainable and green cleaning solutions. We delve into the science behind these natural ingredients and their unique attributes that make them promising candidates for a cleaner, healthier, and more environmentally conscious future.

2. MATERIAL AND METHODS

Creating a formulation of floor cleaner (phenyl) using neem leaves, crystal salt, camphor, and alum at the college laboratory level involves careful handling and accurate measurements. Here's a simplified formula and instructions for a laboratory experiment:[2][2]

Ingredients

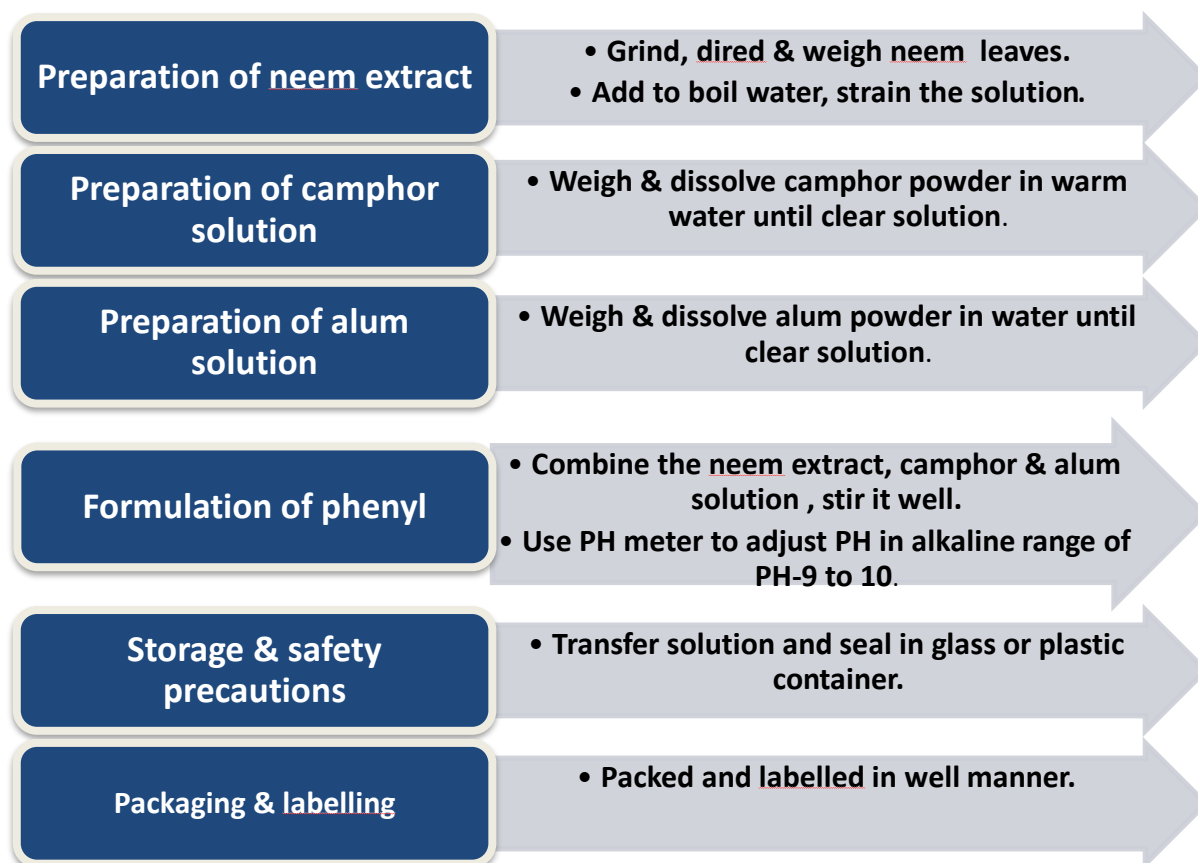
- Neem leaves (dried and powdered)
- Crystal salt (powdered)
- Camphor (powdered)
- Alum (powdered)
- Distilled water



Equipment:

- Glass beakers
- Graduated cylinders
- Stirring rods
- pH meter
- Filter paper and funnel
- Glass bottles for storing the phenyl
- Safety goggles and lab coat

Procedure & Steps :



- Creating a small-scale laboratory formulation of a floor cleaner (phenyl) using neem leaves, crystal salt, camphor, and alum requires careful proportioning. Here's a simplified recipe suitable for a college-level laboratory:^[3]

Formula

SR.NO.	INGREDIENTS	QUANTITY TAKEN	CATEGORY
1	Neem leaves	10 gm	Disinfectant
2	Crystal Salt Powder	5 gm	Antifungal
3	Camphor Powder	2 gm	Deodorizing effect
4	Alum Powder	3 gm	Astringent
5	Distilled Water	500 ml	Solubilizer

This recipe is designed for small-scale laboratory experimentation and is not suitable for large-scale production. For commercial production, you would need to conduct further research, testing, and optimization to ensure that the formulation meets quality and safety standards. Always follow your laboratory's safety protocols and consult with your instructor or lab supervisor for specific guidelines and safety measures.



- **Certainly, here's detailed information about neem when used in the formulation of a floor cleaner (phenyl) with neem leaves, crystal salt, camphor, and alum:**

- ✓ **Taxonomical Information**

- Neem, scientifically known as *Azadirachta indica*.
- Family: Meliaceae.
- Genus: *Azadirachta*.
- Species: *Azadirachta indica*.

Fig:1.Neem leaves



- ✓ **Physiological Information**

- Neem is an evergreen tree native to the Indian subcontinent.
- It's known for its distinct compound leaves, which are pinnate with multiple leaflets.
- The neem tree can grow up to 15-20 meters in height and has a dense, rounded crown.
- Neem leaves are rich in various bioactive compounds, which give them their pharmacological properties.

- ✓ **Pharmacological Properties**

1. **Antibacterial and Antifungal Activity:**Neem leaves contain compounds like azadirachtin, nimbin, and nimbidin, which exhibit strong antibacterial and antifungal properties. This makes them effective in inhibiting the growth of harmful microorganisms on surfaces.
2. **Anti-Inflammatory Effects:**Neem has anti-inflammatory properties due to compounds like quercetin and catechin, which can help in reducing inflammation.^[14]
3. **Antioxidant Properties:**Neem is rich in antioxidants such as flavonoids and tannins, which can help protect surfaces from oxidative damage.^[15]
4. **Immunomodulatory Effects:**Neem may modulate the immune system, potentially contributing to a healthier living environment.^[4]
5. **Insecticidal Properties:**Neem is known for its natural insect-repelling properties, which can be valuable in deterring pests from indoor spaces.^{[5][16]}

- ✓ **Scientific Research on Neem in Floor Cleaner Formulation**

- Scientific research investigates the optimal concentration of neem leaves in the formulation to maximize its antibacterial, antifungal, and insecticidal effects while ensuring safety for household use.^[17]
- Researchers study the synergistic effects of neem leaves, crystal salt, camphor, and alum when combined in a floor cleaner formulation. This research aims to understand how these ingredients work together to enhance the cleaning efficacy.
- The formulation stability over time is examined to ensure that the neem-based floor cleaner remains effective and doesn't degrade.
- The study also evaluates the safety and environmental impact of the neem-based floor cleaner, aligning with the broader goal of creating eco-friendly and sustainable cleaning solutions.^[6]

In summary, neem leaves in a floor cleaner formulation provide a natural and sustainable approach to cleaning with various pharmacological properties. Scientific research contributes to optimizing this formulation for effective, eco-friendly, and safe household cleaning, promoting a healthier and more environmentally conscious living space.

- **Certainly, here's detailed information about crystal salt (rock salt) when used in the formulation of a floor cleaner (phenyl) with neem leaves, camphor, and alum**

- ✓ **Taxonomical Information**

- Common Name: Crystal salt, Rock salt, Halite.
- Chemical Composition: Sodium chloride (NaCl).
- Halide mineral group.



- Crystal System: Isometric.

Fig:2.Crystal Salt



✓ **Physiological Information**

- Crystal salt is a naturally occurring mineral that is typically found in salt mines and salt flats.
- It is commonly available in the form of white or colorless translucent crystals.
- Its natural formation involves the evaporation of ancient seas and water bodies.

✓ **Pharmacological Properties**

1. Antibacterial and Antifungal Properties: Crystal salt has natural antibacterial and antifungal properties, making it effective in inhibiting the growth of microorganisms on surfaces.^[18]
2. Deodorizing Effect: Crystal salt can help neutralize odors, providing a fresh and clean scent in the area being cleaned.
3. Abrasive Properties: The abrasive texture of crystal salt makes it effective for scrubbing away dirt, stains, and grime from various surfaces.
4. Solubility: Crystal salt can dissolve in water, allowing it to be incorporated into cleaning formulations and efficiently utilized during cleaning.

✓ **Scientific Research on Crystal Salt in Floor Cleaner Formulation:**

- Scientific research often focuses on optimizing the concentration of crystal salt in the floor cleaner formulation. This ensures that it provides effective cleaning without causing damage to the surfaces.^[19]
- Researchers study the interaction and synergy of crystal salt with neem leaves, camphor, and alum. This research aims to understand how these ingredients work together to enhance the cleaning efficacy and overall performance of the floor cleaner.^[20]
- Studies examine the solubility of crystal salt in the cleaning solution to ensure it dissolves effectively, allowing for even distribution during cleaning.
- The abrasive nature of crystal salt is also evaluated to determine its effectiveness in removing stains and grime from various types of flooring materials.

In summary, crystal salt in a floor cleaner formulation contributes antibacterial, deodorizing, and abrasive properties, enhancing the cleaning process. Scientific research is instrumental in fine-tuning the inclusion of crystal salt to optimize cleaning performance while ensuring safety and efficacy in household cleaning products, especially when used in combination with neem leaves, camphor, and alum.

- **Certainly, here's detailed information about camphor when used in the formulation of a floor cleaner (phenyl) with neem leaves, crystal salt, and alum:**

✓ **Taxonomical Information**

- Camphor, scientifically known as *Cinnamomum camphora*.
- Family: Lauraceae.
- Genus: *Cinnamomum*.
- Species: *Cinnamomum camphora*.

✓ **Physiological Information**

- Camphor is a white crystalline substance with a strong, distinctive aroma.
- It is typically obtained from the wood of camphor trees or synthesized from turpentine oil.
- Camphor has a long history of use in traditional medicine and various industrial applications.



Fig:3.Camphor



✓ **Pharmacological Properties**

1. **Antibacterial and Antifungal Activity:** Camphor exhibits mild antibacterial and antifungal properties, which can complement the cleaning and disinfecting effects of the floor cleaner.^[21]
2. **Aromatic and Deodorizing Effect:** Camphor's strong aroma provides a pleasant and refreshing scent to the area being cleaned, effectively masking odors.
3. **Solubility:** Camphor is readily soluble in various solvents, making it easy to incorporate into cleaning formulations.^[22]
4. **Mild Anesthetic Effect:** Topically, camphor can produce a cooling and mild anesthetic effect, which can provide a soothing sensation.

✓ **Scientific Research on Camphor in Floor Cleaner Formulation**

- Scientific research investigates the optimal concentration of camphor in the floor cleaner formulation to maximize its antimicrobial and deodorizing properties without overwhelming the senses.^{[7][23]}
- Researchers examine the interaction of camphor with neem leaves, crystal salt, and alum to understand how these ingredients collectively enhance the cleaning efficacy and aroma.
- Studies also focus on the solubility of camphor in the cleaning solution, ensuring that it disperses evenly and retains its aromatic and antibacterial properties.^[24]
- The research may also explore the safety and environmental impact of camphor in the formulation to align with the goal of creating eco-friendly and effective household cleaning products.

In summary, camphor, when used in a floor cleaner formulation, provides antimicrobial, deodorizing, and mild anesthetic properties. Scientific research is essential to fine-tune the inclusion of camphor to optimize cleaning performance while ensuring safety and efficacy in household cleaning products when used in combination with neem leaves, crystal salt, and alum.

Fig:4.Alum



- **Certainly, here's detailed information about alum when used in the formulation of a floor cleaner (phenyl) with neem leaves, crystal salt, and camphor:**

✓ **Taxonomical Information**

- Alum, scientifically known as Potassium aluminum sulfate dodecahydrate ($KAl(SO_4)_2 \cdot 12H_2O$) or Ammonium aluminum sulfate dodecahydrate ($(NH_4)Al(SO_4)_2 \cdot 12H_2O$).
- Alum belongs to the family of double salts, and it comes in various forms, with the two most common being potassium alum and ammonium alum.

**✓ Physiological Information**

- Alum is a colorless, odorless crystalline substance that is soluble in water.
- It is widely used in various industrial applications, including water purification, pickling, and as an astringent in personal care products.

✓ Pharmacological Properties:

1. Antibacterial and Astringent Properties: Alum has natural antibacterial properties and astringent effects, making it valuable in cleaning products for its ability to inhibit bacterial growth and its ability to cause tissues to contract, which may be useful in cleaning surfaces.^[25]
2. Coagulant: Alum can act as a coagulant in water, which helps remove impurities by causing fine particles to bind together and settle out.

✓ Scientific Research on Alum in Floor Cleaner Formulation:

- Scientific research examines the optimal concentration of alum in the floor cleaner formulation to maximize its antibacterial and astringent properties without causing any adverse effects on surfaces.
- Researchers may study the interaction of alum with other ingredients such as neem leaves, crystal salt, and camphor to understand how these components work together to enhance the cleaning efficacy and antibacterial properties.
- Studies may also investigate the solubility of alum in the cleaning solution to ensure it disperses evenly and effectively targets impurities and bacteria.
- The safety and environmental impact of alum in the formulation may be explored to ensure it aligns with eco-friendly and effective household cleaning product standards.

In summary, alum, when used in a floor cleaner formulation with neem leaves, crystal salt, and camphor, contributes to antibacterial and astringent properties. Scientific research is instrumental in optimizing the inclusion of alum to enhance cleaning performance while maintaining safety and environmental considerations in household cleaning products.

• Formulating a floor cleaner (phenyl) using neem leaves, crystal salt, camphor, and alum has several merits :**✓ Merits**

1. Natural and Eco-Friendly: One of the primary advantages is that this formulation relies on natural ingredients, reducing the dependence on harsh synthetic chemicals. It aligns with the growing demand for eco-friendly and sustainable cleaning products.^[26]
2. Antibacterial and Antifungal Properties: Neem leaves, crystal salt, and alum offer natural antibacterial and antifungal properties, making the floor cleaner effective in disinfection and cleanliness.^[27]
3. Deodorizing Effect: Camphor provides a pleasant aroma, effectively masking odors and leaving the area smelling fresh and clean.
4. Abrasive Cleaning: Crystal salt's abrasive properties help in removing dirt and stains from surfaces, enhancing the cleaner's effectiveness.
5. Safety: The use of natural ingredients reduces the risk of exposure to harmful chemicals, making the cleaner safer for both users and the environment.
6. Immune and Insect Repellent Properties: Neem's potential immune-boosting effects and insect-repelling properties contribute to a healthier living space.

In summary, the formulation of a floor cleaner using neem leaves, crystal salt, camphor, and alum offers numerous advantages in terms of eco-friendliness, antibacterial properties, and safety. However, it may face challenges related to consistency, strong aroma, residue, and the need for further scientific research to validate its effectiveness. Users should carefully consider their preferences and priorities when choosing such a cleaner.^[8]

• The formulation of a floor cleaner (phenyl) using neem leaves, crystal salt, camphor, and alum aligns with several future trends and considerations in the cleaning product industry:

1. Green and Sustainable Cleaning: The use of natural ingredients, such as neem leaves, crystal salt, camphor, and alum, reflects the growing demand for green and sustainable cleaning products. As environmental awareness continues to rise, consumers are seeking cleaning solutions that minimize their ecological footprint.
2. Health and Wellness: There's an increasing emphasis on creating living spaces that promote health and wellness. Neem's potential immune-boosting and antibacterial properties align with the trend toward healthier indoor environments.
3. Natural Disinfectants: The ongoing focus on hygiene and cleanliness, especially in the wake of global health concerns, encourages the development of natural disinfectants. The antibacterial and antifungal properties of neem and alum in this formulation cater to this demand.



4. **Aromatherapy and Sensory Experience:** Consumers are looking for products that provide a pleasant sensory experience. The use of camphor for its deodorizing effect contributes to the growing trend of aromatherapy in cleaning products.
5. **DIY and Customization:** There's a rising interest in DIY cleaning products, where individuals have the option to customize formulations according to their preferences. This trend might encourage the use of ingredients like neem leaves, crystal salt, camphor, and alum in personalized cleaning solutions.
6. **Local Sourcing:** The sourcing of local and indigenous ingredients, like neem leaves, is becoming more popular. It promotes regional economies and reduces the carbon footprint associated with ingredient transportation.
7. **Clean Label and Transparency:** Consumers are seeking products with clear and transparent labeling, which provides information about the ingredients and their sources. The formulation's simplicity and natural components align with this trend.
8. **Scientific Validation:** While the use of natural ingredients is promising, future trends may involve more scientific research to validate the efficacy of specific combinations. Consumers may look for evidence of effectiveness, safety, and environmental impact.
9. **Biodegradability and Minimal Packaging:** Sustainable packaging and biodegradability are crucial considerations. Future trends might emphasize the reduction of plastic waste and environmentally friendly packaging for cleaning products.^[28]
10. **Regulatory Compliance:** As the industry evolves, adherence to regulations and standards related to environmental impact and safety will be crucial. Companies formulating such products will need to ensure compliance with changing regulations.

In conclusion, the formulation of a floor cleaner using neem leaves, crystal salt, camphor, and alum resonates with future trends centered on sustainability, health, wellness, and consumer preferences for green and effective cleaning solutions. Scientific research and innovation will likely play a significant role in shaping the future of these products.

- **The formulation of floor cleaner phenyl using neem leaves, crystal salt, camphor, and alum incorporates elements of traditional knowledge from various cultures where these natural ingredients have been used for cleaning and purification. Here's a glimpse of their traditional uses:**

1. **Neem Leaves:** Neem (*Azadirachta indica*) is an integral part of traditional Indian medicine and is known for its antibacterial, antifungal, and insect-repelling properties. Neem leaves have been used in India for centuries for various purposes, including cleaning and purifying living spaces. The leaves were burned to fumigate homes and repel pests. The idea of using neem in a floor cleaner aligns with the traditional knowledge of its cleansing and antibacterial attributes.
2. **Crystal Salt:** Salt has a long history of use in various cultures for cleaning and purifying. In ancient times, salt was often spread on surfaces to absorb moisture and prevent mold and bacteria growth. The use of salt in cleaning products is reminiscent of traditional practices aimed at keeping environments clean and free of harmful microorganisms.
3. **Camphor:** Camphor has been used in several traditional practices around the world, including India and China. It is known for its aromatic and deodorizing properties. Camphor was used to freshen the air and dispel unpleasant odors. Incorporating camphor into cleaning products aligns with traditional practices of using its scent to create a pleasant and clean atmosphere.
4. **Alum:** Alum has a history of use in traditional medicine and various applications. It has been used for its astringent and antibacterial properties. In some traditional practices, alum was used for purification and as a disinfectant. The inclusion of alum in a floor cleaner formulation reflects its traditional roles in maintaining cleanliness.

The combination of these traditional elements creates a holistic approach to cleaning that considers not only cleanliness but also the creation of a pleasant and sanitized living environment. It also respects the wisdom passed down through generations regarding the use of these natural substances for purification and wellness.

- **Modern scientific research into the formulation of a floor cleaner (phenyl) using neem leaves, crystal salt, camphor, and alum focuses on several key aspects:**

1. **Efficacy and Cleaning Performance:** Researchers assess how well the formulation cleans various types of surfaces, from removing dirt and stains to disinfecting and inhibiting bacterial and fungal growth. Scientific studies aim to validate the cleaning performance of this natural formulation compared to traditional chemical-based cleaners.
2. **Synergistic Effects:** The interactions between the individual components, such as neem, crystal salt, camphor, and alum, are examined to understand if their combined use enhances cleaning efficacy. Researchers seek to identify any synergistic effects that make the formulation more effective than individual components used separately.^[29]
3. **Safety and Toxicity:** Safety is a paramount concern. Scientific research evaluates the safety of the formulation for users, considering factors like skin and eye irritation, inhalation risks, and any potential allergic reactions. Toxicity studies aim to ensure the product's safe use in household environments.^[30]
4. **Environmental Impact:** Researchers investigate the environmental impact of the formulation, considering factors such as biodegradability, eco-friendliness, and potential harm to aquatic life or ecosystems. The goal is to create cleaning products that have minimal environmental impact.^[31]



5. **Stability and Shelf Life:** The stability and shelf life of the product are studied to ensure that it remains effective and safe for an extended period. This includes examining whether ingredients degrade over time or if there are any unintended chemical reactions.^[9]
6. **Consumer Acceptance:** Research may include surveys, consumer testing, and focus groups to gauge user acceptance. Understanding consumer preferences and feedback helps refine the formulation and enhance market adoption.^[32]
7. **Aromatherapy and Sensory Experience:** Studies may assess the impact of the formulation's aroma, specifically camphor's scent, on user experience and mood. The sensory aspect of the product is becoming increasingly important.^[33]
8. **Regulatory Compliance:** Compliance with local and international regulations and standards is a key focus. Researchers ensure that the formulation meets safety, labeling, and packaging requirements, reflecting an evolving regulatory landscape.
9. **Microbiological Assessment:** Researchers examine the formulation's effectiveness in controlling and inhibiting the growth of microorganisms. This includes testing against common bacteria, fungi, and other pathogens found in indoor environments.^[34]
10. **Comparative Studies:** To validate its effectiveness, the formulation is often compared with conventional chemical-based floor cleaners. These studies provide valuable data on the formulation's performance in real-world settings.

In summary, modern scientific research into the formulation of a floor cleaner phenyl using neem leaves, crystal salt, camphor, and alum encompasses a wide range of considerations, including efficacy, safety, environmental impact, and sensory experience. This research aims to create effective, eco-friendly, and user-friendly cleaning solutions that align with current consumer preferences and evolving regulatory standards.

- **The historical background of formulating a floor cleaner (phenyl) using neem leaves, crystal salt, camphor, and alum is rooted in the traditional knowledge and practices of various cultures. While there may not be a specific historical record of this exact formulation, each ingredient has a long history of use in cleaning, disinfection, and overall wellness:**
 1. **Neem Leaves:** Neem (*Azadirachta indica*) is native to the Indian subcontinent and has been used in traditional Indian medicine (Ayurveda) for over 2,000 years. It has been recognized for its antibacterial, antifungal, and insect-repelling properties. Neem has been used for various cleaning and purification purposes, including fumigation to disinfect living spaces.
 2. **Crystal Salt:** Salt has a history of being used for preserving and purifying food. Its antimicrobial properties were harnessed to prevent spoilage. Salt has also been used in traditional practices for cleaning and purifying surfaces, particularly in humid environments where moisture can lead to mold and bacterial growth.
 3. **Camphor:** Camphor has been used in traditional practices in countries like India and China for centuries. It was employed as a fumigant to purify living spaces, dispel unpleasant odors, and create a clean and refreshing atmosphere. Camphor's aromatic properties made it a valuable addition to purification rituals.
 4. **Alum:** Alum (potassium aluminum sulfate) has been used historically as an astringent and antiseptic. Its antibacterial properties were utilized in various cultures for disinfecting and purifying water, as well as for personal hygiene and wound care. Alum's use in purification rituals is well-documented in different regions.

The formulation of a floor cleaner that combines these traditional elements represents a contemporary effort to leverage the historical use and knowledge of these natural substances for modern cleaning needs. The emphasis on eco-friendliness and safety aligns with current consumer preferences and the growing awareness of the environmental impact of cleaning products. While there may not be a specific historical precedent for this exact formulation, it draws on the wisdom of traditional practices for maintaining clean and healthful living spaces.

RESULT

Evaluation

- **Physical Evaluation:** –
 - i. **Appearance:** - It was determined visually
 - ii. **PH :-** The PH was determined using digital PH meter & the PH of herbal floor cleaner was found to be 7.35-9.75



Fig.5.PH of herbal floor cleaner.

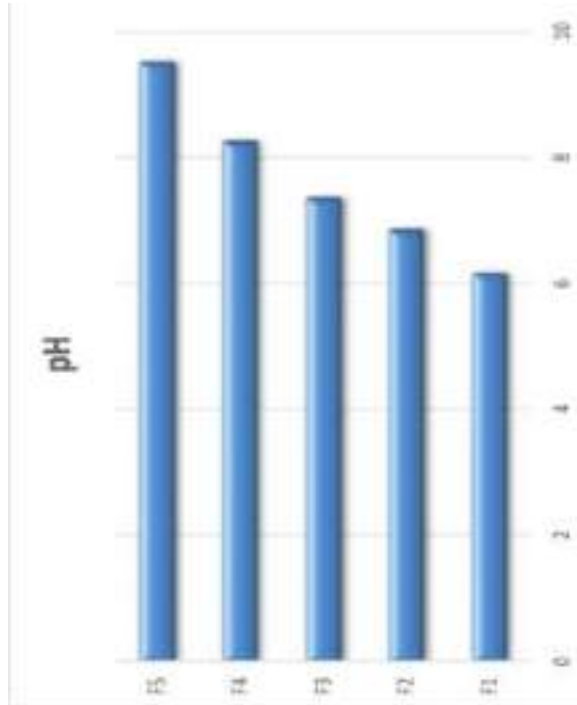


Fig.5.1. PH of herbal floor cleaner

- iii. Colour:- It was determined visually.
- iv. Odour:- It was determined manually.
- v. Stability Studies:- The stability of herbal floor cleaner was carried out by storing measure amount at different temperatures. i.e.25°c , 37°c , 40°c for one month. During stability Studies no change in colour & no phase separation where observed in the formulated floor cleaner.



Fig.6. Stability of herbal floor cleaner.

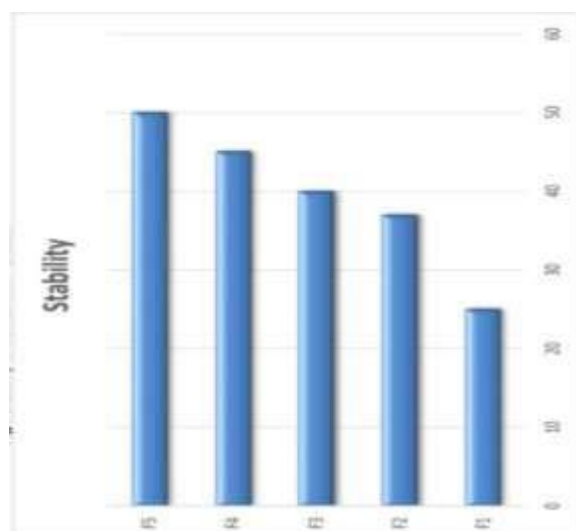


Fig. 6.1. Graph Stability of herbal floor cleaner.

Foam Height

- 1) 10 ml of sample of herbal floor cleaner taken and dispersed in 100 ml distilled Water.
- 2) Then transferred it into 500 ml stoppers measuring cylinder, volume make up to 100 ml with water.
- 3) 25 stroke was given and stand till aqueous volume measured upto 100 ml and measured the foam height



Fig.7. Foam height of herbal cleaner.

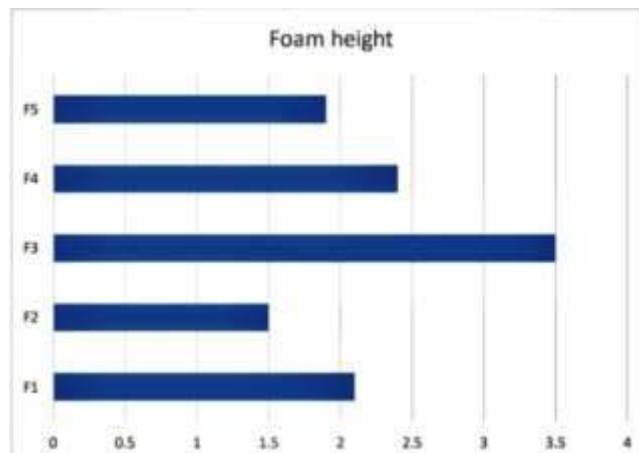


Fig.7.1. Graph of foam height of herbal cleaner.

- The findings demonstrated the significant activity of the floor cleaner made with neem extract, camphor, alum & crystal salt. Bacterial growth in the culture plate was significantly inhibited by the herbal floor cleaner formulation.
-

Table: Physical Evaluation of of Formulation

Sr.No.	Parameters	F1	F2	F3	F4	F5
1	Appearance	Clear	Clear	Clear	Clear	Clear
2	PH	6.1	6.85	7.35	8.25	9.1
3	Stability	Stable	Stable	Stable	Unstable	Stable
4	Foam Stability	Stable	Stable	Unstable	Unstable	Stable
5	Foam Height	2.1	1.5	3.5	2.4	1.9

CONCLUSION

The formulation of a floor cleaner (phenyl) using neem leaves, crystal salt, camphor, and alum represents an innovative approach that combines traditional knowledge and contemporary needs for eco-friendly and effective cleaning products. In conclusion, this formulation offers several key points:

1. **Eco-Friendly Cleaning:** The use of natural ingredients, such as neem leaves, crystal salt, camphor, and alum, aligns with the growing demand for eco-friendly and sustainable cleaning products. It provides an alternative to conventional chemical-based cleaners, reducing the environmental impact.
2. **Natural Disinfection:** Neem leaves, crystal salt, and alum contribute antibacterial and antifungal properties, making the floor cleaner effective for disinfection and sanitation. This aligns with the need for maintaining clean and hygienic living spaces.
3. **Deodorizing and Aromatherapy:** Camphor's aromatic properties offer a pleasant sensory experience, creating a clean and refreshing atmosphere. It caters to the demand for products that enhance the sensory environment.
4. **Safety and Wellness:** The formulation prioritizes safety by avoiding harsh chemicals and toxins. It aligns with the trend toward creating healthier living spaces and minimizing exposure to harmful substances.
5. **Traditional Wisdom:** The formulation draws on traditional knowledge and practices where these natural substances have been used for purification, disinfection, and wellness. It respects the wisdom passed down through generations regarding the use of these natural ingredients.
6. **Research and Innovation:** The formulation is subject to scientific research, aiming to validate its efficacy, safety, and environmental impact. Future trends may involve further research and development to optimize the formulation and address consumer preferences.

In summary, the formulation of a floor cleaner phenyl using neem leaves, crystal salt, camphor, and alum reflects the evolving preferences for eco-friendly, safe, and effective cleaning products. It combines traditional wisdom with modern scientific research to meet the demands of a more sustainable and health-conscious consumer base.

**TABLES AND FIGURES****Table 1 . Formula**

SR.NO.	INGREDIENTS	QUANTITY TAKEN	CATEGORY
1	Neem leaves	10 gm	Disinfectant
2	Crystal Salt Powder	5 gm	Antifungal
3	Camphor Powder	2 gm	Deodorizing effect
4	Alum Powder	3 gm	Astringent
5	Distilled Water	500 ml	Solubilizer

Figure 1. Neem Leaves**Figure 2. Crystal Salt****Figure 3. Camphor****Figure 4. Alum****Acknowledgements**

I am pleased to submit this Project report studied out in Institute of pharmacy, Badnapur.

I would like to thanks all those who helped me to make this Project I specially thanks to our respected Principal **Dr. Swati Rawat** who gave me full support and opportunity to work on this Project.

I also deeply acknowledge my guide **Mr. Gitesh V. Vyas, Ms. Pooja Muley, Ms. Ashwini Bahir** for never ending encouragement, moral support and patience during the preparation of my project.

I express my heart filled gratitude to **Mr. Gitesh V. Vyas Sir** who offered me all possible assistance during my developing period and for the intrest he took in sorting my difficulties and offering me guidance, encouragement and help. Lastly I am also obliging to the teachers and lab Technician & also some of my friends **Vitthal, Yogesh**, and all my Final year classmate who helped me to solve theproblem and giving suggestions for my project and heartly thanks to my parents who gave me moral, finicial support.

Author contributions :Concept – V.G.; Design – A.K., T.S., E.T.; Supervision – P.M.,A.B.; Resources – D.K.; Materials – I.O.P.; Data Collection and/or Processing – ONLINE,BOOKS.; Analysis and/or Interpretation – P.L., Y.P., S.P., T.S.; Literature Search – ONLINE.,BOOKS., PHARMACOEPIA.; Writing – A.H.; Critical Reviews – V.G..

REFERENCES**Reference to a book**

1. *A text book of pharmacognosy* CK Kokate, AP Purohit, SB Gokhale Pune: Nirali Prakashan 8 (66), 1-624, 2003
2. *The text book of Trease, E.C. and Evans, W.C. (2009) Pharmacognosy. 16th Edition, W.B. Saunders, Philadelphia, 365-650.*

Reference to a website

1. *Behavioral Sciences | Free Full-Text | Creative Self-Efficacy ... - MDPI*
<https://www.mdpi.com/2076-328X/13/11/890>
2. *What types of cleaners work best on each surface in a home?*
<https://www.southernliving.com/home/cleaning-and-housekeepin...>



3. Guyanese Peppercorn: Fascinating Facts Unveiled – Remitly Blog
<https://blog.remitly.com/lifestyle-culture/nationaldishes-pe...>
4. Facilitators and barriers to COVID-19 testing in community and ... - PubMed
<https://pubmed.ncbi.nlm.nih.gov/37874783/>
5. Fragrance Diffusers: Enhance Indoor Air Quality With 4 Essential Oils
<https://www.thehealthsite.com/body-mind-soul/fragrance-diffu...>
6. Why are vapour degreasing solvents so good at cleaning?
<https://www.theengineer.co.uk/content/product/why-are-vapour...>
7. I Can Show the Number 5 in Many Ways | Number Recognition | Jack ...
https://www.youtube.com/watch?v=q_DGrdsyirk
8. Ammonium aluminum sulfate dodecahydrate – MilliporeSigma
<https://www.sigmaaldrich.com/US/en/substance/ammoniumaluminu...>
9. Sensors | Free Full-Text | A Review of Optical Fibre Ethanol ... - MDPI
<https://www.mdpi.com/1424-8220/22/3/950>
10. 6 Ways To Wake Up Early Without Feeling Tired – LifeHack
<https://www.lifehack.org/404417/6-ways-to-wake-up-early-with...>
11. Difference between Microsoft OneDrive and Google Drive
<https://www.geeksforgeeks.org/difference-between-microsoft-o...>
12. Libya flood disaster displaced over 43,000 people: IOM | World News ...
<https://www.hindustantimes.com/world-news/libya-flood-disast...>
13. Immunoinformatic-guided designing and evaluating protein and mRNA-based ...
<https://jgeb.springeropen.com/articles/10.1186/s43141-023-00...>
14. Jemal A, Fedewa SA, Ma J, et al. Prostate Cancer Incidence and PSA Testing Patterns in Relation to USPSTF Screening Recommendations. *JAMA* 2015;314:2054-61.
15. Elumalai P, Gunadharini DN, Senthilkumar K, Banudevi S, Arunkumar R, Benson CS, Sharmila G, Arunakaran J. Ethanolic neem (*Azadirachta indica* A. Juss) leaf extract induces apoptosis and inhibits the IGF signaling pathway in breast cancer cell lines. *Biomed Prev Nutr.* 2012;2:59-68.
16. M. Alam, "Bioactivity against phytonematodes," *Neem Research and Development, Society of Pesticide Science, New Delhi, India, 1993.*
17. Matin, M. A., Islam, M. A., & Khatun, M. M. (2017). Prevalence of colibacillosis in chickens in greater Mymensingh district of Bangladesh. *Veterinary World*, 10, 29-33. 10.14202/vetworld.2017.29-33
18. R. K. Swarnkar, S. C. Singh, and R. Gopal, "Effect of aging on copper nanoparticles synthesized by pulsed laser ablation in water: structural and optical characterizations," *Bulletin of Materials Science*, vol. 34, no. 7, pp. 1363-1369, 2011.
19. Kim, H.; Yang, S.; Narayanan, S.; Umans, A. S.; Wang, E. N.; Rao, S. R. Sorption-Based Atmospheric Water Harvesting Device. U.S. Patent 20180171604. June 21, 2018.
20. Parashar G, Sutar N, Sanap S. Antibacterial activity of mixture of leaf extracts of neem (*Azadirachta indica* Linn.) and *Tantani* (*Lantana camara*) *Int J Pharm Sci Res.* 2018;;9(6) ©:2545--2549..
21. B. Mamtha, "An in vitro study of the effect of *Centella asiatica* (Indian pennywort) on enteric pathogens," *Indian Journal of Pharmacology*, vol. 36, no. 1, p. 41, 2004
22. Sharmeen, J. B.; Mahomoodally, F. M.; Zengin, G.; Maggi, F. Essential Oils as Natural Sources of Fragrance Compounds for Cosmetics and Cosmeceuticals. *Molecules* 2021, 26, 666, DOI: 10.3390/molecules26030666
23. Berg G., Mahnert A., Moissl-Eichinger C. Beneficial effects of plant-associated microbes on indoor microbiomes and human health? *Front. Microbiol.* 2014 doi: 10.3389/fmicb.2014.00015.
24. Silva A., Genoves S., Martorell P., Zanini S. F., Rodrigo D., Martinez A. (2015). Sublethal injury and virulence changes in *Listeria monocytogenes* and *Listeria innocua* treated with antimicrobials carvacrol and citral. *Food Microbiol.* 50 5-11. 10.1016/j.fm.2015.02.016
25. Goswami AK, Mahajan RK, Nath R, Sharma SK. How safe is 1% ALUM irrigation in controlling intractable vesicle hemorrhage? *J Urol.* 1993;149(2):264-267.
26. Kunduru, K. R., Basu, A., & Domb, A. J Biodegradable polymers: medical applications. *Encyclopedia of Polymer Science and Technology*, 1-22 (2016).
27. Bc A.-O., Aj N., Salisu I., Hajia Mairo I., E O., E A., et al. (2013). Antimalarial Effect of Neem Leaf and Neem Stem Bark Extracts on *Plasmodium berghei* Infected in the Pathology and Treatment of Malaria. *Int. J. Res. Biochem. Biophysics* 3 (1), 7-14.
28. A.S. Luyt, S.S. Malik Can biodegradable plastics solve plastic solid waste accumulation? *Plast. To Energy, Elsevier* (2019), pp. 403-423
29. Goswami AK, Mahajan RK, Nath R, Sharma SK. How safe is 1% ALUM irrigation in controlling intractable vesicle hemorrhage? *J Urol.* 1993;149(2):264-267.
30. International Council for Harmonisation of technical requirements for registration of pharmaceuticals for human use. ICH harmonised guideline. Guideline for residual solvents. Q3C(R6). Final version adopted October 20, 2016.
31. León LM, Parise M (2008) Managing environmental problems in Cuban karstic aquifers. *Environ Geol* 58: 275-283.
32. Moorman C., Matulich E. A model of consumers' preventive health behaviors: The role of health motivation and health ability. *J. Consum. Res.* 1993;20:208-228. Doi: 10.1086/209344.
33. Breer H. (2003). Sense of Smell: Recognition and Transduction of Olfactory Signals. *Biochem. Soc. Trans.* 31, 113-116. 10.1042/bs0310113
34. Klevens M, Edwards JR, Richards CL, Horan TC, Gaynes RP, Pollock DA, et al. Estimating health care-associated infections and deaths in U.S. hospitals, 2002. *Public Health Rep.* 2007;122(2):160-166. Doi: 10.1177/003335490712200205.



ANALYSIS OF MAIN GOTHIC ELEMENTS IN ENGLISH BILDUNGSROMANS

Safarova Zilola Tolibovna¹, Barotova Latofat Karimovna²

¹Associate Professor, Bukhara State University

²Master Student of the University of Turkiston New Innovations

ANNOTATION

This article delves into the Gothic elements existing in English Bildungsromans, exploring the ways in which these elements contribute to the genre. Through a meticulous literature analysis, the study aims to identify and categorize key Gothic features in novels of formation, highlighting their significance and impact on the overall narrative. The authors of this genre often address to the description of horror and mystery in order to raise the curiosity of the reader and make the literary work more appealing.

KEYWORDS: Gothic elements, novels of formation, Bildungsroman, theme, hero, author, genre.

The Gothic genre has long been associated with dark, mysterious settings, strange atmospheres, and supernatural occurrences. While traditionally applied to works of horror and romance, these elements were first used in Spanish literature. Gothic literature is another branch of fiction which became popular in Europe in the late 1700s, and some sources describe such works as “horror novels”.¹ They are novels describing supernatural forces and horrible events in Western European and American literature of the second half of the 18th century and the beginning of the 19th century.²

In “Jane Eyre”, the first novel of formation about a woman (“Female Bildungsroman”), which has a special place in English literature, the writer Charlotte Bronte skillfully used the same combination of elements of gothic style. An example of an English Bildungsromans with Gothic elements is Charlotte Brontë’s “Jane Eyre,” where the setting of the Lowood School and the mysterious atmosphere surrounding Thornfield Hall incorporates many Gothic elements into the narrative.

In the novel, the Gothic feature is manifested, first of all, in the example of the “red room”: ... *hung with curtains of deep red damask, stood out like a tabernacle in the centre; the two large windows, with their blinds always drawn down, were half shrouded in festoons and falls of similar drapery; the carpet was red; the table at the foot of the bed was covered with a crimson cloth.*³

Through the imagination of the girl Jane, this room looks mysterious, prison-like and evokes a feeling of horror. Jane, the heroine of the novel, imprisoned in this room, describes the red room as a room with curtains made of dark red thick fabric.

In the course of the work, it is told that Jane grows up, leaves Lowood School, and starts living in Thornfield as the governess of Mr. Rochester’s adopted daughter, Adela. Here, the author confronts the reader with Bertha Rochester, a “ghost” character found in many Gothic novels - a demented woman locked in an attic. Her unusual noises and wild actions increase the suspense in the novel. From the first day, Jane hears strange noises and laughter coming from one of the empty rooms. From the images given by the author, the reader comes to the conclusion that there must be some ghosts in the house. One evening, just after Jane’s eyes fell asleep, she was awakened by a loud noise. It was a strange, indistinct voice that seemed to be just above her. Jane describes the event as follows:

*“I rose and sat up in bed, listening. The sound was hushed. I tried again to sleep; but my heart beat anxiously: my inward tranquillity was broken. The clock, far down in the hall, struck two. Just then it seemed my chamber-door was touched; as if fingers had swept the panels in groping a way along the dark gallery outside. I said, “Who is there?” Nothing answered. I was chilled with fear.”*⁴

¹ Хотамов Н., Саримсоқов Б. Адабиётшунослик терминларининг русча-ўзбекча изоҳли луғати. – Тошкент: Ўқитувчи, 1979. – Б. 264.

² O’rayeva D., Quvvatova D. Jahon adabiyoti atamalarining izohli lug’ati. – Toshkent: Turon zamin ziyo, 2015. – B. 161.

³ Charlotte Bronte. Jane Eyre. – Smith, Elder and Co., Cornhill, Third Edition, 1857. – P. 14.

⁴ Charlotte Bronte. Jane Eyre. Smith, Elder and Co., Cornhill. – Third Edition, 1857. – P. 174.



From his first works, an English writer Ch. Dickens also included in his novels an artistic image characteristic of Gothic novels. He used the rich thematic and metaphorical techniques of these traditions to engage his readers. At the same time, the author manages to reflect the “dark scenes of British society” by creating a scary and mysterious atmosphere.⁵ His novel “Great Expectations” is a clear proof of our words. Researcher John Bowen calls this work a “Gothic novel” in his article “The Gothic in Great Expectations Portraits”.⁶ The reason for this is that the work is enriched with many supernatural, abstract and mysterious images. The terrifying and mysterious atmosphere that Ch. Dickens gave at the beginning of the novel dominates until the end of the work. The image of the village in the swamp, the foggy day, the arrival of young Pip near the church, the graves of his parents and five brothers, the image of a rude and scary man who appears in front of the church terrifies the reader. The hero of the work, the boy Pip, was afraid thinking that a man came out of the grave, and the reader will experience the same feeling.

Gothic elements in novels of formation can add a layer of mystery, suspense, and often a sense of the supernatural to the narrative. While Gothic literature is typically associated with romance and horror, it has been integrated into various genres, including Bildungsromans. Here are some main Gothic elements you might find in those novels:

Atmosphere and Setting:

- Mysterious Settings: Gothic novels often feature mysterious and isolated settings, such as old, imposing schools, castles, or large, eerie campuses.
- Weather: Stormy weather, mist, and darkness contribute to the eerie atmosphere commonly found in Gothic literature.

Architecture

- Decaying Buildings: Dilapidated, decaying, or haunted buildings are common in Gothic literature. In educational novels, this might be an old school building with a dark past.

Supernatural Elements

- Ghosts and Apparitions: The presence of ghosts, spirits, or apparitions can heighten the supernatural atmosphere, perhaps linked to a tragic event in the school’s history.
- Curses and Prophecies: A curse or prophecy can add an element of inevitability and foreboding to the story.

Mystery and Suspense

- Secrets and Hidden Passages: Characters may uncover secrets and hidden passages within the school, revealing a darker side to the institution.
- Unknown Identities: Characters with mysterious backgrounds or hidden identities can contribute to the overall sense of mystery.

Romantic Elements

- Forbidden Love: The theme of forbidden or taboo love can add a romantic Gothic element to the plot.
- Tragic Romance: Tragic love stories, often involving lost loves or unfulfilled desires, are common in Gothic literature.

Character Types

- Byronic Hero or Antihero: A brooding, mysterious, and morally ambiguous protagonist may be present.
- Villains: The presence of a menacing antagonist or a villainous force can create tension and conflict.

Symbolism

- Symbolic Objects: Objects with symbolic significance, such as a key or a specific artifact, may play a role in the plot.
- Dark Imagery: Gothic literature often uses dark and symbolic imagery to evoke a sense of foreboding and mystery.

Emotional Intensity

- Intense Emotions: Characters experiencing extreme emotions like fear, passion, and despair contribute to the overall Gothic atmosphere.

The discussion delves into the implications of these findings, exploring the symbiotic relationship between the Gothic and educational elements. The incorporation of Gothic elements in educational novels serves not only to captivate readers but also to emphasize the emotional and psychological aspects of the learning experience. This section also considers the potential impact on

⁵ Robert Mighall. “Gothic Criticism”. *A New Companion to the Gothic* (2000). – P. 265-287.

⁶ Zakir Ullah, Ahmad Ullah, Haroon Iqbal, Zohaib Zahir, Akbar Zaman. *Great Expectations: A Manifestation of Gothicism and Romanticism. International Journal of Trend in Scientific Research and Development (IJTSRD) Volume 4 Issue 5, August, 2020 Available Online: www.ijtsrd.com e-ISSN: 2456 – 6470*



readers and educational discourse, discussing how Gothic elements contribute to a more engaging and thought-provoking narrative.

CONCLUSION

In conclusion, this study illuminates the dynamic interplay between Gothic elements and the genre of Bildungsromans. The infusion of Gothic themes adds depth and complexity to the portrayal of educational settings and characters. Moving forward, scholars and educators can use these insights to explore innovative ways of incorporating Gothic elements into educational literature, fostering a more engaging and enriching learning experience for readers.

Future research could delve deeper into the reception of Gothic-infused educational novels among readers, exploring the psychological and pedagogical implications. Additionally, comparative studies across different cultural and historical contexts could shed light on the universality of Gothic elements in educational narratives.

REFERENCES

1. "Children's Choices for 2003." *The Reading Teacher*, Vol. 57, No. 2. (Oct., 2003), 163-178. JSTOR. PDF file.
2. Safarova, Z. (2023). TARBIYA ROMANLARINING BADIY ADABIYOTDAGI GENEZISI VA O'RNI. ЦЕНТР НАУЧНЫХ ПУБЛИКАЦИЙ (buxdu.uz), 40(40).
3. Hughes, Henry J. "Familiarity of the Strange: Japans Gothic Tradition." *Criticism*. 42: 1. 2013
4. Safarova, Z. (2023). EDUCATION IN SHARLOTTE BRONTE'S "JEYN EYRE". ЦЕНТР НАУЧНЫХ ПУБЛИКАЦИЙ (buxdu.uz), 32(32).
5. Holland, Norman N. and Leona F. Sherman. "Gothic Possibilities." *New Literary History*, Vol. 8: 2 (Winter, 1977). JSTOR. PDF file.
6. Tolibovna, S. Z. (2023). "Longing" as a main theme in english and Uzbek bildungsromans. *Asian Journal Of Multidimensional Research*, 12(8), 11-15.
7. Safarova, Z. (2022). A realistic artistic depiction of the lives of orphans in Dickens's novel *Oliver Twist*. ЦЕНТР НАУЧНЫХ ПУБЛИКАЦИЙ (buxdu.uz), 13(13).
8. Karst, Kenneth L. "Law, Cultural Conflict, and the Socialization of Children." *California Law Review*: 4 (Jul., 2003). JSTOR. PDF file.
9. Safarova, Z. (2020). Analysis of orphan images and orphanhood in children's literature. ЦЕНТР НАУЧНЫХ ПУБЛИКАЦИЙ (buxdu.uz), 1(1).
10. Tolibovna, S. Z. (2022). Analysis of abandoned and orphan heroes in JK Rowling's "garry potter". *ACADEMICIA: An International Multidisciplinary Research Journal*, 12(5), 401-405.
11. Klapcsik, Sándor. "Neil Gaiman's Irony, Liminal Fantasies, and Fairy Tale Adaptations." *Hungarian Journal of English and American Studies (HJEAS)*, Vol. 14: 2 (Fall, 2008). 317-334. JSTOR. PDF file.



ARAB-MUSLIM CULTURE IN THE PERIOD OF EARLY ISLAM: PROMOTION AND APROBATION

Mirdjalalova Ezozakhon Ramazon qizi

Doctoral student, International Islamic, Academy of Uzbekistan.

A.Navoiy str. 11, 100011, Tashkent city, Uzbekistan.

ABSTRACT

The article is devoted to the consideration of the fundamental factors that contributed to the further spread of Arab-Muslim culture, which to some extent helped the Arabs to popularize the conditionally "new" dogma and thereby realize the Arab-Muslim culture as a civilizational aspect of world history in the period of early Islam. The scientific work shows the legitimization of the Arab-Muslim culture on the example of the initial Arab-Muslim pact between the Prophet Muhammad and the administrative aristocracy of Mecca, which turned out to be the starting point for the further emission of the young culture of the Arabian Peninsula. The legitimization of Arab-Muslim relations and the spread of Arabic literary language throughout the territory of the Caliphate had a favorable effect on the development of medieval Arab-Muslim science, helped the communication of scholars and the establishment of ties between the centers of science of the empire. Linguistic unity facilitated the development of the Greek-Iranian cultural heritage by the inhabitants of the empire, which, thanks to the works of Arab translators, became the property of educated Muslims, regardless of their ethnicity or religious beliefs. Immediately after the first legal assertion as an instrument of cultural creativity, Arabic literary language contributed to the convergence of groups of the population that were distant in ethnic and linguistic terms, which ultimately led to the creation of an Arab-Muslim cultural region.

KEYWORDS: *Islam, legitimacy, treaty of Hudaibiyyah, Arab-Muslim culture, culture popularization, prophet Mohammad, linguistic unity.*

INTRODUCTION

Commencing from the middle of the VII century, gradually, at a moderate pace, a huge state was created - the Arab caliphate. Under its rule were the territories from the Atlantic Ocean to the borders of China: North Africa, Spain (Andalusia), Sicily, Armenia, Azerbaijan, Iran, Afghanistan, Central Asia, a part of India, etc. The peninsulas, having collided with ancient civilizations, not only did not assimilate, but, on the contrary, they were able to impose their religion – Islam – on neighbors, besides, their language and, to some extent, their mentality and culture. It is well known that this process later led to the Eastern Renaissance.

So, next, we will consider the fundamental factors that contributed to the further spread of the Arab-Muslim culture, which to some extent helped the Arabs to popularize the conditionally "new" dogma and thereby realize the Arab-Muslim culture as a civilizational aspect of world history during the period of early Islam.

BODY PART

What brought the Muslim peoples to the forefront of history? What turned them into an active phenomenon shaping a new Arab-Muslim civilization, one of the richest in the world? The adoption of a new system of spiritual values - Islam was a strong incentive for active historical activity. Islam as a system of spiritual values was born in the Middle East from the same root as Judaism and Christianity. Prophet Muhammad (s.a.v.), the founder of Islam and the first Muslim community, was well acquainted with both religions. Thanks to this connection in Islam, in contrast to the old Eastern religions such as Hinduism and Buddhism - the idea of development is quite vividly expressed. Islam means "surrender to God", "obedience" [8; 103]. The road, to obedience, or, the path is movement, development. For Islam, the concept of a linear, progressive time is characteristic. In the process of our life, we tend to perceive and experience the instantaneous and local flow of time in linear, uniform, Newtonian time. This time is objectively measured in hours or years [9]. The idea of development was enriched during the formation of the Arab-Muslim civilization (VII-XII centuries). The Christian tradition was actively absorbed. But especially much has passed into the culture of the Muslim East from the ancient Greek rationalist culture (Hellenism). Due to this, the Arab world has jumped ahead. A distinctive feature of the new society was that it brought the pagan societies of Arabia, and then the peoples of the world, the highest culture, enlightenment, and progress based on faith in one God. This is precisely the success of the mission of Muhammad (s.a.v.) and the early Muslims [2; 3].



We also need to take into account the words of Academician V.V. Barthold: "The East in the Muslim era continued the cultural work, interrupted in the Greco-Roman world, and for several centuries occupied the first place in cultural terms" [3; 3]. This culture is the so-called Arab-Muslim culture, the beginning of which is the emergence and spread of the Muslim religion. It should be emphasized that foreign and Uzbek orientologists worked a lot in the study of medieval Arab-Muslim culture. But they studied mainly those components of this culture in which they were specialists: Islam and its sources, Muslim law, Sufism, history, mathematics, astronomy, medicine, philological and philosophical sciences, art, etc. But it would not be a mistake to say that there are no general works on all of the main components of this culture at the moment. The most valuable in this regard is the work of I.M. Filshinsky, B.Ya. Shidfar, and Grunebaum G.E., but in the works of the scientists, there is no problem in revealing the legitimate beginning of the Arab-Muslim cultural expansion on a par with the issue of linguistic unity in the Caliphate.

In this regard, two fundamental factors should be noted, which became the fundamental basis for the further popularization and integration of the Arab-Muslim culture during the period of early Islam. The first factor is to highlight the factor of legitimization of Arab-Muslim relations, the second - linguistic integration and its role in the development of Arab-Muslim science and culture. After all, Islam for a long time remained a primitive religion, and only in the XI century, the development of its dogma was completed. Then it played a cultural and creative role, acting as an ideological basis, integrating all the components of Muslim culture [1:15].

The description of many phenomena of the international system can be accompanied by the adjective "legitimate": in the scientific and socio-political literature, there are both "legitimate order", and "legitimate norm", and "legitimate body", and "legitimate actions". At the same time, the problem of legitimacy in the science of international law is a complex issue with a long history of clashes between adherents of various theories [10:52].

It should be noted that attempts to consider the phenomenon of legitimacy were undertaken in the light of general theories of power, primarily the research of sociologist and lawyer Max Weber, who defined legitimacy as a social fact: the phenomenon according to which people are ready to accept power (domination) on normative grounds, regardless of based on what beliefs this acceptance takes place. That is, legitimacy describes a situation in which "the social order has the prestige of being considered binding" [20:1469]. M. Weber identifies three bases of legitimacy [4: 808]: 1) the authority of "eternally yesterday": the authority of morals, consecrated by the primordial significance and the usual orientation towards their observance, - "traditional" domination; 2) the authority of an unusual personal gift (Gnadengabe) (charisma), complete personal devotion and personal trust caused by the presence of the qualities of a leader in a person: revelations, heroism and others - charismatic domination; 3) domination by virtue of "legality", by virtue of the belief in the obligation of legal establishment (Satzung) and business "competence", justified by rationally created rules, that is, an orientation towards submission while fulfilling the established rules - domination in the form in which it is carried out by modern "state employee". Thus, the legitimacy in this group of theories reflects the attitude of individuals and groups of individuals to power, which can be seen on the example of the treaty of al-Khudaibiyah (الحديبية).

The initial spread of the Arab-Muslim culture in a politically consolidated form becomes Asia, the Arabian Peninsula, where Islam was born. Prophet Muhammad, who consolidated his power politically, militarily, and economically, conjoining with the Medinians, went to Umra (628) with a caravan of 1,400 people. The aristocracy of the city of Mecca forced him to draw up the agreement of al-Khudaibiyah (الحديبية). Several clauses of the treaty have raised discontent among Muslims. However, this satisfied the Prophet Muhammad, since even if the upper strata of society did not accept him as a messenger, they looked at him as the equal leader of the independent Madina Ummah, with whom they were negotiating. And in turn, it proves a great political victory in favor of the prophet. After the agreement of al-Khudaibiyya in the Arabian Peninsula, Medina's troops, even more, began to conquer neighboring tribes. The prophet Muhammad directed the main force to the north - to Syria. As a result, such territories as Khaybar (خيبر) and Fadak (فدك) submitted to the dominion of Medina. Prophet Muhammad, being the real head of government, began to build diplomatic relations with the border leaders of states. For the purpose of the alliance, he corresponded with the emperor of Byzantium Heraclius (610-641), the Shahanshah of Iran, Khisraw II Parvez (590-628), Najoshi (died 660) - the negus of Ethiopia, the ruler of Egypt Mukavkis (639-642), the Shah of Bahrain Munzir ibn Saviy, as well as the emir of Yamama Amiri Hamze ibn 'Ali [7:28].

According to Arab sources, ambassadors and letters with them were received in different ways. For example, Emir Bahrain, responding to the call of Muhammad, converted to Islam. Many received the ambassadors kindly but did not confess in Islam. The Shahanshah of Iran Khosrav II was angry when he received Muhammad's letter, tore it up, sent his representative to Bazan, the governor of Yemen, a vassal of Iran, demanding to bring this man who appeared in the Hejaz. But this governor, as soon as he got in touch with Muhammad, converted to Islam and Muhammad appointed him to the post as his governor. All the ambassadors of Muhammad returned safe and sound except one: the ruler of Busra, Shurahbil bin Amr al-Juzami, the governor of Byzantium in al-Balka, acting in a hostile manner, killed the ambassador. Many Western scholars are skeptical about the reliability of the reports of medieval Arab historians, but they recognize at least one case of undoubted serious contact of Muhammad with the ruler of the country outside of Arabia - with Mukavkis, the governor of Egypt, who at the beginning of VII A.D. sent gifts to Muhammad: two



slave sisters, a mule, and clothes made of Coptic fabrics. One of the slaves, Mary, Muhammad took as his concubine, and the other presented to the poet Hassan bin Thabit. Various circumstances associated with these individuals leave no doubt about the reality of this gift. Ibn Ishaq carefully defines the period of sending these messages as the time between Khudaybiya and the death of Muhammad, that is, 628-632 years. With this approach, doubts disappear, so to speak "from purely logical considerations", it is unlikely that Muhammad felt entitled to address Irakli or Khosrav II with a letter in an almost orderly tone [14:222]. In this moment of early Islam must be considered that the first agreement in the history of the religion was concluded. And this agreement contributed to the further official dissemination of not only the religion itself but also the syncretic Arab-Muslim culture. Since if you delve into the meaning and text of this document, you can see the following: Muhammad with his companions had to stay in Mecca for three days, have (only) the traveler's weapon with him: a sword in a sheath, with nothing else to enter it, and if someone wants to enter into an alliance with Muhammad and (conclude with them) an agreement will enter into it, the enmity between the Quraysh will cease, and there will be no robberies or intrigues [14:214-215] ... After the conclusion of the agreement, the iron curtain fell, existed between the communities, and contacts between Muslims and pagans began to be established. In 2 years after the Khudaybiya agreement, more people accepted Islam than in the entire period since 610 [13:74]. The creation for Muhammad of a legitimate and calm environment for Umrah had very little effect on the spread of Muslim culture among the Arabs. The reason for this is the not fully formed view of the Arabs about Islam and Muslim culture in general. Although the evidence is scarce, three more religious traditions that came to the region from neighboring territories were joined to a number of the oldest local Arab religions: Judaism, Christianity, and Zoroastrianism. From the middle of the VIII century, Islam became the dominant religion and, of course, the institutions, customs, and beliefs of the older religions were supplanted or absorbed by the Islamic ones. Local Arab religions were partially focused on temple worship, which was located in cities including Mecca and the sides of the Kaaba surrounded by 360 idols to worship [19:52]. This phenomenon naturally slowed down the process of intercourse of the Arab-Muslim culture in the region. Al-Khudaybiya's legal document was a legally focused step in building the foundation for the further spread and prosperity of syncretic Arab-Muslim culture. Step by step, Islam spreads to territories more distant from Mecca, and from the middle of the VII century the Abbasid dynasty, with the capital of Baghdad, ruled the caliphate. As soon as under the first Abbasid caliphs, separate regions fell away from the caliphate, one after another. The rulers declare themselves independent from the central government, and by the end of the X century. The caliphate disintegrated into several Muslim states, which either shrink, or expand, or merge, forming fragile political associations that usually ceased to exist with the death of their founder. However, all the territories that were part of the caliphate (except for Spain, which was finally conquered by Christians in the XV century) continued to remain Muslim.

The rise of culture in the territory of the caliphate has been noted approximately since the second half of the VIII century, and the process of political fragmentation that began in the X century does not generally violate the unity of the cultural life of the region. Since, based on the second factor, which was mentioned above, there was a coherent mediation in their unity, in the role of which the Arabic language served. The unification of vast territories within one state stimulated the development of trade between its regions and countries, and the advantageous position of the Baghdad Caliphate on international trade routes, along which goods from China and India went to Africa and Europe, determined its dominant role in international transit trade ... Despite the well-known corporate disunity of the urban population of the Caliphate, the various groups constantly came into contact with each other. They were united by their religion (many Persians, Syrians, Egyptians, Spaniards were Muslims), as well as their profession: merchants and artisans of different nationalities and religions often traded in the same market, Muslim merchants, Christians, Jews often sailed on the same ship, and served in government institutions. quite a few Christians, among the intelligentsia, especially doctors, the predominant role was played by the Syrians-pagans, Christians, and Persians-Zoroastrians [12:82]. Newly converted Muslims played an important role in the development of a systematic grammar of the Arabic language, guided mainly by the writings of Aristotle, as well as using the achievements of Indian philologists. The creation of the two largest works of Arabic-speaking philologists, the Arab al-Khalil (d. C. 790) and the Persian Sibawayh (d. C. 793), who created the first systematic exposition of Arabic grammar, dates back to the VIII century. One of magnificent reasons for the widespread of the Arabic language was the lack of linguistic unity in many countries that became part of the Caliphate - Iran was not a linguistically uniform territory, and the dialects of the east of Iran were quite different from the northern dialects, moreover, for many reasons, the state language of Sassanian Iran was Aramaic is the language of the Semitic group, close to Arabic. Other languages were also unwritten or lacked literary support (Berber in North Africa or Gothic in Spain). The literary Arabic language was "denationalized" and began to be perceived as an instrument of higher culture. The predominance of the Arabic language in the countries of the Caliphate took on such proportions that the ardent opponents of the Arabs and the entire Arab, the so-called Shuubites, who played a small role in Iran (VII-IX centuries), and later, in the XI century, appeared in Andalusia, was used for anti-Arab propaganda in Arabic [12: 90-93].

CONCLUSION

The legitimization of Arab-Muslim relations and the spread of the Arabic literary language throughout the territory of the Caliphate favorably affected the development of medieval Arab-Muslim science, helped the communication of scientists, and the establishment of ties between the scientific centers of the empire. Linguistic unity facilitated the development of the Greek-Iranian cultural heritage by the inhabitants of the empire, which, thanks to the works of Arab translators, became the property of educated



Muslims, regardless of their ethnicity. Immediately after the first legal approval as a tool of cultural creativity, the Arabic literary language contributed to the rapprochement of ethnically and linguistically distant groups of the population, which ultimately led to the creation of an Arab-Muslim cultural region.

REFERENCES

1. Абдуллаев М.А. Средневековая арабо-мусульманская культура и ее влияние на Дагестан. – Махачкала: Изд. дом «Эпоха», 2005. -316 с.
2. Али-заде Айдын Ариф оглы. Хроники мусульманских государств I–VII веков хиджры / А. Али/заде. Изд. 2-е, испр. и доп. – М., УММА, 2004. -445 с.
3. Бартольд В.В. Ислам и культура мусульманства. М.1992. -221 с.
4. Вебер.М. Избранные произведения / М. Вебер: пер. с нем.; сост., общ. ред. и послесл. Ю. Н. Давыдова; предисл. П. П. Гайденко; коммент. А. Ф. Филиппова. - М.: Прогресс, 1990. -.808 с.
5. Грюнебаум Г.Э. фон. Основные черты арабо-мусульманской культуры. - М., 1981. -227 с.
6. Грюнебаум Г.Э. фон. Классический ислам. Очерк истории (600-1258) / Пер. с англ. И. М. Дижуря. Предисл. В.В. Наумкина. – М.: Наука, 1988. -. 216
7. Захидов К.Т. Илк ислом давлатчилиги ва унинг шаклланиш жараёналари (632-661 йиллар): Тарих фанлари номзоди илмий даражасини олиш учун ёзилган диссертация. Ўзбекистон Республикаси олий ва ўрта махсус таълим вазирлиги Тошкент давлат шарқишунослик институти. Тошкент 2004. -175 б.
8. Ислам: Энциклопедический словарь. – М. ; Наука . И87 Главная редакция восточной литературы , 1991. - 340 с.
9. Капица С.П. К понятию времени в истории // Синергетика и эволюционизм [Электронный ресурс]. Режим доступа: <http://spkurdyumov.ru/evolutionism/k-ponyatiyu-vremeni-v-istorii/>
10. Кузнецова Е.В. Концепция легитимности в международном публичном праве. // 2011 г. -144 с.
11. Микульский Д.В. Арабо - мусульманская культура в сочинении ал - Мас'уди «Золотые копи и россыпи самоцветов» («Мурад аз - захаб ва ма'адин ал - джаухар»): X век. – Изд-во «Восточная литература», 2006. -207 с.
12. Фильштинский И.М., Шидфар Б.Я. Очерк арабо-мусульманской культуры (VII-XII века). – М; Издательство “Наука”. 1971. - 256 с.
13. Ханмагомедов Я.М. Религиозная реформа пророка Мухаммада и формирование исламского хаджа. // УДК 297:217. 2011 г. -81 с.
14. Хасанов А.А. Лекции по истории раннего ислама. Ташкент: Ташкентский исламский университет. - 2013г. - 326 с.
15. Anvar G.Ch. Arabic: Its Significance And Place In Arab-Muslim Society// Middle East Journal, Vol. 19, No. 4, Published by: Middle East Institute (Autumn, 1965) .-470 p.
16. Grunebaum G. E. Islam: Essays in the Nature and Growth of a Cultural Tradition. Kessinger Publishing, LLC (July 25, 2006). - 278 p.
17. Islam Issa Milton in the Arab-Muslim World. New York, Routledge; 1 edition (October 31, 2016) -264 p.
18. John I. E. What Everyone Needs to Know About Islam. Oxford university press, 2002. -258 p.
19. Juan E. C. Encyclopedia of Islam . Facts On File, Inc. New York. An imprint of Infobase Publishing..2009. -801 p.
20. Weber. M. Economy and Society / M. Weber, G. Roth and C. Wittich [et. al.]: Vol. 2. -Berkeley: University of California Press, 1978. -1469 p.



A REVIEW ARTICLE ON NOVEL DRUG DELIVERY BIGEL

**Prajapati Hardik Narendra¹, Dr. Kantilal Narkhede², Dr. Anuradha P. Prajapati³,
Dr. Sachin B. Narkhede⁴, Dr. Shailesh Luhar⁵, Ms. Vidhi Patel⁶, Ms. Urmi Prajapati⁷**

Article DOI: <https://doi.org/10.36713/epra15258>

DOI No: 10.36713/epra15258

ABSTRACT

Gel are semisolid systems made up of a gelling agent and a polar liquid solvent. Gels are used in the food, pharmaceutical, and cosmetics industries. They are classified based on their structural and rheological properties. Scientists are looking for new ways to create gels with better properties. Many bigel formulations have been created and altered recently to satisfy the demands of various applications. Bigels' ability to deliver both hydrophilic and lipophilic active agents, their water washability after application to the skin, their easy preparation, good stability, and the enrichment of stratum corneum's hydration, which results in a cooling and moisturizing effect, are some of their key characteristics that make them useful for controlled drug delivery. Since bigel formulations are a new class of materials, further research into these systems is necessary before they can be used in real-world applications. When synthesizing bigels by combining organogel and hydrogel, several factors are crucial, such as bigel storage.

KEY WORDS: *Gels, Bigels, Hydrophilic, Lipophilic, Controlled Drug Delivery*

INTRODUCTION:^[1]

It is possible to define gels based on two key characteristics: rheological behaviour and structural behaviours. A substance can be classified as a gel from a rheological perspective if it satisfies the following criteria:

- [i] it behaves like a solid
- [ii] on the analytical experiment time scale, its structure is permanent with macroscopic dimensions
- [iii] it has a plateau region of storage modulus with low $\tan\delta$ at an angular frequency ranging from 10-3 to 102 rad/s
- [iv] it does not flow.

From a structural standpoint, gel is a system made up of molecules, particles, and chains that are partially connected to one another in a liquid medium by chemical or physical bonds; this network is what causes the system to lose its fluidity.

Gels are semisolid systems that are typically made up of two parts: a solid part that serves as a gelling agent and a liquid part that can be either polar or a polar and functions as a solvent. To produce semisolid properties, the gelling agent traps the solvent phase by creating a three-dimensional network structure. Gels are remarkable substances that possess both elasticity and rigidity by nature. They find extensive use in the food, pharmaceutical, and cosmetics industries.

Classification of Gels

Gels are classified as polymer gels (formed by crosslinked polymer molecules) and particle gels (containing colloidal particles). They are further categorized as hydrogels (with polar solvents) or organogels. Hydrogels are widely used in pharmaceuticals, while recent studies explore emulgels and bigels for topical drugs.

Organogels

Oleogels, or palatable oil organogels, are solid-like systems with a thermoreversible 3D network formed by organogelators. They efficiently immobilize organic liquids at low concentrations, ideal for enhancing drug permeation and surpassing emulsifier limits in food preparation.

Hydrogels

Hydrogels, jelly-like materials formed by hydrophilic agents, create a three-dimensional network to encapsulate water without dissolving. They are non-greasy, easily removable, offer a cooling effect, enhance skin hydration, and boast a high market value due to increased patient compliance.



Cons of Conventional Gel

Organogels pose challenges with greasiness and stickiness, reducing patient compliance due to difficulty in skin removal. Hydrogels face limitations in delivering lipophilic medications through the stratum corneum, hampering their efficacy.

Newer Approach

Emulgels, created in the last decade, address the hurdle of dispensing hydrophobic drugs. This semisolid system combines gel and emulsion properties, with a structured continuous phase containing a dispersed liquid phase, acting like a soft particle suspension.

Bigels:^[2]

Bigels, a breakthrough in multiphase formulations, address stability issues in emulgels. By structuring both internal and external phases, bigels surpass emulsions. They blend hydrogel and organogel, forming innovative materials for cosmetics and pharmaceuticals with enhanced properties.

Advantages of Bigels

Bigels combine the benefits of aqueous and oily gels, offering controlled delivery of lipophilic and hydrophilic compounds. They hydrate the stratum corneum, spread easily, are water-washable, and provide stable dispersion for 6–12 months, overcoming drawbacks of traditional gels.

Disadvantages

Bigels may also have certain disadvantages, such as the inability to be thermo-reversible due to destabilization at high temperatures.

Classification of Bigel:⁽²²⁾

Depending upon the distribution of both phases (organogel and hydrogel) within bigels, these systems can be classified into three types:

1. Organogel-in-hydrogel type
2. Hydrogel-in-organogel type
3. Bi-continuous/matrix-in-matrix type

Organogel-in-Hydrogel

The organogel-in-hydrogel system comprises a dispersed organogel phase within a continuous hydrogel phase. Various hydrogelators, including gelatin, guar gum, and polyvinyl alcohol, were combined with organogels like olive oil or sorbitan monostearate for bigel formulation in different studies.

Hydrogel in organogel type

It can be defined as the system in which hydrogel phase is distributed within the continuous phase.

Second type of bigel (hydrogel-in-organogel) is the system in which hydrogel phase is distributed within the continuous matrix of organogel. Patel et al (4). described the investigation of bigels prepared by mixing locust bean gum-carrageenan based hydrogel and sunflower oil fumed silica based organogel at several organogel-hydrogel ratios. Hydrogel-in-organogel type morphology of bigels was confirmed by the results of confocal microscopy.

Bi-continuous/ matrix in matrix type

It can be regarded as a system with complex structure in which it is difficult to identify the dispersed and continuous phase.

Third type of bigel can be regarded as a system with complex structure in which it is difficult to identify the dispersed and continuous phase. Lupi et al. (3) reported bigels made by mixing a cosmetic system (O/W) with organogels having monoglycerides of fatty acids as organogelator and olive oil as a solvent, with increasing fraction of organogel. At the maximum fraction of organogel, results revealed the presence of a complex matrix-in-matrix structure.

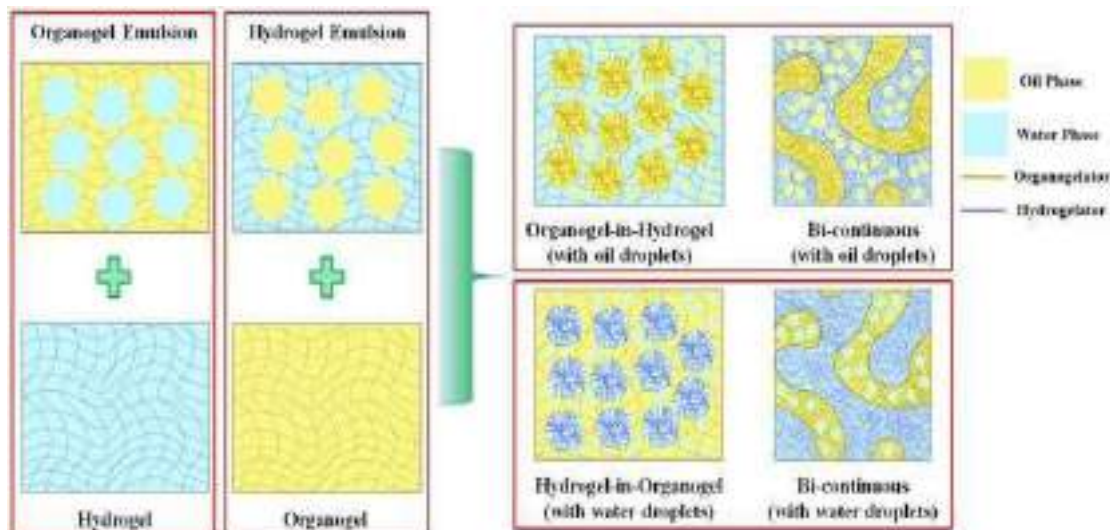


Fig 1: Types of Bigels

Method Of Preparation:⁽⁵⁾

The aqueous phase and the oleaginous phase are prepared separately by mixing the components at a defined speed and temperature.

Preparation of aqueous phase (Hydrogel)

Hydrogels, elastic structures with hydrophilic polymeric networks, are formed by cross-linking synthetic or natural polymers through techniques like copolymerization or radiation. Various polymerization methods create gels with monomers, initiators, and cross-linkers, while diluents control properties. Washing removes impurities post-preparation.

Preparation of Oleogel:

Oleogel, an organogel phase, is formed by self-assembly of organogelators (fatty acids, alcohols, lecithin, waxes, cyclodextrins, steroids) in a specified oil phase through homogenization at elevated temperature, solidifying at 25°C.

Preparation of Bigel

Bigel, a stable blend of hydrogel and oleogel, is prepared at high shear rates, maintaining the individual characteristics of each component. A homogenous gel forms at specific shear speed and temperature, crucially dependent on phase composition. Temperature during mixing is vital; some opt for room temperature, while others prefer higher temperatures (e.g., 50°C) for liquid phases. Thermal stability of hydrogelators is essential for the latter method. Storing individual gels before or after mixing impacts final bigel characteristics. Some create bigel systems by mixing stored gels, while others store the final bigel post-mixing. The latter method may yield a more stable system, while storing individual gels prior to mixing ensures complete gelling.

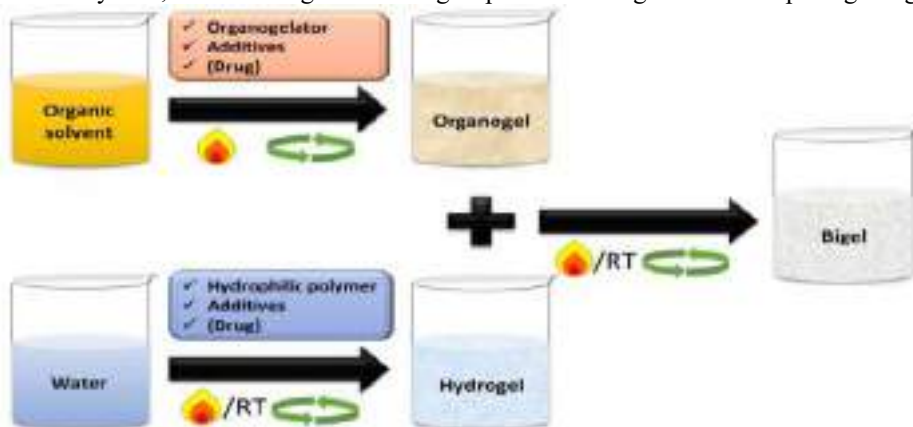


Fig 2: Bigel preparation

Characterization Techniques:⁽⁶⁻⁹⁾

Various techniques can be used to investigate important parameters such as the distribution of organic and aqueous phases within gels, the average droplet size of the dispersed phase, phase inversion, thermal stability, viscoelasticity, flow behaviour, antimicrobial efficiency, and drug release rate.

**Mechanical Characterization**

Bigels' mechanical tests (compression, shearing, tension, bending) rely on linear motion, affected by polysaccharide branching; branched ones yield higher strength. Organogel enhances cohesiveness.

Physical Characterization

Physical characterization in pharmaceutical bigel formulations is crucial. Parameters like viscosity, shear-thinning behavior, and swelling influence drug delivery. Shear thinning enhances skin coverage, promoting transdermal absorption, ensuring efficient spreading, and minimizing gel quantity needed.

Structural Characterization

1. Microscopy
2. Fourier Transform Infrared (FTIR)
3. X-Ray Diffraction (XRD)
4. Thermal Characterization
5. Antimicrobial Testing
6. In vitro release study

Table 1: Different Bigel Systems in the literature are reported for drug delivery applications:

Oil Phase	Organogelator	Hydrogelator	Drug Incorporated
Corn oil	DIMODAN® monoglyceride	K-carrageenan	β-carotene(10)
Sweet almond oil	Span 65	Alginate	Cetavlon® (11)
Sesame oil	Sorbitan monosterate (Span 60)	Guargum	Ciprofloxacin(12)
Soyabean oil	Stearic acid	Mixture of agar and gelatin	Metronidazole (13)
Rice bran oil	Stearyl alcohol	Stearyl alcohol	Ciprofloaxacin HCl (14)
Fish oil	Bees wax	Carbopol	Imiquimod (15)
Almond oil	Sorbitan monosterate (Span 60)	Carbopol	Ketoprofen (16)
Isopropyl palmitate	Mixture of soya lecithin and pluronic	Hydroxy propyl methyl cellulose	Flubiprofen (17)
TegoSoft® CT (Caprylic/capric triglycerides)	Compritol® (Liquid excipient of glycerylbehenate).	Carbopol	Ibuprofen (18)
Rice bran oil	Stearic acid	Tamarind gum	Moxifloxacin (19)
Liquid paraffin	Polyethylene	Poloxamer 407	Ciclopirox olamine and terbinafine HCl (20)
Oleogel	Polyethylene	Carbopol	NSAIDS (21)

Application of Drug Delivery

Topical drug delivery through the skin is non-invasive, requires no specialized personnel, and avoids metabolism risks. Transdermal systems, like bigels, exhibit promising drug release properties, influencing applications from medications to cosmetics and potential use in food, warranting further research.

CONCLUSION

Gels have been studied extensively for topical drug delivery, and new developments in pharmaceutical science and technology have introduced new semisolid systems, like bigels, especially for topical drug delivery, in addition to modifying traditional gels, like hydrogels and organogels. Many bigel formulations have been created and altered recently to satisfy the demands of various applications. Bigels' ability to deliver both hydrophilic and lipophilic active agents, their water washability after application to the skin, their easy preparation, good stability, and the enrichment of stratum corneum's hydration, which results in a cooling and moisturising effect, are some of their key characteristics that make them useful for controlled drug delivery. Since bigel formulations are a new class of materials, further research into these systems is necessary before they can be used in real-world applications.



When synthesising bigels by combining organogel and hydrogel, several factors are crucial, such as bige storage, mixing temperature and the use of emulsion gels in place of hydrogel or organogel.

REFERENCES

1. Shakeel, A., Lupi, F. R., Gabriele, D., Baldino, N., & De Cindio, B. (2018). Bigels: A unique class of materials for drug delivery applications. *Soft Materials*, 16(2), 77-93.
2. Sreekumar, M., Mathan, S., Mathew, S. S., & Dharan, S. S. (2020). Bigels: An updated review. *Journal of Pharmaceutical Sciences and Research*, 12(10), 1306-1308.
3. Lupi, F. R., Shakeel, A., Greco, V., Rossi, C. O., Baldino, N., & Gabriele, D. (2016). A rheological and microstructural characterisation of bigels for cosmetic and pharmaceutical uses. *Materials Science and Engineering: C*, 69, 358-365.
4. Patel, A. R., Mankoč, B., Sintang, M. B., Lesaffer, A., & Dewettinck, K. (2015). Fumed silica-based organogels and 'aqueous-organic' bigels. *Rsc Advances*, 5(13), 9703-9708.
5. RAJESWARI, S., PULLABHATLA, R., & SATYAVATHI, C. Y. (2021). Bi-Gels: a Novel Material for Transdermal Drug Delivery. *Innovare J Sci*, 9, 1-5.
6. Rehman, K., & Zulfakar, M. H. (2017). Novel fish oil-based bigel system for controlled drug delivery and its influence on immunomodulatory activity of imiquimod against skin cancer. *Pharmaceutical research*, 34, 36-48.
7. Ibrahim, M. M., Hafez, S. A., & Mahdy, M. M. (2013). Organogels, hydrogels and bigels as transdermal delivery systems for diltiazem hydrochloride. *asian journal of pharmaceutical sciences*, 8(1), 48-57.
8. Sahoo, S., Singh, V. K., Uvanesh, K., Biswal, D., Anis, A., Rana, U. A., Al-Zahrani, S. M., & Pal, K. (2015). Development of ionic and non-ionic natural gum-based bigels: Prospects for drug delivery application. *Journal of Applied Polymer Science*, 132(38).
9. Yu, G., Yan, X., Han, C., & Huang, F. (2013). Characterization of supramolecular gels. *Chemical Society Reviews*, 42(16), 6697-722.
10. Zheng, H., Mao, L., Cui, M., Liu, J., & Gao, Y. (2020). Development of food-grade bigels based on κ -carrageenan hydrogel and monoglyceride oleogels as carriers for β -carotene: Roles of oleogel fraction. *Food Hydrocolloids*, 105, 105855.
11. Khelifi, I., Saada, M., Hayouni, E. A., Tourette, A., Bouajila, J., & Ksouri, R. (2020). Development and characterization of novel bigel-based 1, 4-naphthoquinones for topical application with antioxidant potential. *Arabian Journal for Science and Engineering*, 45(1), 53-61.
12. Satapathy, S., Singh, V. K., Sagiri, S. S., Agarwal, T., Banerjee, I., Bhattacharya, M. K., Kumar, N., & Pal, K. (2015). Development and characterization of gelatin-based hydrogels, emulsion hydrogels, and bigels: A comparative study. *Journal of Applied Polymer Science*, 132(8).
13. Singh, V. K., Anis, A., Banerjee, I., Pramanik, K., Bhattacharya, M. K., & Pal, K. (2014). Preparation and characterization of novel carbopol based bigels for topical delivery of metronidazole for the treatment of bacterial vaginosis. *Materials Science and Engineering: C*, 44, 151-8.
14. Kodela, S. P., Pandey, P. M., Nayak, S. K., Uvanesh, K., Anis, A., & Pal, K. (2017). Novel agar-stearyl alcohol oleogel-based bigels as structured delivery vehicles. *International Journal of Polymeric Materials and Polymeric Biomaterials*, 66(13), 669-78.
15. Rehman, K., & Zulfakar, M. H. (2017). Novel fish oil-based bigel system for controlled drug delivery and its influence on immunomodulatory activity of imiquimod against skin cancer. *Pharmaceutical research*, 34, 36-48.
16. Andonova, V., Peneva, P., Georgiev, G. S., Toncheva, V. T., Apostolova, E., Peychev, Z., Dimitrova, S., Katsarova, M., Petrova, N., & Kassarova, M. (2017). Ketoprofen-loaded polymer carriers in bigel formulation: an approach to enhancing drug photostability in topical application forms. *International Journal of Nanomedicine*, 12, 6221-38.
17. Fang, J. Y., Hwang, T. L., Fang, C. L., & Chiu, H. C. (2003). In vitro and in vivo evaluations of the efficacy and safety of skin permeation enhancers using flurbiprofen as a model drug. *International journal of pharmaceuticals*, 255(1-2), 153-66.
18. Hamed, R., AbuRezeq, A. A., & Tarawneh, O. (2018). Development of hydrogels, oleogels, and bigels as local drug delivery systems for periodontitis. *Drug development and industrial pharmacy*, 44(9), 1488-97.
19. Paul, S. R., Qureshi, D., Yogalakshmi, Y., Nayak, S. K., Singh, V. K., Syed, I., Sarkar, P., & Pal, K. (2018). Development of bigels based on stearic acid-rice bran oil oleogels and tamarind gum hydrogels for controlled delivery applications. *Journal of Surfactants and Detergents*, 21(1), 17-29.
20. Mazurkeviciute, A., Ramanauskiene, K., Ivaskiene, M., Grigonis, A., & Briedis, V. (2018). Topical antifungal bigels: Formulation, characterization and evaluation. *Acta Pharmaceutical*, 68(2), 223-33.
21. Hamed, R., AbuRezeq, A. A., & Tarawneh, O. (2018). Development of hydrogels, oleogels, and bigels as local drug delivery systems for periodontitis. *Drug development and industrial pharmacy*, 44(9), 1488-1497.
22. Iqra, S., Vyas, D. J., & Upadhyay, D. U. (2022). Bigel: An opportunity for topical applications. *Nat J Pharm Sci*, 2(2), 37-42.



A REVIEW ON NUTRITIONAL MANAGEMENT IN RHEUMATOID ARTHRITIS

**Ahir Meet Jiteshbhai¹, Mrs. Neha S. Vadgama², Dr. Anuradha P. Prajapati³,
Dr. Sachin B. Narkhede⁴, Dr. Shailesh Luhar⁵, Oza Vrushant⁶**

Article DOI: <https://doi.org/10.36713/epra15261>

DOI No: 10.36713/epra15261

ABSTRACT

Rheumatoid Arthritis is a autoimmune disease which affects about 1% of the global population and is caused by increase in age, smoking, obesity and various other causes which create complications like osteoporosis, Rheumatoid Nodules, Infection, Dry eyes. There are various allopathic medicine available like DMARDS, NSAIDS, Glucocorticoids, Analgesic but they have a number of side effects. To overcome this problem, we move towards nutritional management by fruits, herbs, different dietary intervention

KEY WORDS:- *Rheumatoid Arthritis, Autoimmune Disease, Nutritional Management, Complication And Side Effects, Alternative Therapies*

INTRODUCTION

Rheumatoid arthritis (RA) is a chronic, progressive autoimmune disease characterized by persistent inflammation in the joints, leading to painful deformities, swelling, and stiffness, particularly in the feet, fingers, wrists, and ankles. This condition arises when the immune system, designed to protect the body from infections and viruses, mistakenly attacks healthy tissues, primarily the synovium, the inner lining of the joint capsule.

In a healthy joint, the synovium produces synovial fluid, a thick substance that lubricates and protects the joint. This fluid allows for smooth movement between the bones, each covered by a thin layer of cartilage acting as a cushion, preventing bones from rubbing against each other. Tendons, strong cords connecting muscles to bones, facilitate movement by pulling the bones in specific directions. The joint capsule envelops and stabilizes the joint, preventing excessive movement.

RA disrupts this delicate balance. The immune system's misguided attack on the synovium triggers inflammation, a natural response that typically occurs to heal the body after an injury or infection. However, in RA, the inflammation persists and targets healthy joints, leading to swelling, redness, pain, and increased heat in the affected areas. The chronic nature of this inflammation can result in substantial damage to joints, cartilage, and nearby bones if left untreated.

One hallmark of rheumatoid arthritis is its symmetrical impact on joints, affecting both sides of the body equally. Although it may initially manifest in a limited number of joints, RA commonly targets the wrists, hands, elbows, and ankles. The consequences of this autoimmune attack extend beyond immediate discomfort, as it can lead to the formation of painful deformities and joint instability.

The joint capsule, responsible for maintaining joint integrity, can become stretched and lose its ability to hold the joint in its proper position when inflammation subsides. This instability contributes to ongoing pain and hinders joint function. Moreover, chronic inflammation can lead to irreversible joint damage, impacting the overall quality of life for individuals living with RA.

Effective management of rheumatoid arthritis often involves a multifaceted approach. Traditional treatments include disease-modifying antirheumatic drugs (DMARDs), nonsteroidal anti-inflammatory drugs (NSAIDs), glucocorticoids, and analgesics. However, these medications may carry side effects, prompting a growing interest in complementary strategies.

Nutritional interventions, such as incorporating anti-inflammatory foods and supplements, have gained attention for their potential in alleviating symptoms and supporting overall joint health. Additionally, lifestyle modifications, including regular exercise and stress management, are integral components of a comprehensive RA management plan.

In conclusion, understanding the intricate dynamics of rheumatoid arthritis sheds light on the complexities of this autoimmune condition. As researchers continue to explore innovative therapies and interventions, a holistic approach that combines medical treatments, nutritional support, and lifestyle modifications offers a promising avenue for enhancing the well-being of individuals navigating the challenges posed by RA.[7]

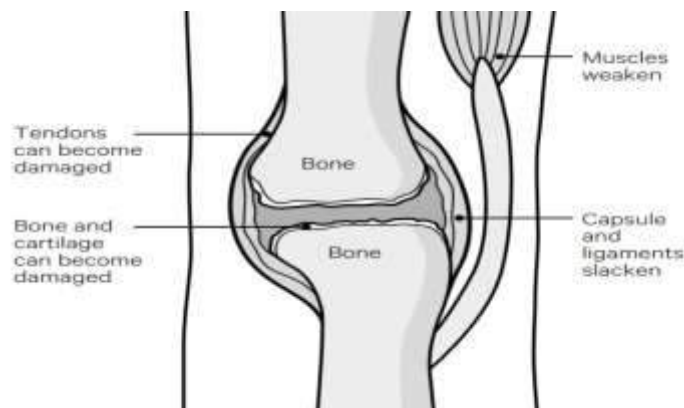


Figure 1. A Joint affected by Rheumatoid Arthritis

As many chronic diseases, the history of rheumatoid arthritis started around 1500 BC when Ebers Papyrualies describes a several condition similar to rheumatoid arthritis. Several reports suggest that mummies from different eras have deformities that are pathognomonic of arthritis, however, was not until later 1800 where this chronic condition was named by Garrod rheumatoid arthritis, replacing the terms arthritis deformans and rheumatic gout. Thomas Sydenham and later on, Beauvais pointed out that Rheumatoid Arthritis has a chronic progressive course especially in the tendon sheaths and bursa causing damage of the bone and cartilage.[3]

Types of Rheumatoid Arthritis

Seropositive rheumatoid arthritis: If your blood tests positive for the protein called Rheumatoid Factor (RF) or the antibody anti-Cyclic Citrullinated Peptide (anti-CCP), it means your blood has antibodies that can attack to your body might be actively response to your normal tissues. Having these proteins doesn't really mean you have Rheumatoid arthritis. Notwithstanding, in the event that you do, it can assist specialists with distinguishing the sort. [6]

Seronegative Rheumatoid Arthritis: People who test negative for Rheumatoid Factor (RF) and anti-CCP in their blood can still have Rheumatoid arthritis. Diagnosis does not depend on just these tests. Your Primary Care Physician (PCP) will also take into consider clinical symptoms, X-rays, and other laboratory tests. People who test negative for RF and anti-CCP tend to have a milder form of Rheumatoid arthritis than those who test positive for Rheumatoid Factor (RF).[6]

Juvenile Rheumatoid Arthritis: Juvenile rheumatoid arthritis, also called as juvenile idiopathic arthritis is the most common type of arthritis in children. It is a swelling of the joints that is characterized by warmth and pain. Arthritis can be short-term, enduring only half a month or months and then disappearing - or it may be chronic and last for months, years or even a lifetime. [6]

Rheumatoid Arthritis can be classified as: [15]

- 1) Palindromic rheumatoid arthritis
- 2) Juvenile rheumatoid arthritis
- 3) Rheumatoid spondylitis
- 4) Other types of arthritis
- 5) Osteoarthritis:
 - a. Primary osteoarthritis - It occurs in varied parts of body.
 - b. Secondary osteoarthritis - It occurs after an injury.
- 6) Ankylosing spondylarthritis
- 7) Infectious arthritis:
 - a. Supportive arthritis
 - b. Tuberculous arthritis
 - c. Lyme arthritis



d. Viral arthritis

8) Gout and gout arthritis

Signs and symptoms of autoimmune disorder may include:

- Delicate, warm, enlarged swollen joints
- Joint stiffness that is typically worse in the mornings and after inactivity
- Fatigue, fever and loss of appetite

Early rheumatoid arthritis tends to affect smaller joints first and particularly the joints which attach fingers to hands and toes to feet. As the disease getting worse, symptoms often spread to the wrists, knees, ankles, elbows, hips and shoulders. In some cases, symptoms occur in the same joints on both side of your body. Areas that may be affected includes: [6] Skin, Eyes, Lungs, Heart, Kidneys, Nerve tissue, Bone marrow, Blood vessels

Symptoms affecting the joints [6]: Rheumatoid arthritis mainly affects the joints. It can affect any joint in the body, although the small joints in the hands and feet are often the first to be affected. Pain, Stiffness , Swelling, warmth and redness

Diagnosis [3]:

You will be diagnosed with rheumatoid arthritis based on:

- your symptoms
- a doctor examining you and your joints in person
- The results of x-ray, scans and blood tests

Blood Tests [8]:

There is no single blood test that confirms you have rheumatoid Arthritis. However, there are a few tests that can show possible signs of the condition. Erythrocyte sedimentation rate (ESR): This test shows the level of inflammation in your body. C-reactive protein (CRP) test: This test also helps to measure inflammation in your body. Full blood count: A full blood count measures how many red blood cells Are in your blood.

Seropositive and seronegative (rheumatoid factor and Anti-CCP antibodies) [8]

If you have been diagnosed with rheumatoid arthritis, you may have been told that you are seropositive or seronegative. If you're told you're seropositive, it means that you have one or both Antibodies present in your blood: Rheumatoid factor (RF), Anti-cyclic citrullinated peptide (anti-CCP). About 85% of people with rheumatoid arthritis have one or both Antibodies.

Disease Activity Score (DAS28) [14]

A Disease Activity Score is a scoring System that helps your doctors see how your condition affects your Body, and how it reacts to treatment. For rheumatoid arthritis, this assessment is called the DAS28.

Scans [3]

You may also have some scans to check if you have any joint inflammation or damage. These include: X-rays, Ultrasound scans, Magnetic resonance imaging (MRI) scans, Computerised tomography (CT) scans, Assessing your physical ability [3]

CAUSES AND RISK FACTOR OF RHEUMATOID ARTHRITIS: [4]

Rheumatoid arthritis is a chronic autoimmune disorder where the immune system attacks joint tissues, potentially affecting the heart, lungs, nerves, eyes, and skin. Genetic factors increase susceptibility, with environmental triggers like infections playing a role in onset. Age, Sex, Smoking, Early Life Exposures, Obesity

PATHOGENESIS OF RHEUMATOID ARTHRITIS

Rheumatoid arthritis is a chronic inflammatory joint disorder influenced by genetic and environmental factors. Immune cells, particularly macrophages and T cells, produce cytokines leading to synovial hyperplasia, cartilage destruction, and bone erosion. Autoantibodies contribute to diagnosis and prognosis. [2,3]

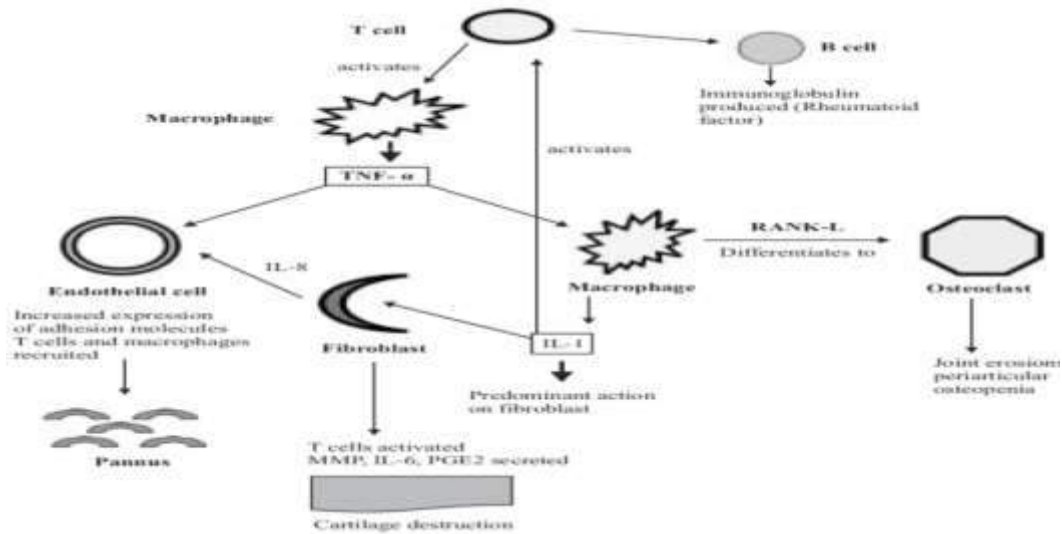


Figure 2. Rheumatoid Arthritis Pathogenesis

ALLOPATHIC REMEDIES: [1,12]

- 1) Disease-modifying anti-rheumatic drugs (DMARDs).
 - Hydroxychloroquine
 - Methotrexate
 - Sulfasalazine
 - Azathioprine
 - Lefludomide
- 2) Biologic response modifiers (a type of DMARD)
- 3) Glucocorticoids
- 4) Nonsteroidal anti-inflammatory medications (NSAIDs)
- 5) Analgesics (painkillers)
- 6) Janus Kinase (JAK) Inhibitor
 - **Surgery includes:**
 - 1) Joint Replacement , Arthrodesis, Synovectomy

NUTRITIONAL MANAGEMENT

Rheumatoid arthritis (RA) is a pervasive autoimmune disorder affecting 1% of the global population. Beyond joint inflammation, it extends systemically, impacting organs and diminishing life quality. Immune attacks cause pain, swelling, and stiffness, accompanied by fatigue and unpredictable flare-ups. The chronic nature burdens daily activities, and increased morbidity strains healthcare systems. Targeted therapies like DMARDs and biologics offer relief, emphasizing the need for early intervention. RA requires a collaborative effort to explore innovative treatments, enhance support systems, and improve overall quality of life for those grappling with this complex condition.

Dietary interventions in Rheumatoid Arthritis [5]: Research highlights a crucial link between altered gut microbiota and Rheumatoid Arthritis (RA) progression. Dysbiosis in RA patients' gut microbiota triggers immune responses leading to chronic inflammation. Rheumatologists endorse dietary interventions, including supervised fasting and plant-based approaches like vegan or Mediterranean diets, to manage RA. Medically supervised fasting resets the immune system, while anti-inflammatory-rich diets alleviate symptoms. Long-term adherence to these dietary plans improves RA symptoms, emphasizing the need for a holistic approach alongside medication to address the intricate relationship between gut microbiota, inflammation, and immune dysregulation in RA patients.

Seven days fasting followed by vegan diet [5]: Subtotal fasting, a 7-10 day approach limiting nutrients, demonstrates promise in managing Rheumatoid Arthritis (RA). It reduces CD4 T cell activation, addressing the chronic inflammation characteristic of RA. Caution is advised, and medical supervision is crucial.



Vegan Diet: Vegan diet, excluding animal products, may aid Rheumatoid Arthritis remission by reducing immune reactivity to excluded antigens. [5]

Mediterranean Diet: Mediterranean diet contains high amount of oleic acid, omega-3 fatty acids, unrefined carbohydrates, and phytochemicals. [5]

Elemental Diet: A groundbreaking trial by Podas et al. suggests the elemental diet's efficacy in managing Rheumatoid Arthritis, providing a less immunogenic alternative to conventional pharmacotherapy. [5]

Elimination Diet: Elimination diet targets food antigens, moderates rheumatoid arthritis symptoms via gut-immune interaction. Dietary Fibres and Whole Grains, Fruits, Spices[5]

Synbiotics: Synbiotics, combining probiotics and prebiotics, show promise in enhancing gut health. In Rheumatoid Arthritis, studies suggest *Lactobacillus casei*, a probiotic, may reduce pro-inflammatory markers. The link between gut health and systemic inflammation underscores synbiotics' potential to influence conditions beyond the gut.[7]

Herbs: Ashwagandha, Ayurvedic anti-inflammatory herb, inhibits NF- κ B, suppresses certain cytokines in vitro. [7]

CONCLUSION

Dietary interventions, such as vegan, Mediterranean, elemental, and elimination diets, show promise in managing Rheumatoid Arthritis (RA) by reducing inflammation. Plant-based diets may alleviate symptoms by eliminating potential triggers, while the Mediterranean diet's anti-inflammatory properties benefit RA. However, caution and professional guidance are essential due to individual variability in RA responses to dietary changes.

REFERENCES

1. Bullock, J., Syed A.A. Rizvi, Saleh A., Ahmed S., Duc P Do, Ansari R., & Ahmed J. (2018). *Rheumatoid Arthritis: A Brief Overview Of The Treatment. Medical Principles and Practice*, 27, 1-7.
2. Guo, Q., Wang Y., Dan Xu, Nossent J., Pavlos N., & Jiak Xu. (2018). *Rheumatoid arthritis: pathological mechanisms and modern pharmacological therapies. Bone Research*, 6, 1-14.
3. Fauzi, A., Hameed I., & Kadhim M. (2017). *Rheumatoid Arthritis: History, Stages, Epidemiology, Pathogenesis, Diagnosis and Treatment. International Journal of Toxicological and Pharmacological Research*, 1-12.
4. Aho, K., & Heliovaara M. (2004). *Risk factors for rheumatoid arthritis. Annals of Medicine*, 36(4), 1-11.
5. Khanna, S., Kumar S., & Gupta B. (2017). *Managing Rheumatoid Arthritis with Dietary Interventions. Frontiers in Nutrition*, 4(52), 1-16.
6. Andrew V. (2021). *A Note on Rheumatoid Arthritis: Symptoms and Types. Journal of Arthritis*, 10, 1.
7. Rennie, K.L., Hughes J., Lang R., & Jebb S.A. (2003). *Nutritional management of rheumatoid arthritis: a review of the evidence. The British Dietetic Association Ltd.*, 16, 1-13.
8. Heidari, B. (2011). *Rheumatoid Arthritis: Early diagnosis and treatment outcomes. Caspian Journal of Internal Medicine*, 2(1), 1-10.
9. Grimstvedt, M., Woolf, K., Milliron, B.J., & Manore, M. (2009). *Lower Healthy Eating Index - 2005 dietary quality scores in older women with rheumatoid arthritis. Public Health Nutrition*, 13(8), 1-8.
10. Bacon, M., White, P., Raiten, D., Craft, N., Margoli, S., Levander, O., Taylor, M., Lipnik, R., & Sami, S. (1990). *Nutritional Status and Growth in Juvenile Rheumatoid Arthritis. Seminars in Arthritis and Rheumatism*, 20, 1-10.
11. Kim, J., & Suh, C. (2020). *Systemic Manifestations and Complications in Patients with Rheumatoid Arthritis. Journal of Clinical Medicine*, 9(6).
12. Frank, J. (2016). *5 types of medication that treat rheumatoid arthritis. Arthritis Health*.
13. Nezamoleslam, S., Ghiasvand, R., Feizi, A., Salesi, M., & Pourmasoumi, M. (2020). *The relationship between dietary patterns and rheumatoid arthritis: a case-control study. Nutrition & Metabolism*.
14. Tanaka, Y. (2020). *Rheumatoid Arthritis. Tanaka Inflammation and Regeneration*, 40(20), 1-8.
15. Nimesh, S. (2018). *Herbal Drug is Better Than Allopathic Drug in Treatment of Rheumatoid Arthritis. IJP*, 5.
16. Tortora, G.J., & Derrickson, B. (2014). *Principles of Anatomy and Physiology*, 14th edition. Wiley.
17. ResearchGate. (n.d.). *A simplified schematic diagram of pathogenesis of RA. Retrieved from https://www.researchgate.net/figure/A-simplified-schematic-diagram-of-pathogenesis-of-RA_fig2https://www.researchgate.net/figure/A-simplified-schematic-diagram-of-pathogenesis-of-RA_fig2_8106909*



A REVIEW ON PHARMACOVIGILANCE AND DRUG SAFETY MEASURES

**Bhanushali Mayank Ratilal¹, Dr. Anuradha P. Prajapati², Dr. Kantilal Narkhede³,
Dr. Sachin B. Narkhede⁴, Dr. Shailesh Luhar⁵**

^{1,2,3,4,5}Smt B.N.B Swaminarayan Pharmacy College, Salvav-Vapi, India

Article DOI: <https://doi.org/10.36713/epra15259>

DOI No: 10.36713/epra15259

ABSTRACT

Pharmacovigilance, or PV, is the process of continuously monitoring pharmaceuticals once they are put on the market in order to evaluate and enhance their safety profile. Increasing the number of adverse drug reactions (ADRs) that are spontaneously reported is the primary goal in order to collect a wide range of data. The World Health Organization (WHO) defined pharmacovigilance as the science and set of procedures concerning the identification, assessment, comprehension, and rejection of negative effects or problems associated with various drugs in nursing. A clinical test may involve an analysis study involving human subjects in order to address particular health questions. Carefully carried out clinical trials are the fastest and safest methods because they help individuals receive treatments that work and because they improve health. Pharmacovigilance, which provides information on the negative effects that the drug-using population typically experiences, is acknowledged to be essential to the sensible use of pharmaceuticals. Adverse drug reactions (ADRs) are becoming more and more common, and various methods, including scientific and administrative research, in-depth observation, impromptu reporting, and information studies, are being developed with the goal of enhancing pharmacovigilance. Because assessment procedures contain some subjective judgements, integrator reliability is frequently low. In summary, there is presently no well recognized mechanism for assessing casualties from ADRs.

INTRODUCTION^(1,2)

According to the World Health Organisation (WHO), "Pharmacovigilance is defined as the science and activities relating to the detection, assessment, understanding and prevention of adverse effect or any other possible drug-related drawback, particular, long term and short term adverse effects of medicines". Pharmakon (Greek for "drug") and vigilare (Latin for "to keep watch") are the origins of the term "Pharmacovigilance.". Pharmacovigilance is not a new concept in Asian countries; it has been practiced since 1998. .When Asian countries decided to join the Uppsala Centre for Adverse Event Monitoring. The spontaneous reporting of adverse drug reactions and adverse events is a critical tool for gathering safety data for early detection.

Before it can be marketed commercially, it must go through several stages of testing to ensure its safety and efficacy. However, clinical trials have several limitations, including the following: strict inclusion and exclusion criteria limit their use to a very select group of patients; special population groups such as children, pregnant women, and the mature population are not studied during the trials; and other factors causing drug reactions such as genetic factors, environmental factors, and drug-drug interactions may not have been studied during the clinical trials.

These adverse drug reactions (ADRs) not only increase patient suffering, but also morbidity and mortality, as well as a financial burden on society. In hospitalised patients, the overall incidence of ADRs is estimated to be 6.7% (0.1-0.85%).5. data show that in patients who have ADRs, the death rate is 19.18% higher and the length of hospital stay is 8.25% longer. Total medical costs for patients with ADRs increased by an average of 19.86%.

Drug safety has surged to the forefront of pharmaceutical concerns, taking precedence as the primary focus before any medication enters the market. Recognizing the limitations of clinical trials in fully assessing safety, it's now widely acknowledged that these trials alone cannot provide adequate safety information to protect public health. To address this, there are now stringent provisions in place to continually monitor drug safety after a product receives market authorization, mandated by regulatory bodies. Pharmacovigilance, which arose after the tragic thalidomide event in the 1960s, has become pivotal in mitigating drug safety oversights. Since then, substantial strides have been made in this arena, from spontaneous reporting systems to the contemporary implementation of risk management plans, all aimed at progressively enhancing drug safety.



Despite efforts, adverse drug reactions (ADRs) remain inevitable, though some can be averted. The acquisition of new insights into novel and rare ADRs, especially those related to newly introduced medications, remains crucial to safeguard public health. Pharmacovigilance operates as an ongoing process, continuously monitoring drug safety while providing updated information and insights into ADRs. This information is indispensable for drug regulators, empowering them to make informed decisions concerning marketed drugs. The understanding that drugs are evaluated based on their benefit-risk ratio underscores the importance of these insights. Regulators are empowered to impose warnings, alter labels as restrictions, or ultimately withdraw drugs from the market based on this crucial information. Stakeholders, including drug regulators, maintain a constant vigilance over drug safety issues, illustrated by examples such as the recent withdrawal of rosiglitazone from the European market and the historical removal of well-known drugs like terfenadine, cisapride, phenylpropanolamine, refocoxib, and cerivastatin due to safety concerns. Therefore, the role of drug safety monitoring, encapsulated in pharmacovigilance, stands as an essential pillar in ensuring public health safety.

HISTORY OF PHARMACOVIGILANCE^(3,4)

The thalidomide tragedy in the 1960s marked a pivotal moment in drug safety, prompting global initiatives. The 1893 Lancet publication on chloroform deaths also fueled concerns. Amendments to the US FDA Act in 1906 and 1962 addressed safety after sulphanilamide elixir fatalities and thalidomide, respectively. The UK's Medicines Act of 1968 and the World Health Organization's Program for International Drug Monitoring in 1968 further strengthened global drug safety efforts.

The Sequential Pharmacovigilance Developments

YEAR	DEVELOPMENTS
1747	The very first known clinical trials by James Lind proved the usefulness of lemon juice in preventing scurvy
1947	Death of more than 100 children due to toxicity of sulphanilamide
1950	Aplastic anaemia was reported due to Chloramphenicol toxicity
1961	Worldwide tragedy due to thalidomide toxicity
1963	16th World Health congregation recognizes significant to rapid action on Adverse Drug Reactions (ADRs).
1968	WHO research project for international drug monitoring on a pilot scale
1996	Global standards level clinical trials initiated in India
1997	India attached with WHO Adverse Drug Reaction Monitoring Program.
1998	Initiation of Pharmacovigilance in India
2002	67th National Pharmacovigilance Centre established in India.
2004-05	India launched National Pharmacovigilance Program
2005	The accomplishment of structured clinical trials in India.
2009-10	Pharmacovigilance Program (PvPI) started

FUNDAMENTALS OF PHARMACOVIGILANCE⁽⁵⁾

Pharmacovigilance, crucial in public health legislation, focuses on detecting, assessing, and preventing adverse drug reactions. ADRs, causing 5% of EU hospital admissions and 200,000 deaths yearly, incur €80 billion in costs. The WHO's global drug monitoring program, initiated in 1968 with ten countries, now involves over 100, managing a database with 10 million adverse reaction reports.

ADVERSE DRUG REACTIONS (ADR)⁽⁶⁾

Adverse effects encompass all unwanted drug outcomes, avoiding mechanism assumptions, unlike toxic or side effects. Adverse drug reactions (ADRs) are unintended and unfavorable effects during clinical use, impacting patient quality of life. ADRs contribute to 5% of hospital admissions, with 10%-20% hospitalized individuals experiencing them. Timely identification and management are vital to mitigate harm.

CLASSIFICATION OF ADRs

Originally, adverse drug reactions (ADRs) were categorized as Type A (dose-dependent, foreseeable) and Type B (unpredictable). Later, Types C (chronic) and D (delayed) were added. Withdrawal (Type E) and therapy failure (Type F) followed. About 80% of hospital ADRs are Type A, often preventable. Common culprits include corticosteroids, antibiotics, and cardiovascular drugs in adults, and anti-infectives, respiratory drugs, and vaccines in children. For detailed management approaches, visit **DRUG SAFETY**



SURVEILLANCE⁽⁷⁾

Efficient post-market drug surveillance is imperative to identify adverse drug events (ADEs) and safeguard public health. Traditional spontaneous reporting systems are passive and may miss up to 90% of serious ADEs. Leveraging electronic health records (EHRs) and advancing natural language processing (NLP) techniques offer a proactive and precise approach, crucial for large-scale drug safety monitoring.

RISK MANAGEMENT PLANS⁽⁸⁾

Proactive post-market surveillance advances with Risk Management Plans (RMPs), crucial in identifying and mitigating risks associated with medicinal products. The EU's RMP includes safety specifications and pharmacovigilance plans, evaluating the need for risk minimization activities. Plans are required for new substances, product modifications, new indications, or unforeseen risks, focusing on refining the benefit-risk ratio during post-authorization.

FUTURE PERSPECTIVES⁽⁸⁾

Recent regulatory advancements in pharmacovigilance require evaluation for their impact. While current focus is on detecting adverse drug reactions (ADRs), the field needs to prioritize generating information aiding healthcare decisions. Active surveillance, patient involvement, and innovative methodologies are crucial. Pharmacovigilance's evolution is evident, necessitating continued adaptation for robust drug safety and public health.

REGULATORY ASPECTS IN PHARMACOVIGILANCE⁽⁹⁾

Need Of Regulations in Pharmacovigilance

Regulatory bodies are becoming more forward-thinking in identifying possible safety concerns related to drugs on the market, demanding swift responsiveness from the pharmaceutical industry.

- Increased political and societal pressures coincide with faster communication methods.
- Legal actions resulting from inadequate pharmacovigilance can be profoundly damaging for all involved parties.
- Neglecting pharmacovigilance can result in the suspension or revocation of licenses in the United States.

NATIONAL PHARMACOVIGILANCE PROGRAM⁽¹⁰⁾

Initiated in November 2004 by the Central Drugs Standard Control Organization, India's National Pharmacovigilance Program aims to enhance drug safety by collecting and evaluating adverse drug reaction data. Operating through a three-tier framework and various centers, it facilitates swift regulatory actions to ensure public health.

Features of NPP

- Its immediate objective is to foster a culture of notification not only amongst doctors but also amongst other healthcare providers, viz., pharmacists and nurses.
 - Although the drug regulators would be more interested in receiving information on adverse drug reactions of newly marketed drugs, the program allows reporting of common or non-serious adverse drug reactions of even well established drugs. This has been done to encourage every healthcare provider to start reporting adverse events.
 - The reporting forms maintain patient confidentiality. Identification of notifier, however, is obligatory to allow for verification of information and discourage submission of spurious data.
 - Now even practicing doctors and pharmacists can establish Peripheral Pharmacovigilance Centers.

GLOBAL PERSPECTIVES IN PHARMACOVIGILANCE⁽¹¹⁾

WHO PROGRAM FOR INTERNATIONAL DRUG MONITORING

The WHO's International Programme for Adverse Reaction Monitoring, initiated three decades ago, aimed to detect rare adverse drug reactions globally. Evolving beyond its initial focus on managing a centralized database, the program, now known as pharmacovigilance, faces the challenge of adapting to the expanding concerns of diverse stakeholders in global drug safety monitoring.

TECHNOLOGICAL ADVANCEMENTS IN PHARMACOVIGILANCE⁽¹²⁾

Current Uses of Information Technology in Pharmacovigilance: Rule-Based Static Systems

Current pharmacovigilance (PV) systems rely on algorithmic approaches grounded in binary logic to manage safety data. These algorithms, managed by users, employ consistent and objective expert knowledge in a standardized manner, ensuring familiarity and comprehension of the outcomes of data processing. The European Good Pharmacovigilance Practice Annex 1 defines five (5) domains within PV systems, briefly outlined below:



- **Quality (management) system (QMS) for the PV system:** The organizational structure, responsibilities, procedures, processes, and resources of the PV system as well as appropriate resource management, compliance management, and record management. The QMS is part of the PV system.
- **Risk management system:** A set of PV activities and interventions designed to identify, characterize, prevent, or minimize risks relating to a medicinal product, including the assessment of the effectiveness of those activities and interventions .
- **Management of ICSRs:** Collection, collation, processing, and assessment of safety data to standardize the format and content of a relational database used for the reporting of one or several suspected adverse reactions to a medicinal product that occur in a single patient at a specific point of time
- **Aggregate reporting:** Periodic reports summarizing safety data received over a fixed-term for a specified medicinal product, sometimes including a detailed comparison with the cumulative safety data for the product.
- **Signal management:** A set of activities performed to determine whether, based on an examination of ICSRs, aggregated data from active surveillance systems or studies, scientific literature information or other data sources, there are new risks associated with an active substance or a medicinal product or whether known risks have changed, as well as any related recommendations, decisions, communications, and tracking

Artificial Intelligence (AI)-Informed Static Systems^(13,14):

AI in pharmacovigilance streamlines processes, reducing human error and enhancing efficiency in ICSRs, aggregate reporting, risk management, signal management, and QMS.

DISCUSSION

Pharmacovigilance, a linchpin in drug safety, monitors and prevents adverse reactions throughout a drug's lifecycle. Evolving from traditional methods to AI and machine learning, it detects unforeseen effects, informs regulations, and ensures real-time surveillance. With a focus on continuous improvement, it fosters patient-centric care, optimizing the benefit-risk balance in a dynamic healthcare landscape.

CONCLUSION

Pharmacovigilance is a crucial aspect of modern healthcare, adapting to cutting-edge methods like AI and big data for real-time drug safety monitoring. Beyond signal detection, it provides personalized insights, optimizing treatment decisions. Transparent communication of risks enhances public trust, while its role in regulatory decisions ensures the highest patient care standards. In an evolving healthcare landscape, pharmacovigilance's commitment to innovation and patient-centricity safeguards lives, epitomizing an ethical ethos in medicine.

REFERENCES

1. Kesharwani, V., Farooqui, M. A., Kushwaha, N., Singh, R. K., & Jaiswal, P. K. (2018). An overview on pharmacovigilance: a key for drug safety and monitoring. *Journal of Drug Delivery and Therapeutics*, 8(5), 130-135.
2. Härmark, L. (2012). *Web-based intensive monitoring; a patient based pharmacovigilance tool [thesis]*. Groningen: Rijksuniversiteit Groningen.
3. Agrawal, P., Kushwaha, V., Siddiqui, S., Khan, N. F., & Tripathi, M. (2022). *HISTORY OF PHARMACOVIGILANCE AND DRUG SAFETY*.
4. Santosh, K. C., & Tragulpiankit, P. (2011). *Pharmacovigilance: an overview*. *Mahidol Univ J Pharmaceutical Sci*, 38(1-2), 1-7.
5. Kaeding, M., Schmälter, J., & Klika, C. (2017). *Pharmacovigilance in the European Union: practical implementation across member states*. Springer Nature.
6. Schatz, S., & Weber, R. J. (2015). *Adverse drug reactions*. *Pharmacy Practice*, 1(1).
7. Liu, F., Jagannatha, A., & Yu, H. (2019). *Towards drug safety surveillance and pharmacovigilance: current progress in detecting medication and adverse drug events from electronic health records*. *Drug safety*, 42(1), 95-97.
8. Härmark, L. (2012). *Web-based intensive monitoring; a patient based pharmacovigilance tool [thesis]*. Groningen: Rijksuniversiteit Groningen.
9. Khattri, S., Balamuralidhara, V., Pramod, K. T., Valluru, R., & Venkatesh, M. P. (2012). *Pharmacovigilance regulations in India: A Step forward*. *Clinical Research and Regulatory Affairs*, 29(2), 41-45.
10. Bavdekar, S. B., & Karande, S. (2006). *National pharmacovigilance program*. *Indian pediatrics*, 43(1), 27.
11. Olsson, S. (1998). *The role of the WHO programme on International Drug Monitoring in coordinating worldwide drug safety efforts*. *Drug safety*, 19(1), 1-10.
12. Lewis, D. J., & McCallum, J. F. (2020). *Utilizing advanced technologies to augment pharmacovigilance systems: challenges and opportunities*. *Therapeutic Innovation & Regulatory Science*, 54, 888-899.
13. Danysz, K., Cicirello, S., Mingle, E., Assuncao, B., Tetarenko, N., Mockute, R., ... & Desai, S. (2019). *Artificial intelligence and the future of the drug safety professional*. *Drug safety*, 42, 491-497.
14. Lewis, D. J., & McCallum, J. F. (2020). *Utilizing advanced technologies to augment pharmacovigilance systems: challenges and opportunities*. *Therapeutic Innovation & Regulatory Science*, 54, 888-899.



UBHAYAMARGA SHODHANA (DUO - DIRECTIONAL CLEANSING) IN KITIBHA KUSHTA – A CASE STUDY

**Dr Bhaskar B^{1*}, Dr Gavisiddanagouda Patil², Dr Suresh N Hakkandi³,
Dr Manjunath P Akki⁴, Dr Gurumahantesh TM⁵**

Postgraduate Scholar¹, Professor & HOD², Professor & HOD³, Professor⁴, Associate Professor⁵.

¹*Department of Panchakarma Shree Jagadguru Gavisiddheshwara Ayurvedic Medical College & Hospital,
Gavimath campus, Koppal, Karnataka, India.*

²*Department of Kaumarabhritya Shree Jagadguru Gavisiddheshwara Ayurvedic Medical College & Hospital,
Gavimath campus, Koppal, Karnataka, India.*

³*Professor & HOD, Department of Panchakarma, Shree Jagadguru Gavisiddheshwara Ayurvedic Medical College &
Hospital. Koppal, Karnataka, India.*

⁴*Professor, Department of Panchakarma, Shree Jagadguru Gavisiddheshwara Ayurvedic Medical College & Hospital.
Gavimath campus, Koppal, Karnataka, India.*

⁵*Associate Professor, Department of Panchakarma, Shree Jagadguru Gavisiddheshwara Ayurvedic Medical College &
Hospital. Gavimath campus, Koppal, Karnataka, India.*

**Corresponding Author*

Article DOI: <https://doi.org/10.36713/epra15262>

DOI No: 10.36713/epra15262

ABSTRACT

Skin is a barrier protecting the underlying tissue from physical, chemical and biological toxic agents. Skin diseases are mainly affecting the external beauty of the patients that clogs the routine of one's life. Skin disorders constitute one of the largest groups of health problems in general clinical practice. Kushta is a broad term which covers almost all the skin disease in Ayurveda. In general, Tvak Vikaras are mainly affecting due to altered lifestyle, lack of physical exercise, poor hygiene, mental stress and improper food habits. Kushta is further divided into Maha Kushta and Kshudra Kushta. Kitibha Kushta is one of the Kshudra Kushta. Here Tridosha, Rasa, Rakta, Mamsa, Ambu (Sapta Dushya) are affected. Rasa and Rakta Dushti are the main causes of Tvak Vikaras for which Vamana and Virechana Karma are the Agrya Shodhanas respectively. After Shodhana, Shamana Chikitsa plays a major role in Alpadosha Nirharana. This case study highlights Kitibha Kushta as a Rasa-Raktavahasrotodusti Vikara which was intervened with a unique therapeutic modality Ubhayatahamarga Shodhana - a duo - directional cleansing.

KEYWORDS: *Kitibha Kushta, Psoriasis. Ubhayatahamarga, Shodhana, Duo-directional cleansing.*

INTRODUCTION

Panchakarma, the unique therapies of Ayurveda, attract the attention of people for the treatment of various disorders and also for their preventive and promotive effect. With increase of awareness and global acceptance, it is the need of the hour to work on Ubhayamarga Shodhana¹ Karma in a scientific manner.

Deergha Roganam² Shreshta is Kushta. Kushta refers to a Tvacha deformity (Kusha Nishkarsha), which can result in skin discoloration (Kushnati Angam) or the loss of Sparshanendriya's integrity (Kutsitam Tishtati). Touch sensation that seems to be moving like an insect (Kitiriva Bhati) is Kitibha Kushta.

Kitibha / Kitima³ Kushta is a type of Kshudra Kushta, Acharya Charaka⁴ and Vagbhata⁵ mentioned under the Vata-Kaphaja Kushta whereas, Sushrutacharya⁶ explained under the Pittaja Kushta, Kitima characterized by the Shyava Varna, (Krushna-Peeta Varna - Brownish red) Kina, (Mamsagranthi - Callosity) is seen. So, the lesion is Khara Sparsha of Kina, - that is Karkasha Sparsha - Gruffy. The Khara word must have been used to indicate the Lekhana Guna. which scrapes out the skin in this context. Kathina, Amrudu, Parushata of Kina - Rukshata of the Tvacha is always there in the Kitibha Kushta because of the Vata Dosha. Sraava - is flow of exudates from the Vrana Sthaana. Vrutta - is circular shape of the Vrana, Ghana / Drudha - is the Sthairya, Kathinyata character of the Vrana in Kitibha Kushta. Ugra Kandhu - is extensive itching in the sufferers of the Kitibha⁷.



Psoriasis is included under chronic inflammatory dermatosis, a condition where desquamation or shedding of abnormal scale or salmon colored plaque is seen. (onset as a result of T- lymphocyte-mediated immunological response). Psoriasis had a prevalence of 0.44 - 2.8 percent in India, it commonly affects individuals in their third or fourth decade with males being affected two times more common than females⁸. Psoriasis is characterized by erythematous patches associated with silvery scales, itching, burnt skin appearance, and in some cases pustules or blisters. The disease not only causes physical deformity but can also cause severe social stigma to a person and affects one's quality of life⁹. Social exclusion, discrimination, and stigma are psychologically devastating for individuals suffering from psoriasis and their families. Psoriasis unguis - The involvement of the nail in psoriatics is called so. The common changes are pitting of nail plate, onycholysis, subungual hyperkeratosis and crumbling of nail plate.

There is no definite treatment available for psoriasis, but different treatment modalities, such as internal medications, topical creams, phototherapy, and biologics, are available. They are found to bring symptomatic relief, but the long-term use of these medications can cause systemic and local side effects as well as toxicity. According to Ayurvedic literature, psoriasis can be compared with either *Ekakushta*, *Sidhma Kushta*, or *Kitibha Kushta*, which are of *Vata-Kaphaja* in origin. For the elimination of *Doshas*, repeated *Shodhana* (purification) is necessary, which is explained in classics as the main line of treatment and after *Shodhana* for enhancing the deteriorated *Dhatus* (bodily tissues) followed by *Shamana* (Palliative) and *Rasayana Chikitsa* (Rejuvenation therapy) is advisable to prevent reoccurrence.

AIMS AND OBJECTIVES

To evaluate the effectiveness of both *Vamana* and *Virechana Karma (Ubhayamarga Shodhana)* in *Kitibha Kushta*.

CASE PRESENTATION

A 32-year-old male patient who works as a professional and comes from a middle-class, Hindu household initially appeared with erythematous spots, severe itching, and rough skin that eventually spread over his entire scalp, back and belly. He also had scaling over his entire head that had been there for ten years. Only the right index nail has been affected in the extremities for the past four years. Prior to ten years, the patient appeared to be normal. At first, he saw tiny sores on the back. He chose to ignore the ailment, but when the sores grew larger and more widespread, he saw an allopathic doctor, who prescribed topical steroids, antibiotics, and antihistamines. However, there was not much respite. Subsequently, the illness returned with considerably greater ferocity. He saw a homoeopathic doctor, took some medicine, and experienced some brief alleviation. He later gave an OPD consultation at our hospital.

A thorough examination showed that the patient's symptoms were made worse by exposure to sunshine, and that his severe itching prevented him from going about his everyday business. The patient's personal history indicates that they may have developed the illness as a result of consuming an excessive amount of spicy and sour foods, including curd. As he prepared for physical fitness, he regularly drank milkshakes with sprouts (*Virudhaka Dhaanya-Aharaja Nidana*), ran for a long time in the cold breeze (*Tushaara Sevana*), and engaged in strenuous exercise (*Viharaja Nidana*). Meanwhile, he was psychologically concerned (*Chintya - Manasika Nidana*) and frequently entered competitions, but he was troubled because he did not see positive results, which further supported the current issue. In the current situation, very few additional particular causal elements were determined to be significant.

CLINICAL FINDINGS

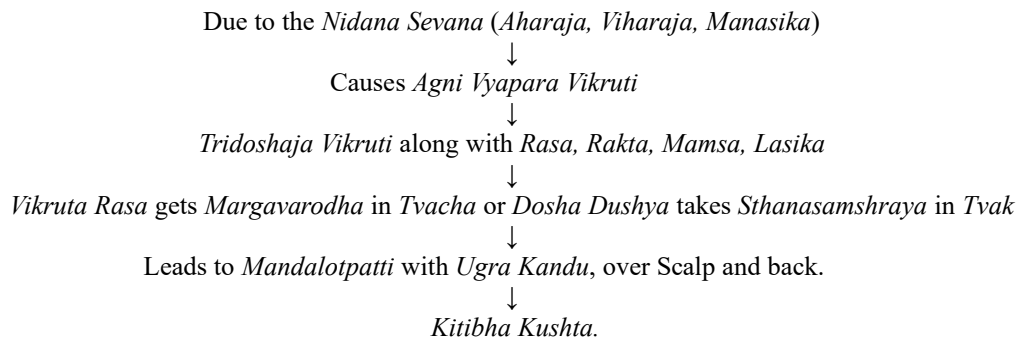
Table -1 Ayurveda and Allopathy Clinical assessment	
Ayurvedic perspective of clinical assessment (<i>Samprapti Ghataka</i>)	Allopathy perspective of clinical assessment
<i>Dosha - Vata-Kapha Pradhana Tridoshaja</i>	Lesion type : Scaly raised circular patches (<i>Kinavat Sparsham</i>)
<i>Dushya - Rasa, Rakta, Mamsa. Ambu</i>	Configuration : Irregular
<i>Ama - Jatharagnimandyajanya Ama</i>	Color : Erythematous (<i>Aruna Varna</i>)
<i>Agni - Jatharagni and Dhatvagni.</i>	Texture : Rough (<i>Khara Sparsham</i>),
<i>Srotas - Rasa, Raktavaha Srotas.</i>	Symmetry : Asymmetrical.
<i>Srotodushti Prakara - Sroto Sangra</i>	Distribution : Whole scalp, Back, Abdomen,
<i>Rogamarga - Baahya</i>	Nails : Affected : Right extremity -Index finger nail pitting.
<i>Udbhava Sthaana - Aamashaya</i>	Mucosa : Unaffected.
<i>Vyakta Sthaana - Tvacha</i>	Swelling : Absent
<i>Roga Swabhava - Chirakari</i>	On palpation : Warmth touch with rough texture
<i>Sadhyasadhya - Kricchra Saadhya</i>	Signs : Candle Grease Sign "Positive" and Auspitz Sign "Negative"

Investigations

Blood routine and liver function test results were within the normal limits.



Samprapti



MATERIALS AND METHODS

Centre of study

This study was carried out in Department of PG & PhD studies in Panchakarma. Shree Jagadguru Gavisiddheshwara Ayurvedic Medical College & Hospital, Gavimath campus, Koppal, Karnataka, India.

Assessment Parameters

Parameters such as the Psoriasis Area Severity Index (PASI)¹⁰, Dermatological Life Quality Index (DLQI). Primary findings were: PASI, 12.7; DLQI-16. Based on the manifested symptoms and clinical findings, the case was diagnosed as *Kitibha Kushta*, which is characterized by reddish patches, severe itching, and scaling.

Therapeutic intervention

Ayurveda emphasizes that “*Samprapti Vighatanam Eva Chikitsa*”. The interventions were done after ascertaining the *dosha* involved. Even though primarily involved doshas were *Vata* and *Kapha* as history of *Kitibha* presenting *Tridoshaja Lakshanas*. It is elicited based on the presenting complaints and other clinical findings.

The treatment was accomplished in 2 different phases:

1. *Ubhayatahamarga Shodana Chikitsa* (Bi-Purificatory treatment measures).
 - a) *Vamana Karma* (Therapeutic emesis Table - 2)
 - b) *Virechana Karma* (Therapeutic purgation Table - 3)

2. *Shamana Chikitsa* (Pacifying treatment; Table - 4)

Vamana (emesis) for the *Nirharana* of the *Sanchita Apakva Pitta – Shleshma*, *Virechana* (Purgation) for the *Prakupita Pitta*, was planned for the purification of the body. As a part of the preoperative procedure, *Paachana* (Carminative therapy) using *Abhyantara Paachana Yoga*, *Abhyantara* and *Baahya Snehana* (Internal & External Oleation therapy) and *Svedana Karma* (Sudation therapy) were performed. The entire *Vamana* course of the treatment is listed in Table - 3.

Table - 2 Vamana Karma schedule

S.N	PROCEDURE	Dravya / Yoga	Day/Observation
1)	<i>Abhyantara Deepana-Paachana yoga</i>	<i>Agnitundi Vati</i> ¹¹ 1-0-1 with warm water B/F	04/09/23 to 10/09/23.
2)	<i>Shodhananga Snehapana</i>	<i>Mahatiktaka Ghruta</i> ¹² with 200 ml of <i>Sukoshna Sasharkara Ksheera</i> ¹³ as <i>Anupaana</i> .	11/09/23 to 13/09/23. 50 ml, 100 ml, 150ml. <i>Samyak Snigdha Lakshanas</i> observed.
3)	<i>Abhyanga</i> and <i>Svedana</i>	<i>Yashtimadhu Taila</i> 200 ml/day <i>Sarvanga Abhyanga</i> and <i>Mrudu Bashpa Sveda</i>	14/09/23 <i>Vishrama Kaala</i> 15/09/23 On the day of <i>Vamana Karma</i> morning.
4)	<i>Vamana Karma</i>	<i>Madana Yoga</i> includes, i. <i>Madhu</i> - 15ml. ii. <i>Saindhava</i> - 1gm iii. <i>Madana Phala Pippali Churna</i> - 6gm (<i>Antrnakha Mushti Pramana</i> of the <i>Vami</i>). iv. <i>Vacha Churna</i> - 2 gm.	15/09/23.



		<p><i>Sambhara Sangraha for Vamana</i></p> <p>a) <i>Sukoshna Ksheera</i> - 2.4 Lts. b) <i>Yashtimadhu Phanta</i> - 2.4 Lts. c) <i>Saindhava Jala</i> – 1 Lt. d) <i>Kanaa-Siddhathaka Phanta</i> - 200 ml. e) <i>Sukoshna Salila</i> - 1 Lt.</p>	After 3 rd <i>Vega</i> the patient felt difficulty for next <i>Vega</i> (<i>Nirharana</i> of <i>Dosha</i>) for which <i>Kanaa-Siddhathaka Phanta</i> was administered
		<p><i>Chaturvidha Shuddhi</i></p> <p>I. <i>Maaniki</i> : Input 7Lt, Output 7.4 Lt. II. <i>Vaigiki</i> : 5 <i>Vega</i> III. <i>Antiki</i> : <i>Pittanta</i> IV. <i>Laingiki</i> : <i>Samyak</i></p>	
5)	<i>Samasarjana Krama</i>	<i>Peyadi Krama</i>	15/09/23 to 19/09/23.

**Figure-1 Vomitus with Scale. Figure-2 Total Vomitus, Figure-3 During Vamana Vega.**

S.N	PROCEDURE	Dravya / Yoga	Day
01)	<i>Abhyantara Deepana-Paachana Yoga</i>	<i>Agnitundi Vati</i> 1-0-1 With warm water B/F	06/10/23 to 10/10/23.
02)	<i>Shodhananga Snehapaana</i>	<i>Mahatiktaka Ghruta</i> with <i>Ushnodaka</i> as <i>Anupaana</i>	11/10/23 to 13/10/23. 50 ml, 100 ml, 150ml. <i>Samyak Snigda Lakshanas</i> observed.
03)	<i>Abhyanga and Svedana</i>	<i>Yashtimadhu Taila</i> 200 ml/day for Massage <i>Sarvanga Abhyanga</i> and <i>Mrudu Bashpa Sveda</i>	14/10/23 to 16/10/23 <i>Vishrama Kaala</i> 17/10/23 On the day of <i>Virechana Karma</i> morning.
04)	<i>Virechana Karma</i>	<i>Trivrut Leha</i> , 80 gm with warm water. <i>Chatuvidha Shuddhi</i> i. <i>Maaniki</i> : - ii. <i>Vaigiki</i> : 14 <i>Vega</i> iii. <i>Antiki</i> : <i>Kaphanta</i> iv. <i>Laingiki</i> : <i>Samyak</i>	17/10/23.
05)	<i>Samasarjana Krama</i>	<i>Peyadi Krama</i>	17/10/23 to 21/10/23

**Table no - 4 Summary & Shamanoushadhi**

Date	Summaries from initial and follow-up visits	Interventions
04/09/23	Pt c/o reddish patches, extensive itching, and roughness of skin gradually developed over the whole back and abdomen, Scaling over whole scalp since 10 years.	None of the Oral medications are advised during the course of <i>Shodhana</i> procedures. Apart from Anti-hypertensive medicine as he was a known case of a Hypertension.
15/09/2023	After the <i>Vamana Karma</i> . Patients finds marked relief from <i>Ugrakandu</i> (Intense itching), and scaling. Rather the change in the colour	
17/09/2023	After <i>Virechana Karma</i> Patient found dramatic relief from reddish rashes, induration, scaling, and itching.	
22/10/2023	Advised few <i>Shamanoushadhi</i> for complete pacification, and rejuvenation purpose.	01) Tab Imupsora 1-0-1 A/F with warm water. 02) Cap Urtiplex 1-0-1 A/F with warm water. 03) Psoralin oil. External application (Once in morning prior to bath in a luke warm state) All medications advised for 15 days.

Outcome

There was arrest in the progression of erythematous patches, scaling, and itching at the time of discharge itself (after *Virechana Karma*). During *Shodhananga Snehapaana* factors such as scaling, itching, increased, but all these parameters showed marked reduction after *Ubhayamarga Shodana Karma*.

The PASI score and the DLQI score explain this stupendous change. Photographs were taken during and after the treatment for records. Outcome measures (Assessment before and after treatment).

- Itching: Severe to markedly subsided after *Vamana*
- Scaling: Severe to subsided
- Thickness: Severe to markedly subsided
- Redness: Severe to Markedly subsided after *Virechana*
- PASI: 12.7 to 1.3
- DLQI: 16 to 3.

DISCUSSION

The disease *Kushta* is one among the *Ashtamahagada*¹⁴ (8 great disorders) and *Santarpanajanya Vyadhi* (diseases of over nutrition). The vitiation of the *Tridoshas* and *Saptha Dhatu* (bodily tissues) occurs in *Kushta*. Ayurveda explains mainly 18 types of skin diseases under 2 categories named *Maha Kushta* (Major skin diseases) and *Kshudra Kushta* (Minor skin diseases), based on severity in their manifestations.

Each one among the major categories is further explained in detail with the *Dosha* involvement and skin appearances. Because of the prolonged nature of the disease along with the involvement of the deeper *Dhatu*s and predominance of *Dosha*s, *Shodhana* is the first and foremost line of treatment in *Kushta*. Depending on the predominance of *dosha*s and strength of the patient, even repeated *Shodhana* can be done, as per the advice put forth by *Acharyas*. The disease psoriasis is mainly compared with either *Eka Kushta*, *Sidhma Kushta*, or *Kitibha Kushta*, which are of *Vata-Kapha* in origin. The scaly, rough, erythematous patches associated with severe itching are the characteristic features of *Kitibha Kushta*, and the case was diagnosed as it is. In the present case the *Dosha* involvement was assessed by specific features of *Vata* and *Kapha*, which produces severe itching, scaling, and erythematous patches. In the contemporary system of medicine this is referred to as Psoriasis.

The treatments adopted were purely based on the Ayurvedic principles. In *Bahudosha Avasta* (excessively aggravated doshas) *Shodhana* is the main line of treatment. Because *Kushta* is a *Bahu Dosha Avasta Vyadhi* and *Santarpanotha Vyadhi* repeated *Shodana* is the treatment principle told in classics¹⁵ and the same is adopted here. For the elimination of *Vaikruta Vata Dosha* *Abhyantara Shodhananga Sneha* (*Sarpi Paana* - Ghee intake) followed by *Baahya Snehana* and *Svedana* were done, *Kaphapradhanya - Anubandhi Pitta Dosha* were eliminated through emesis, and purgation was done for the elimination of the *Dushita Rakta* and *Pitta Dosha* along with *Anubandhi Kapha*.



In this diagnosed case of *Kitibha Kushta*, based on the *Dosha* analysis, *Vata-Kaphahara* line of treatment was adopted. Both Purificatory measures along with wholesome diet were found to be effective in the termination of the disease. The course of treatment was 12 days for each *Shodhana* (*Vamana* and *Virechana*) in hospital-based treatment at an interval of 15 days between *Shodhana*.

Photographs

The photographs of Back of the body Before treatment (Figure - 4), after *Vamana Karma* (Figure - 5), and after *Virechana Karma* (Figure - 6) of the patient were recorded.



Modern medicine treats psoriasis with various medicaments like topical treatment such as application of corticosteroids, Keratolytics, Anthralin and Tars, Tazoterene analogues of Vit-D3. Systemic treatment consists of Cyclosporine, Retinoids, Methotrexate. Photo Therapy consists of UVB, PUVA, Bath PUVA and PDT. Despite their efficacy, these treatments have serious adverse effects like hepato-toxicity, pulmonary toxicity, pancytopenia, teratogenicity, metabolic disturbances and increased risk of malignancies.

Kustha is a condition that is difficult to treat by nature, it is referred to as "*Dushchikitsya*"¹⁶ however by using *Shodhana*, the cure of the diseases becomes easier by eliminating the root cause and hence *Shodhana* has great importance in *Bahudosha Avastha*.

Discussion on Mode of action of the procedures can be dealt under these headings

- a) Probable Mode of action of *Vamana Karma* in psoriasis.
 - Probable action of *Aama Paachana* by *Agnitundi Vati*.
 - Probable action of *Shodhananga Snehapana - Mahatikta Ghruta*.
 - Probable action of *Bahya Snehana (Sarvanga Abhyanga)* and *Svedana*.
 - Probable action of *Vamana Karma*.
- b) Probable Mode of action of *Virechana Karma* on psoriasis.

a) Probable Mode of action of *Vamana Karma* in psoriasis

Because of *Rasavaha Srotodusti* the patient is having *Agnimandhya* so entire treatment schedule was planned accordingly.

• Probable action of *Aama Paachana - Agnitundi Vati*

The treatment plan was initiated with *Deepana-Pachana Yoga*, or *Agnivardhaka* and *Amapachaka* in *Purva Karma*. *Agnitundi Vati* was administered for 6 days 1 Tablet BID with warm water before food.

Agnitundi Vati contains *Shodita Paarada*, *Chitraka*, *Jeeraka*, *Tinduka*, *Vidanga*, *Souvarchala* and *Samudra Lavana*, *Tankana*, *Jambeera Svarasa*, majority of the ingredients contain *Ushna Virya* and *Laghu*, *Ruksha* properties, where all have *Ushna Veerya*, *Katu Vipaka*. As a result, they work on the *Kapha-Vata Dosha*, break down *Ama*, and stimulate appetite. It increases hunger and digestive fire while eliminating *Ama*. It is a digestive stimulant that promotes bile secretion from the liver and acid production from stomach. Therefore, *Agnitundi Vati* causes *Ama Paachana* and intensifies the digestive fire (*Agni*) so that *Ghruta* can be easily digested during *Snehapana*.

• Probable action of *Shodhananga Snehapana - Mahatikta Ghruta*

Sneha pacifies *Vata*, brings softness in body parts along with *Mala* accumulated and stagnated in body parts get loosened. *Mahatikta Ghruta* which is mentioned in *Kustha Chikitsa* by *Acharya Charaka* used in this case study for *Abhyantara Shodhananga Snehapana* having superior *Kusthaghna* properties and *Kapha - Pittahara Guna*. So, it brings vitiated *Doshas* to



Koshtha. *Sneha* tends to balance the *Gati* of *Vaayu* by cardinal feature of *Snigdha Guna* of *Sneha* in *Koshtha*. Thus attains *Agnideepti*. As a *Anupaana Sasharkara Ksheera* is used for *Doshotklesha* purpose.

Snehapaana - Sneha Matra and *Kaala* in *Shodhananga Snehapaana* in *Arohana Matra* helps to bring the *Doshas* situated in *Shaakha* (peripheral tissues) to the *Koshtha* so that they can be easily expelled out. This is achieved by *Vruddhi* (increase) and *Vishyandana* (dissolution or diffusion) *Karma* of *Snehapaana* therapy. The administered *Sneha* undergoes various digestive phases in *Koshtha*. The digestion and absorption of administered *Sneha* in *Snehapaana* creates certain physiological changes in the body. These changes create *Doshotklesha* and prepare the body for the *Shodhana Karma*.

During *Snehapaana* qualities of *Ghruta* reaches into each cell of the body and the toxins from the cells diffuse back into the *Ghruta* medium through active and passive transportation. *Svedana Karma* increases the exchange process between the cells. *Sneha* reaches to *Srotas* (Nano channels) and acts as a solvent to remove the obstruction by dissolving those vitiated *Doshas* in it, resulting in the removal of *Srotorodha* (blockage in channels), which is one of the important steps in *Samprapti Vighatana* (reversal of pathogenesis). By the combined effect of *Snehana* and *Svedana*, *Doshas* reaches to the *Koshtha* by *Anupravana Bhava* and after that, they will be expelled out through the nearest route by proper *Shodhanakarma*.

The *Ghruta* induces production and secretion of several digestive enzymes necessary for excess lipid molecules to get digested there by eliminate unwanted molecules from the body. A *Tikta Rasa Samskaarita Ghruta* helps to reach deeper tissue by its nature and does the *Utkleshata*. Being *Tikta Rasa Pradhana* it will act on *Pitta* so does on *Rakta* because of their *Ashraya Ashraye bhava*, by which it had an effect on Psoriasis which is a *Rakta Pradoshaja Vikara*¹⁷ (Disorders of blood). Further, *Vamana* act as *Kapha-Pitta Shodhana* (Purification). *Kapha* being one of the major culprit *Dosha* in the Psoriasis, it had shown the fruitful effects in Psoriasis.

Mahatiktaka Ghruta contains key ingredients like *Aragvadha* (Cassia fistula), *Saptaparna* (Alstonia scholaris), *Musta* (Cyperus rotundus), *Vatsakabija* (Holarrhena antidysenterica), *Dravyas* of *Balaasajith Gana*¹⁸ and part of a *Aragvadhadi Gana*¹⁹ helps to pacify *Kushta*. *Padmaka* (Prunus poddum), *Ushira* (Vetiveria zizanioides), *Saariva* (Hemidsemus indicus), *Chandana* (Santalum album), *Yashtimadhu* (Glycyrrhiza glabra), belongs to the *Saarivadi Gana*²⁰ helps to pacify *Pitta* and *Rakta* dosha. *Patola* (Trichosanthes dioica), *Tiktarohini* (Picrorhiza kurroa), *Murva* (Marsdenia tinescimsima), *Patha* (Cyclea peltata / Cissampelos pareira), *Amruta* (Tinospora cordifolia), *Dravyas* under the *Patoladi Gana*²¹ act as *Kushtaghna*. *Uragandha* (Acorus calamus), *Ativisha* (Aconitum heterophyllum), *Haridra* (Curcuma longa), *Daruharidra* (Berberis aristata), drugs under the *Vachadi Gana*²² which are *Shleshmahara* in nature. *Triphala* act as *Anulomaka*, *Tvachya*, *Rasayana*. *Pichumarda* (Azadirachta indica), *Parpataka* (Fumaria indica), *Dhanvayasa* (Alhagi pseudalhagi), *Pippali* (Piper longum), *Gajapippali* (Piper chaba), *Vishaka* (Citrus chalcocarpus), *Shatavari* (Asparagus racemosus) *Vasa* (Adhatoda vasica), *Kiratiktika* (Swertia chiraita), *Trayamana* (Gentiana kurroa) are *Tikta* and *Madhura Dravyas* has *Pitta-Rechaka* properties through *Sneha* even at the cellular level and *Amalaki phala Rasa* (Emblia officinalis Juice) act as *Kledahara*

• Probable action of *Bahya Snehana* and *Svedana*

Abhyanga is the widely practiced measure to treat various disorders related to skin and other organs. Massage in specific direction improves blood circulation, facilitates removal of toxins from the tissues and recuperates the body tissues.

For the purpose of *Abhyanga* (external oleation) *Yashtimadhu Taila* was used. Its having properties like *Madhura*, *Tikta*, and *Madhura Vipaka* subsides *Vata-Pitta-Rakta Dosha* without disturbing *Kapha Dosha* by its *Prabhaava* for being a *Sneha*. Its *Snigdha Guna* reduces the *Rukshatva*, *Kharatva* and *Parushata*. It has properties like *Kusthaghna* and *Kandughna*. The nature of *Taila* is *Sukshmagamitva* means it helps drugs to go into the minute channels and does the proper absorption. In *Yashtimadhu*, *Liquiritin* is Anti-inflammatory & Fungicide. *Glycyrrhetic-Acid* Anti allergic, Antihistamic. *Glycyrrhizin* Antiplateque. Thus, *Yashtimadhu Taila* is effective in this present condition. While in *Sarvanga Svedana* it causes liquefaction of *Doshas*. Thus, *Doshas* get *Anuloma Gati* and brought towards *Koshtha* further helps for easy evacuation.

Kaphotkleshaka Aharas like *Payasam* and other *Madhura Ahara* (Peda - Milk cream base sweets) are advised during *Vishraama Kaala* for *Vamana*.

Pittotkleshaka Aharas like *Amla Pradhanya* Tamarind-Jaggery based *Rasam* was advised during *Vishraama Kaala* for *Virechana*.

• Probable action of *Vamana Karma*

Kitibha is a *Kapha-Vataja Vyadhi* where patient presenting with the severe itchy lesions. *Vamanam Shleshmaharanaam* (Emesis is best therapy in *Kaphaja Vikara*) *Acharya Sushruta*²³ *Charaka*²⁴ and *Vagbhata*²⁵ indicated *Vamana Karma* in *Kushta* generally.

Vamana is a procedure in which vitiated *Doshas* (Bio-toxins) are eliminated through upper channels i.e. mouth. Specially the Bio-dynamic entities *Kapha* and *Pitta Dosha* brought to *Amashaya* (stomach and duodenum) from all over the body by the specific preoperative procedures and then eliminated out by inducing the emesis.



The *Vamaka Dravya (Madanaphala)* having the properties like *Ushna*, *Teekshna*, *Sukshma*, *Vyavayi*, *Vikasi*, get absorbed and reach to *Hrudaya* due to their *Virya* (Potency). Due to *Sukshma* and *Vyavayi* properties, they move through *Dhamani* to reach *Sthula* (macro) & *Sukshma* (micro) *Srotas* (channels) throughout the body. They act on the sites of *Dosha Sanghata* that is at *Rasavahasroto Dushti* in this case. *Tvak* is the reflection of *Rasa Dhatu Sarata* even its vitiation reflects in *Tvak*. At first, *Yoga* liquifies (*Vishyandayanti*) these *Dushyas* by their *Ushna Guna*. Increased liquidity will further help to flow through circulation. Afterwards these *Dushyas* are fragmented into smaller molecules due to *Tikshna Guna* which will help them to extricate (*Vicchindanti*) from the nano channels. Then, these liquified and fragmented molecules are brought to *Amashaya* flowing through "*Anu Srotas*" (*Anu Pravana Bhaava*) without adhering to them. This advancement takes place in the similar manner in which the water floats through the pot layered by unctuous material without sticking to the same. Where from stimulated by *Udana Vayu* and due to the *Agni* and *Vaayu Mahabhautika* constitution and *Prabhava*, they march in upward direction to expel the vitiated *Kaphadi Dosha*, brought along with them²⁶.

b) Probable action of *Virechana Karma* on psoriasis

*Acharya Charaka*²⁷, *Sushruta*²⁸ and *Vagbhata* suggested *Virechana* is the prime line of treatment in the *Kushta* when it's associated with *Pitta*.

Virechaanam Pittaharanaam (Purgation is best therapy in *Pittaja Vikara*). *Virechana* is a procedure in which vitiated *Pittadi Doshas* (Bio-toxins) are eliminated through lower channels i.e. Anus. Specially the Bio-functional entity *Pitta Dosha* brought to *Pakvashaya* (large intestine) from all over the body by the specific preoperative procedures and then eliminated out by inducing the Purgation.

Virecana Yoga (Trivrut Leha), gets absorbed and due to *Virya*, it reaches to the *Hrudaya* then the *Dhamani* and there after it reaches to macro and micro channels of the body. The *Vyavayi Guna* of drug is responsible for quick absorption. The *Vikasi Guna* causes softening and loosening of the bond by *Dhatu Shaitilya Karma*. Due to *Ushna Guna*, the *Pittadi Dosha Sanghata* (compactness) is liquified (*Vishyandana*). Action of *Tikshna Guna* is to break the *Mala* and *Dosha* in micro form. Due to *Sukshma Guna* by reaching in micro channels, disintegrates endogenic toxins, which are then excreted through micro channels. Mainly due to *Prabhava*, *Prithvi* and *Jala Mahabhuta* and presence of *Sara Guna Virechana* occurs.

From the above description, a hypothesis can be postulated that due to the *Virya* of the *Virechana* drugs softening, disintegration, liquification by which the endogenic metabolic products brought to the *Koshtha* for elimination of *Pittadi Dosha* situated in *Raktadi Dhaatu* as *Ashrayi*. After *Virechana* Erythematous lesions reduced drastically.

CONCLUSION

From the present clinical study, it can be concluded that the *Ubhayamarga Shodhanas* mentioned in the classics for *Kitibha Kushta* are shown Significant results clinically and statistically.

*Acharya Chakrapani*²⁹ states that the periodic *Shodhana* is essential in *Kushta* where *Stoka-Stoka* (little quantity) or *Alpa-Alpa* and *Punaha-Punaha Dosha Nirharana* is beneficial for the patient at *Bhuri Dosha Avastha* in *Kushta*. As complete expulsion of *Vaikruta Dosha* at a stretch is harmful for the Patient and leads to *Bala Kshaya*. In the present study *Shamanoushadhi Dravyas* also act as a *Tvak Rasayana* to prevent the reoccurrence of *Kushta*. In case series style, there is potential for the same.

REFERENCING

- 1) *Sushruta Acharya, Sushruta Samhita, Nibandha Sangraha of Dalhana, Nyaya Chandrika of Gayadasa, Vaidya Yaavji Trikamji Acharya, Chikitsa Sthaana 9/6, Varanasi: Chaukambha Surabharati Prakashana. Reprint 2003, Page No-442.*
- 2) *Agnivesha, Charaka Samhita, Ayurveda Deepika of Chakrapani, Vaidya Jadavaji Trikamji Acharya. Sutra Sthaana 25/40, New Delhi, Choukambha Prakashan, 8th edition. 2013, Pg. No. -132.*
- 3) *Agnivesha, Charaka Samhita, Ayurveda Deepika of Chakrapani, Vaidya Jadavaji Trikamji Acharya. Chikitsa Sthaana 7/22, New Delhi, Choukambha Prakashan, 8th edition. 2013, Pg. No. - 451.*
- 4) *Agnivesha, Charaka Samhita, Ayurveda Deepika of Chakrapani, Vaidya Jadavaji Trikamji Acharya. Chikitsa Sthaana 7/29, New Delhi, Choukambha Prakashan, 8th edition. 2013, Pg. No. - 451.*
- 5) *Vagbhata, Ashtanga Hrudaya, Sarvanga Sundara of Arunadatta, Ayurveda Rasyana of Hemadri, Anna moreshwar kunte, Nidana Sthaana 14/8, Varanasi, Chaukambha Surabharati Prakashan, New Delhi; 2002. Pg. No. -524.*
- 6) *Sushruta Acharya, Sushruta Samhita, Nibandha Sangraha of Dalhana, Nyaya Chandrika of Gayadasa, Vaidya Yaavji Trikamji Acharya, Nidana Sthaana 5/16, Varanasi: Chaukambha Surabharati Prakashana. Reprint 2003, Page No-286.*
- 7) *Sushruta Acharya, Sushruta Samhita, Nibandha Sangraha of Dalhana, Nyaya Chandrika of Gayadasa, Vaidya Yaavji Trikamji Acharya, Nidana Sthaana 5/14, Varanasi: Chaukambha Surabharati Prakashana. Reprint 2003, Page No-286.*
- 8) *Dogra S, Yadav S. Psoriasis in India: Prevalence and pattern. Indian J Dermatol Venereol Leprol. 2010; 76:595-601.*
- 9) *World Health Organization. Psoriasis; 2016. Accessed July 27, 2018. www.who.int*



- 10) Ralston, Stuart H., Ian D. Penman, Mark W. J. Strachan, and Richard Hobson, eds. 2022. *Davidson's Principles and Practice of Medicine*. 24th ed. London, England: Elsevier Health Sciences. 27th chapter 1065 page.
- 11) Agni Shri Brahmashankar Mishra, Bhaishajya Ratnavali of Govinda Sen, 10th Chapter, Verse number 94, Varanasi, Chaukhambha Sanskrit Sansthan, edition reprint-2008, Pg No 648.
- 12) Agnivesha, Charaka Samhita, Ayurveda Deepika of Chakrapani, Vaidya Jadavaji Trikamji Acharya. Chikitsa Sthaana 7/144-150, New Delhi, Choukambha Prakashan, 8th edition. 2013, Pg. No. - 457.
- 13) Agnivesha, Charaka Samhita, Ayurveda Deepika of Chakrapani, Vaidya Jadavaji Trikamji Acharya. Sutra Sthaana 13/88, New Delhi, Choukambha Prakashan, 8th edition. 2013, Pg. No. - 86.
- 14) Agnivesha, Charaka Samhita, Ayurveda Deepika of Chakrapani, Vaidya Jadavaji Trikamji Acharya. Indriya Sthaana 9/8, New Delhi, Choukambha Prakashan, 8th edition. 2013, Pg. No. - 368.
- 15) Agnivesha, Charaka Samhita, Ayurveda Deepika of Chakrapani, Vaidya Jadavaji Trikamji Acharya. Chikitsa Sthaana 7/39, New Delhi, Choukambha Prakashan, 8th edition. 2013, Pg. No. - 452.
- 16) Agnivesha, Charaka Samhita, Ayurveda Deepika of Chakrapani, Vaidya Jadavaji Trikamji Acharya. Shareera Sthaana 7/4, New Delhi, Choukambha Prakashan, 8th edition. 2013, Pg. No. - 337.
- 17) Agnivesha, Charaka Samhita, Ayurveda Deepika of Chakrapani, Vaidya Jadavaji Trikamji Acharya. Sutra Sthaana 28/11-12, New Delhi, Choukambha Prakashan, 8th edition. 2013, Pg. No. - 179.
- 18) Vagbhata, Ashtanga Hrudaya, Sarvanga Sundara of Arunadatta, Ayurveda Rasyana of Hemadri, Anna moreshwar kunte, Sutra Sthaana 15/7, Varanasi, Chaukambha Surabharati Prakashan, New Delhi; 2002. Pg. No. -232.
- 19) Vagbhata, Ashtanga Hrudaya, Sarvanga Sundara of Arunadatta, Ayurveda Rasyana of Hemadri, Anna moreshwar kunte, Sutra Sthaana 15/17-18, Varanasi, Chaukambha Surabharati Prakashan, New Delhi; 2002. Pg. No. -235.
- 20) Vagbhata, Ashtanga Hrudaya, Sarvanga Sundara of Arunadatta, Ayurveda Rasyana of Hemadri, Anna moreshwar kunte, Sutra Sthaana 15/11, Varanasi, Chaukambha Surabharati Prakashan, New Delhi; 2002. Pg. No. -235.
- 21) Vagbhata, Ashtanga Hrudaya, Sarvanga Sundara of Arunadatta, Ayurveda Rasyana of Hemadri, Anna moreshwar kunte, Sutra Sthaana 15/15, Varanasi, Chaukambha Surabharati Prakashan, New Delhi; 2002. Pg. No. -232.
- 22) Vagbhata, Ashtanga Hrudaya, Sarvanga Sundara of Arunadatta, Ayurveda Rasyana of Hemadri, Anna moreshwar kunte, Sutra Sthaana 15/35-36, Varanasi, Chaukambha Surabharati Prakashan, New Delhi; 2002. Pg. No. -238.
- 23) Sushruta Acharya, Sushruta Samhita, Nibandha Sangraha of Dalhana, Nyaya Chandrika of Gayadasa, Vaidya Yaavji Trikamji Acharya, Chikitsa Sthaana 9/43, Varanasi: Chaukambha Surabharati Prakashana. Reprint 2003, Page No-446.
- 24) Agnivesha, Charaka Samhita, Ayurveda Deepika of Chakrapani, Vaidya Jadavaji Trikamji Acharya. Siddhi Sthaana 2/10, New Delhi, Choukambha Prakashan, 8th edition. 2013, Pg. No. - 687.
- 25) Vagbhata, Ashtanga Hrudaya, Sarvanga Sundara of Arunadatta, Ayurveda Rasyana of Hemadri, Anna moreshwar kunte, Sutra Sthaana 18/2, Varanasi, Chaukambha Surabharati Prakashan, New Delhi; 2002. Pg. No. -260.
- 26) Agnivesha, Charaka Samhita, Ayurveda Deepika of Chakrapani, Vaidya Jadavaji Trikamji Acharya. Kalpa Sthaana 1/5, New Delhi, Choukambha Prakashan, 8th edition. 2013, Pg. No. - 651.
- 27) Agnivesha, Charaka Samhita, Ayurveda Deepika of Chakrapani, Vaidya Jadavaji Trikamji Acharya. Siddha Sthaana 2/13, New Delhi, Choukambha Prakashan, 8th edition. 2013, Pg. No. - 688.
- 28) Sushruta Acharya, Sushruta Samhita, Nibandha Sangraha of Dalhana, Nyaya Chandrika of Gayadasa, Vaidya Yaavji Trikamji Acharya, Chikitsa Sthaana 33/32, Varanasi: Chaukambha Surabharati Prakashana. Reprint 2003, Page No-519.
- 29) Agnivesha, Charaka Samhita, Ayurveda Deepika of Chakrapani, Vaidya Jadavaji Trikamji Acharya. Chikitsa Sthaana 7/39, New Delhi, Choukambha Prakashan, 8th edition. 2013, Pg. No. - 452.



TRANSFORMING BREAST CANCER CARE: THE IMPACT OF TELEPHARMACY AND TECHNOLOGY

**Barot Mansi Manoj Kumar¹, Mrs. Neha S. Vadgama², Dr. Anuradha P. Prajapati³,
Dr. Sachin B. Narkhede⁴, Dr. Shailesh Luhar⁵**

^{1,2,3,4,5}Smt. B.N.B. Swaminarayan Pharmacy College, Salvav-Vapi, India

Article DOI: <https://doi.org/10.36713/epra15273>

DOI No: 10.36713/epra15273

ABSTRACT

This article explores the transformative potential of telepharmacy in breast cancer care. Overcoming geographical barriers, telepharmacy increases access to specialized care, fostering patient satisfaction. Despite challenges like limited technology access and privacy concerns, its personalized approach aligns with patient-centric care. The future of breast cancer care may be significantly impacted, with telepharmacy enabling continuous monitoring, tailored interventions, and comprehensive support. A call to action urges healthcare providers to adopt telepharmacy, collaborating with policymakers to address implementation challenges. Researchers are encouraged to delve into the evolving field, evaluating effectiveness and patient outcomes. Through collective efforts, there's potential to revolutionize breast cancer care, offering enhanced accessibility and personalization via telepharmacy's transformative capabilities.

KEYWORDS: Telepharmacy, Breast Cancer Care, Patient Satisfaction, Patient-Centric Care, Continuous Monitoring

INTRODUCTION ^(1,2)

Breast cancer, characterized by uncontrolled cell proliferation in breast tissues, remains a widespread and diverse threat, particularly affecting women globally. Risk factors, including age, hormonal influences, genetic susceptibility, and family history, contribute to its prevalence. Early detection through mammography is crucial for a favourable prognosis. Molecular subtyping guides treatment approaches, encompassing hormone therapy, targeted therapies, radiation, chemotherapy, and surgery. Despite advancements, breast cancer poses physical and mental challenges, emphasizing the need for ongoing research, supportive care, and holistic interventions to enhance outcomes.

Effective medication management is pivotal in optimizing breast cancer treatment. The diverse therapeutic interventions require precise administration to minimize risks. Beyond symptom control, medication management shapes treatment outcomes, influencing survival rates and preventing recurrence. A collaborative healthcare approach, emphasizing education, monitoring, and personalized plans, enhances both treatment success and patient well-being.

Telepharmacy, a component of telehealth, utilizes digital platforms for remote pharmaceutical services, revolutionizing healthcare accessibility. Through video calls and secure channels, telepharmacy empowers pharmacists to provide counselling, prescription verification, and adherence support, transcending traditional boundaries and optimizing patient outcomes.

INCIDENCE AND PREVALENCE OF BREAST CANCER ^(3,4)

Breast cancer is globally pervasive, ranking as the most commonly diagnosed cancer among women. Its incidence, denoting newly diagnosed cases within a specific population during a defined period, reached an estimated 2.3 million in 2020, according to the World Health Organization. Incidence rates vary across regions due to age, genetics, lifestyle, and healthcare infrastructure. High-income countries often exhibit higher incidence rates due to enhanced awareness, screening programs, and healthcare accessibility. The prevalence of breast cancer, reflecting the total number of cases at a specific point, underscores its universal impact, affecting women in both developed and developing nations.

TELEPHARMACY IN ONCOLOGY ⁽⁵⁾

Telepharmacy in oncology adopts a comprehensive strategy, transcending traditional healthcare boundaries to elevate patient care. Through virtual consultations, oncology pharmacists use digital platforms to deliver medication counselling, address treatment inquiries, and monitor adherence. This approach plays a pivotal role in managing chemotherapy side effects, enabling immediate assessment and interventions. Telepharmacy enhances patient education, promoting a deeper understanding of treatment plans.



Optimizing medication management, it ensures timely access to specialized pharmacists and personalized healthcare. The benefits extend to underserved regions, broadening oncology service accessibility.

Breast cancer care in oncology presents unique challenges in treatment decision-making, variable responses across subtypes, and addressing psychosocial aspects. Opportunities arise from personalized medicine progress, targeted therapies, and multidisciplinary approaches. Precision medicine, guided by molecular profiling, tailors treatments for efficacy with minimal side effects. Evolving immunotherapy and innovative trial designs offer breakthrough potential. Holistic care, integrating psychosocial support and awareness initiatives, enriches breast cancer care.

The evolution of telepharmacy within oncology signifies a substantial advancement in patient care and specialized service accessibility. Initially focusing on medication management and remote consultations, telepharmacy has progressed to incorporate sophisticated technologies for instant monitoring, virtual tumour board discussions, and collaborative treatment decision-making. This transformation is driven by telehealth platforms, secure communication channels, and data analytics. Remote evaluation of chemotherapy side effects, prompt interventions, and medication adherence ensure telepharmacy's integral role. Ongoing developments, including artificial intelligence and machine learning, contribute to personalized treatment plans, further optimizing therapeutic outcomes.

MEDICATION COUNSELING AND EDUCATION ^(6,7,8)

Patient education is crucial in breast cancer treatment, empowering individuals to actively engage in healthcare decisions. Understanding the disease, treatment options, and potential side effects helps navigate challenges. Education on early detection methods, like self-exams and mammography, aids prompt diagnosis, impacting overall prognosis. Knowledge of diverse treatment modalities enables collaborative decision-making. Awareness of side effects and management strategies enhances quality of life during treatment. Telepharmacy platforms, vital for medication counselling, use digital technologies for remote interactions, improving access to pharmaceutical services. They effectively address patient inquiries, contributing to enhanced adherence. Telehealth technologies facilitate remote patient-practitioner interactions, improving healthcare accessibility and satisfaction while addressing concerns promptly. This patient-centred approach reshapes contemporary healthcare delivery.

MEDICATION MANAGEMENT AND ADHERENCE ^(9,10)

Managing medications in breast cancer treatment poses complex challenges for healthcare providers and patients. The diverse therapies, including chemotherapy and hormonal treatments, demand meticulous medication management to enhance efficacy. Addressing potential adverse effects requires attentive monitoring and timely intervention, while ensuring patient adherence remains an ongoing challenge with significant treatment implications. The evolving landscape of breast cancer research introduces new therapies and complexities, further complicating medication decisions.

Telepharmacy interventions prove pivotal in symptom management, offering timely remote assistance, especially in cancer care. Remote evaluations and personalized recommendations empower patients to handle symptoms effectively. Supportive care through remote monitoring, utilizing wearable devices and telehealth platforms, revolutionizes healthcare by proactively addressing symptoms, optimizing treatment plans, and enhancing overall patient well-being. Studies affirm its efficacy in improving patient outcomes, emphasizing the need for a patient-centric approach, ethical considerations, and transparent communication for successful implementation.

REMOTE MONITORING AND HEALTH CONTROL ^(11,12)

In the realm of breast cancer, ongoing surveillance is vital for dynamic patient care due to the disease's inherent heterogeneity. Continuous monitoring empowers healthcare professionals to identify complications early, evaluate treatment efficacy, and intervene promptly. This approach is especially critical during and after treatments like surgery, chemotherapy, and radiation therapy, allowing providers to gauge impacts, address side effects, and tailor ongoing plans based on individual responses.

Telepharmacy tools, including telehealth platforms, mobile apps, and wearable devices, play a crucial role in remote patient monitoring. These tools facilitate instant communication, allowing continuous monitoring of health indicators. Wearable devices monitor vital signs and medication adherence, generating valuable data. Telepharmacy platforms enable virtual consultations, supporting early intervention and empowering patients in autonomous health management.



Figure 1: Healthcare System's Architecture

Post-treatment care benefits significantly from telepharmacy, bridging communication gaps between providers and patients. It utilizes digital technologies for remote consultations, medication management, and ongoing support. In chronic conditions like cancer, telepharmacy facilitates virtual follow-up appointments, improving access, reducing in-person visits, and addressing geographical barriers. Research validates telepharmacy's effectiveness in post-treatment care, enhancing patient satisfaction and optimizing healthcare resources. As healthcare embraces digital solutions, telepharmacy emerges as a valuable, patient-centred tool, improving post-treatment care experiences and optimizing resource utilization.

SPECIALITY PHARMACIST AND EXPERT CONSULTATIONS ^(13,14)

Telepharmacy has revolutionized patient access to specialty pharmacists, particularly in oncology, ensuring comprehensive care for cancer patients. This innovative approach overcomes geographical barriers, allowing remote consultations with highly trained oncology pharmacists. This is particularly valuable where specialized oncology services are limited. Through telepharmacy, cancer patients can address medication queries, manage side effects, and ensure adherence to complex regimens. Oncology pharmacists provide personalized advice tailored to the patient's diagnosis and treatment plan, contributing to better treatment outcomes. In complex breast cancer cases, telepharmacy facilitates expert consultations, ensuring access to specialized insights regardless of location. Virtual tumour board discussions and collaborative approaches ensure patients benefit from diverse healthcare professionals' collective expertise. Telepharmacy serves as a catalyst for collaborative patient care, fostering communication and coordination among healthcare providers, addressing both medical and psychosocial aspects of cancer care in a holistic manner.

PATIENT CENTERED APPROACHES ^(15,16,17)

Telepharmacy services to patient needs:

1. Tailored Medication Management Plans

Oncology pharmacists customize medication management plans through virtual consultations. Assessment of patient histories and treatment responses optimizes efficacy while minimizing adverse effects. Ensures personalized and accessible telepharmacy, enhancing overall patient care.

2. Customized Educational Resources

Educational materials are tailored to individual understanding, language preferences, and cultural background. Empowers patients in treatment decisions, fostering active engagement. Enhances accessibility and relevance for a personalized telepharmacy experience.

3. Flexible Communication Methods

Breast cancer telepharmacy prioritizes patient preferences in communication. Offers video calls, phone consultations, or secure messaging based on individual choices. Adaptable communication methods enhance patient engagement and comfort.

4. Cultural Sensitivity in Care

Cultural competence is emphasized, integrating cultural nuances into patient interactions. Fosters trust and engagement by acknowledging and respecting cultural diversity. Creates a supportive and inclusive space for breast cancer patients, addressing both medical and cultural needs.



Feedback and Patient satisfaction

1. Patient Satisfaction Surveys:

Conduct regular surveys for patient insights on communication effectiveness and overall satisfaction. Analyse survey data to guide improvements in breast cancer telepharmacy service delivery.

2. Continuous Quality Improvement

Foster a culture of continuous quality improvement. Utilize patient feedback to enhance processes and prioritize changes for improved care quality.

3. Adaptations Based on Feedback

Actively respond to patient feedback, showcasing commitment to patient-centred care. Adapt services based on patient input, addressing concerns about communication, technology, or specific medications.

4. Patient Engagement Platforms

Integrate platforms for real-time patient feedback. Provide a direct channel for patients to voice opinions, report experiences, and actively shape telepharmacy service evolution.

Addressing Barriers to Patient Engagement

To optimize breast cancer telepharmacy, understanding and mitigating barriers to patient engagement is crucial. This involves a multifaceted approach that considers technological accessibility, health literacy, cultural competence, and the integration of psychosocial support.

1. Technology Accessibility

Breast cancer telepharmacy acknowledges disparities in technology access and provides alternatives, such as phone consultations or assistance with technology use, ensuring inclusivity.

2. Health Literacy Considerations

Communication is tailored to accommodate varying levels of health literacy, utilizing plain language, visual aids, and resources designed to enhance understanding and empower patients to actively participate in their care.

3. Cultural Competence Training

Breast cancer telepharmacy teams undergo ongoing cultural competence training to enhance awareness, sensitivity, and adaptability to diverse cultural backgrounds, ensuring that all patients receive equitable care.

4. Psychosocial Support Integration

Recognizing the psychosocial dimensions of breast cancer care, telepharmacy services integrate psychosocial support resources. This includes access to mental health professionals, support groups, and resources addressing the emotional and social aspects of the breast cancer journey.

EMERGING TECHNOLOGIES IN TELEPHARMACY FOR BREAST CANCER: TRANSFORMING THE LANDSCAPE OF CARE ^(18,19)

Emerging technologies are revolutionizing breast cancer telepharmacy, transforming the care landscape. Artificial intelligence (AI) and machine learning optimize treatment plans by analysing vast datasets, personalizing interventions. Telepharmacy leverages virtual reality (VR) for immersive patient education, enhancing understanding and engagement. Wearable devices monitor vital signs and medication adherence, providing real-time data for proactive intervention. Blockchain ensures secure and transparent data exchange, safeguarding patient information. These technologies collectively redefine breast cancer care, offering personalized, immersive, and data-driven approaches through telepharmacy, advancing accessibility, and patient outcomes in the evolving digital era.

NAVIGATING CHALLENGES AND IMPLEMENTING SOLUTIONS IN BREAST CANCER TELEPHARMACY ^(20,21)

1. In Breast Cancer Telepharmacy, overcoming challenges is crucial for effective care delivery:
 2. Limited Technology Access: Provide devices and training to bridge the digital divide.
 3. Privacy Concerns: Employ robust encryption, ensure compliance, and educate on privacy measures.
 4. Cultural Diversity: Offer multilingual resources and train culturally competent staff for effective communication.
 5. Technological Literacy: Conduct user-friendly training sessions and ongoing support for proficient platform use.
 6. Adherence and Engagement: Implement personalized strategies, reminders, and follow-ups to enhance patient involvement.
- These solutions collectively ensure accessibility, privacy, and effective engagement in breast cancer telepharmacy, advancing patient-centred care.

CONCLUSION

Telepharmacy revolutionizes breast cancer care by overcoming geographical constraints and improving access to specialized services. Its personalized approach ensures high patient satisfaction, yet challenges like limited technology access and privacy concerns necessitate strategic solutions. The integration of telepharmacy holds transformative potential, enabling continual



monitoring and tailored interventions for optimal treatment outcomes. Technological advancements position telepharmacy as a key player in reshaping breast cancer care. A call to action urges healthcare providers to embrace telepharmacy, collaborate with policymakers, and advocate for supportive reimbursement policies. Ongoing research is crucial for assessing effectiveness, patient outcomes, and integration guidelines. The collective effort of providers, researchers, policymakers, and patients is essential for realizing the transformative possibilities of breast cancer telepharmacy, offering enhanced accessibility, personalization, and a patient-centric approach.

REFERENCES

1. Bray, F., Ferlay, J., Soerjomataram, I., Siegel, R. L., Torre, L. A., & Jemal, A. (2018). *Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries*. *CA: a cancer journal for clinicians*, 68(6), 394-424.
2. Harbeck, N. (2020). *Breast cancer is a systemic disease optimally treated by a multidisciplinary team*. *Nature Reviews Disease Primers*, 6(1), 30.
3. World Health Organization. (2021). *Breast cancer*. [<https://www.who.int/news-room/fact-sheets/detail/breast-cancer>]
4. International Agency for Research on Cancer. (2020). *Global Cancer Observatory*. [<https://gco.iarc.fr/>]
5. Hatoum, H. T., Hutchinson, R. A., Witte, K. W., & Newby, G. P. (1988). *Evaluation of the contribution of clinical pharmacists: inpatient care and cost reduction*. *Drug intelligence & clinical pharmacy*, 22(3), 252-259.
6. Matthews, A. K., Sellergren, S. A., Manfredi, C., & Williams, M. (2002). *Factors influencing medical information seeking among African American cancer patients*. *Journal of health communication*, 7(3), 205-219.
7. Dönmez, A. A., & Kapucu, S. (2017). *The effectiveness of a clinical and home-based physical activity program and simple lymphatic drainage in the prevention of breast cancer-related lymphedema: A prospective randomized controlled study*. *European Journal of Oncology Nursing*, 31, 12-21.
8. Chisholm-Burns, M. A., Graff Zivoin, J. S., Lee, J. K., Spivey, C. A., Slack, M., Herrier, R. N., ... & Palmer, J. (2010). *Economic effects of pharmacists on health outcomes in the United States: a systematic review*. *American Journal of Health-System Pharmacy*, 67(19), 1624-1634.
9. Vo, A. T., & Gustafson, D. L. (2023). *Telepharmacy in oncology care: A scoping review*. *Journal of Telemedicine and Telecare*, 29(3), 165-176.
10. Liu, F., Jiang, Y., Xu, G., & Ding, Z. (2020). *Effectiveness of telemedicine intervention for chronic obstructive pulmonary disease in China: a systematic review and meta-analysis*. *Telemedicine and e-Health*, 26(9), 1075-1092.
11. Azevedo, L. C., Caruso, P., Silva, U. V., Torelly, A. P., Silva, E., Rezende, E., ... & Brazilian Research in Intensive Care Network (BRICNet). (2014). *Outcomes for patients with cancer admitted to the ICU requiring ventilatory support: results from a prospective multicenter study*. *Chest*, 146(2), 257-266.
12. Monaghesh, E., & Hajizadeh, A. (2020). *The role of telehealth during COVID-19 outbreak: a systematic review based on current evidence*. *BMC public health*, 20, 1-9.
13. Elkaddoun, R., Haddad, F. G., Eid, R., & Kourie, H. R. (2020). *Telemedicine for cancer patients during COVID-19 pandemic: between threats and opportunities*. *Future oncology*, 16(18), 1225-1227.
14. Denis, F., Lethrosne, C., Pourel, N., Molinier, O., Pointreau, Y., Domont, J., ... & Letellier, C. (2017). *Randomized trial comparing a web-mediated follow-up with routine surveillance in lung cancer patients*. *JNCI: Journal of the National Cancer Institute*, 109(9), dx029.
15. Green, B. B., Cook, A. J., Ralston, J. D., Fishman, P. A., Catz, S. L., Carlson, J., ... Carrell, D. (2012). *Effectiveness of home blood pressure monitoring, Web communication, and pharmacist care on hypertension control: A randomized controlled trial*. *JAMA*, 308(5), 457-466.
16. Finley, P. R., Bluml, B. M., Bunting, B. A., Kiser, S. N., & Parnes, B. L. (2014). *Clinical and economic outcomes of a pilot project examining pharmacist-focused collaborative care treatment for depression*. *Journal of the American Pharmacists Association*, 54(6), 614-621.
17. Kliethermes, M. A., Bogaerts, J., Trippa, L., & Geller, N. L. (2018). *Challenges in the design and interpretation of non-inferiority trials*. *Contemporary Clinical Trials Communications*, 11, 11-18.
18. Esteva, A., Kuprel, B., Novoa, R. A., et al. (2017). *Dermatologist-level classification of skin cancer with deep neural networks*. *Nature*, 542(7639), 115-118.
19. Kim, H., Cho, J., & Park, D. (2017). *Development of a wearable biosensor for monitoring real-time physiological and biochemical responses*. *Sensors (Basel, Switzerland)*, 17(4), 794.
20. Mauco, K. L., Scott, K. M., & Mars, M. (2020). *Remote health monitoring for cancer patients during the COVID-19 pandemic: Enhancing patient care from afar*. *Frontiers in Digital Health*, 2, 1-8.
21. Bashshur, R., Doarn, C. R., Frenk, J. M., Kvedar, J. C., Woolliscroft, J. O., & Yellowlees, P. (2016). *Telemedicine and the COVID-19 pandemic, lessons for the future*. *Telemedicine and e-Health*, 26(5), 571-573.



NAVIGATING MODERN LIVING THROUGH ADVANCEMENTS IN MOBILE SERVICES AND BIOELECTRONIC MEDICINE

**Ansari MDAshfaque M.¹, Dr. Anuradha Prajapati², Dr. Sachin Narkhede³,
Dr. Shailesh Luhar⁴**

Article DOI: <https://doi.org/10.36713/epra15267>

DOI No: 10.36713/epra15267

ABSTRACT

Technology is tightly interwoven with our surroundings, becoming a crucial aspect of our existence. The iPhone, emblematic of technological progress, continually evolves, introducing enhancements in mobile apps, GPS, and cashless payment systems like Ola Cab and Uber. These advancements address challenges like locating reliable taxis swiftly. Bioelectronic medicine, a recent breakthrough, relies on electrical pulses instead of traditional drugs. Implanting small electronic devices generates digital doses, treating conditions like epilepsy and Parkinson's disease. This approach, synonymous with electroceuticals and neuromodulation, leverages the inflammatory reflex theory to map neural circuits. Despite its potential, challenges exist, including maintaining glycemic control and prosthetic eye usage.

1. INTRODUCTION^(1,2)

Our immediate surroundings are intricately shaped by technology, becoming indispensable for our survival. The evolution of the iPhone, with its myriad capabilities like texting, web browsing, camera features, and more, epitomizes the transformative power of technology. Transportation services, epitomized by Ola and Uber, GPS technology, online shopping, and mobile cashless payment systems, have revolutionized daily life, offering convenience and efficiency.

Bioelectronic medicine, a recent development in the pharmaceutical and medical realms, introduces a novel approach to treatment using electrical pulses instead of traditional drugs. This involves implanting small electronic devices to deliver periodic digital doses, particularly effective in conditions like epilepsy and Parkinson's disease. Synonymous with electroceuticals and neuromodulation, it operates based on the inflammatory reflex theory, mapping neural circuits for homeostatic regulation.

Advancements in implantable medical devices extend beyond treating conditions like parkinsonism and epilepsy to enhancing memory stimulation, improving eyesight, correcting gaits, and refining motor skills. Despite challenges in glycemic control and prosthetic eye usage, bioelectronic medicine shows promise in transforming healthcare.

The precision and modulation of electric signaling patterns in the nervous system are pivotal in this new medical frontier. Tiny implanted devices target specific organs, decoding and regulating neural signaling for therapeutic effects. The emerging field of BEM Technology outlines a roadmap for neurotechnology-based diagnosis and treatment, fostering collaboration between academia, industry, and government.

In the broader context of technological progress, bioelectronic medicine aligns with the evolving landscape of drug delivery technology. It addresses issues associated with pharmaceutical drugs, offering individualized treatment and minimizing side effects. Implantable biosensors, employing Aptamer-based technology, enable continuous monitoring of biomolecule levels without exogenous reagents, showcasing sub-minute resolution.

The foundation of bioelectronic medicine rests on advancements in tissue-device interfaces and signal processing, harnessing neural signals to regulate physiological and pathological processes. Research indicates its potential for treating and monitoring various diseases, leveraging neural reflex mapping and electrophysiological advancements.

The integration of bioelectronic medicine into healthcare holds promise for real-time monitoring and disease diagnosis. Biosensors with high selectivity and reliability, coupled with smart systems, contribute to continuous monitoring, complementing traditional analytical approaches. This intrinsic simplicity, affordability, and miniaturization potential make biosensors valuable tools in advancing medical diagnostics and treatment.



2. NEEDS ⁽¹⁾

Similar to the advancements in technology that I have already discussed. The creation of bioelectronic medications as a novel therapeutic approach in the healthcare industry has also increased interest in using them in place of pharmacological therapy. It was found in the desire to fully satisfy the requirements, which comprise:

In order to:

1. Advance and enhance knowledge in the fields of immunology and neuroscience;
2. Implant electrical devices into the body as a substitute for drug therapy;
3. Prevent pharmaceutical side effects by being aware of them;
4. Embrace new challenges in health care economics;
5. Reduce overdose and lower dosage of the drug product;
6. Shorten the time it takes for the drug product to demonstrate therapeutic action.

3. GOALS⁽²⁾

The following are some of the objectives that bioelectronic medicine can accomplish as a therapeutic

1. Finding the targeted illnesses is thought to be a strong candidate for the medical bioelectronics.
2. Investigative devices that can look into the remaining gaps in treatment are necessary for a better understanding of the disease's mechanism.
3. Coordinated efforts between the fields of biology, medicine, and computers are necessary.
4. In relation to the normal state, a model pertaining to the biological, chemical, electrical, and mechanical should be available to aid in the comprehension of the appropriate and entire system behavior of the body during a disease.

4. THE DIRECTION OF BIOELECTRONIC MEDICINE RESEARCH ⁽³⁾

Three guiding principles are applied in the bioelectronic medicine research phase.

1. The atlas of the visceral nerve
2. The progress of neural interface technologies
3. Prompt identification of the therapeutic potential

4.1 The Visceral Nerve Atlas's Creation

Creating a visceral nerve atlas involves mapping organ-specific innervation at the nerve fiber level. This requires intraspecies relationship development, high-resolution tracking tools, and interspecies variation study. The goal is to decode neural signaling patterns for each organ, correlating organ function biomarkers and neural signaling through stimulation studies. Advanced interfacing technology enables in-depth exploration of nerve fiber signaling patterns. This research enhances the application of bioelectronic medicine in clinical settings.

4.2 The progress made in Neural Interface Technology

Neural interface technology progress underpins bioelectronic medicines and neural signal mapping. Existing electrode technology in neuromodulation and electrophysiology needs scaling for efficient visceral nerve exploration. Biophysical techniques like optogenetics and nanoparticles, coupled with ultrasonic tomography, enable non-invasive precision neuromodulation. Progress demands an electronics platform with nerve interface control, high bandwidth data transfer, power management, and signal processing for reliable, compact, and long-term experiments across animal models.

4.3 Early identification of the Therapeutic Potential

Early identification of therapeutic potential involves proof-of-principle experiments. This includes optimizing treatment codes, introducing specific signaling patterns to target nerves, and evaluating long-term safety in neuromodulation for disease alteration.

5. SCIENTIFIC UNDERPINNINGS OF BIOELECTRONIC MEDICATIONS ⁽³⁾

Numerous scientific breakthroughs, improvements in the medical sciences, and technological developments have all contributed significantly to the development of bioelectronic medications for the treatment of various illnesses.

The following are some of the scientific pillars supporting bioelectronic medicine:

1. The vagus nerve being activated
2. The installation of electric implants and electricity
3. The inflammatory reflux was discovered

5.1 Vagus Nerve Involvement

In the 1880s, researchers observed seizure suppression through carotid artery massage, discovering the involvement of the vagus nerve. Originating from the brain stem, this longest nerve regulates vital functions, including heart rate.



5.2 The establishment of Electric Implants and Electricity

Electricity as a therapeutic concept has historical roots, with ancient Egyptians using electric fish for pain relief. In the 1930s-1940s, serious scientific exploration led to neuromodulation, focusing on electrical stimulation of the vagus nerve. FDA-approved Vagus Nerve Stimulation (VNS) in 1997 treats epilepsy and depression. Other applications include cochlear implants for hearing, deep brain stimulation for Parkinson's, and cardiac pacemakers for millions worldwide.

5.3 Finding the Inflammatory Reflux

The discovery of inflammatory reflux in 2002 revealed the nervous system's role in detecting and mitigating acute inflammation, akin to its regulation of vital processes. This theory originated from a cytokine production inhibition experiment, particularly TNF alpha, conducted by Dr. Kevin at the Feinstein Institute for Medical Research. Injecting the medication directly into a rat's brain effectively blocked TNF, emphasizing the vagus nerve's significance in inflammation perception. Previous studies also indicated the vagus nerve's crucial role in sensing inflammation.

6. MECHANISM ^(1,4)

The Inflammatory Reflex theory is one of the methods by which bioelectronic medicine functions. In this case, the primary accountable component of the system is inflammation.

The Theory of Inflammation in Disease

The inflammatory reflex, a key autonomic response, recognizes and reflexively reacts to inflammation and cytokine production through electrical stimulation. It underlies bioelectronic medicine's focus on the immunoregulatory role of the vagus nerve in controlling inflammation.

The anatomy of the vagus nerve's function

The vagus nerve, the body's largest nerve, has mixed afferent and efferent fibers. Its functions include regulating heart rate, gastrointestinal processes, and more. Stimulation of afferent fibers during the inflammatory reflex helps regulate inflammation through various pathways.

The vagus nerve's function in immune and inflammatory neuron regulation

Inflammation, a crucial defense mechanism, involves complex immune responses. Imbalances can lead to chronic conditions. The vagus nerve, with its cholinergic anti-inflammatory outflow and $\alpha 7$ subunit, regulates peripheral immune responses and inflammation for overall health.

7. DEVICES OR BIOELECTRONIC MEDICINE ⁽⁵⁻¹¹⁾

7.1. Bioelectronics

A novel interdisciplinary field combines electronics, biology, and nanotechnology, resulting in implantable, portable devices for diverse biochemical and biotechnological applications.

7.2. Biosensors

Utilizing a precise transducer with molecular recognition transforms biochemical information into bioelectronic data. This integral receptor transducer device offers cost-effective, quick, and portable detection, benefiting on-site and real-time monitoring. Biosensors, often using enzymes, provide ongoing metabolite monitoring for early disease detection and management. Immobilization techniques, such as covalent bonds and encapsulation, stabilize enzymes for biosensor development, influenced by the biological element, transducer type, analyte characteristics, and usage environment.

7.3 Energy-harvesting implants

Interest in the MEMS (Micro Electrical Mechanical Systems) theory grows due to new product opportunities. Biomedical technology aims to create diverse, portable, wearable, and implantable devices compatible with biological systems, exploring energy-harvesting implants.

7.4 Biofuel cells that are implanted

This innovative energy-harvesting device converts endogenous materials and oxygen through an electrochemical reaction, eliminating the need for expensive rare metals and fossil fuels. Biofuels and biocatalysts power the process, categorized as enzymatic or microbial fuel cells.



7.5 Cell-based bioelectronic apparatus

The growing market for eco-friendly products emphasizes renewable resources like cellulose. Derived from photosynthesis-producing organisms, cellulose offers hydrophilicity, biodegradability, and excellent biocompatibility. Cellulose-based materials show promise in biosensor development for enhanced sensitivity and adaptability.

7.6 Device that stores energy using cellulose

Driven by the demand for low-cost, lightweight, and eco-friendly energy storage, recent developments include flexible electrode materials, notably bacteria-based membranes for affordable, environmentally friendly fuel cell electrodes.

7.7 Artificial pacemaker

Artificial pacemakers greatly benefit physicians treating cardiac dysrhythmias. Advanced models operate for extended periods and bypass blocked AV nodes, regulate tachyarrhythmias, and address arrhythmias coexisting with myocardial infarctions. The two types of pulse generators, fixed rate asynchronous and non-competitive, can pose risks if impulses occur during the vulnerable stage of ventricular depolarization.

7.8. Artificial pancreas

The closed-loop device, also known as a bioelectronic artificial pancreas, regulates blood glucose levels in diabetic patients. Comprising an insulin infusion device, control algorithm, and glucose sensor, it evolved from intravenous glucose measurement and insulin infusion studies. The first commercial device, the Biostator, emerged in 1977, utilizing proportional derivatives controllers in closed-loop control algorithms.

7.9 Visual Aids

Advancements in visual prosthetic technology benefit over 40 million blind individuals. Utilizing electrical stimulation by implanted electrode arrays, it translates visual images into meaningful impressions about shape, motion, and depth.

7.10 A blood glucose meter

A portable bioelectronic device for managing glucose levels faces challenges in accuracy due to blood glucose instability. Isotope dilution mass spectroscopy provides precise results but has limitations. Advanced digital glucose meters offer quick analysis and hyper- and hypoglycemia management for improved control. The self-monitoring of blood glucose (SMBG) is a pivotal feature, tracing back to the 1963 invention of Dextrostix by Ernie Adams.

7.11 Organic Bioelectronics

Conductive polymers, bridging biology and electronics, exhibit flexibility, transparency, and both electrical and ionic conductivity. They have a conjugated backbone and doping agents, enabling reversible associations based on redox states. P-doped conductive polymers find applications in stable organic bioelectronics. Their polymeric nature allows various fabrication techniques like bar coating and inkjet printing. Ionic conductivity arises from redox characteristics, enabling reversible oxidation and reduction, maintaining charge equilibrium. This property facilitates the creation of organic bioelectronic devices that convert electrical current from ionic flow, contributing to fields like brain-computer interfaces.

7.12 Bioelectronic nose

The bioelectronic nose, distinct from traditional electronic noses, employs unique sensors such as biomaterials. Using proteins or cells, it enhances sensitivity, selectivity, and efficiency in detecting diverse odorants. Based on the sensing elements used, olfactory biosensors are classified into two types: protein- and cell-based.

8. RECENT ADVANCEMENT ^(12,13)

1. Vagus nerve controls immunity; bioelectronics target inflammatory reflex for disease treatment.
2. Mapping neural circuits advances bioelectronic medicine, combining optical instruments and genetic methods.
3. Neuron barcoding enhances brain circuit research, turning microscopy into a sequencing solution.
4. Recent findings unveil reflex mechanisms, anatomical, and molecular control of immune functions.
5. Autoantibodies activate sensory neurons, contributing to immune responses; context-dependent role in homeostasis.
6. Flexible electrode neuromodulation advances illness treatment and functionality restoration through electrical processes.
7. Magneto-electronic nanoparticles in brain mapping; potential for neurodegenerative illness treatment.

9. LIMITATION/CHALLENGES ^(14,15)

1. Challenges: miniaturization, electrode design, and hybrid optimization hinder bioelectronic devices.
2. Blood glucose control without hypoglycemia is challenging; artificial pancreas aims solutions.
3. Urgent development needed for visual prostheses; vital in bioelectronic medicine.



4. Biosensors face challenges in creating biocompatible, non-toxic, lightweight power devices.
5. Prolonged, suitable power sources remain a major challenge in bioengineering.

10. APPLICATION ^(16,17,18)

1. Treats rheumatoid arthritis via vagus nerve stimulation, alleviating symptoms.
2. Improves Crohn's disease signs through electrical vagus nerve stimulation.
3. Utilized in the central nervous system for intracortical signal recording.
4. Diagnoses and manages autoimmune and inflammatory disorders effectively.
5. Regulates blood glucose levels by influencing neural mechanisms and brain.
6. Addresses obesity and diabetes using neuromodulation and bioelectronic medication.
7. Applies to body odor analysis, detecting diseases through volatile organic compounds.
8. Targets long-term inflammation, offering new treatment options in medical science.

CONCLUSION

Bioelectronic medicine, a cutting-edge treatment approach, utilizes electrical pulses instead of drugs. Implanting small electrical devices into the body, it's applied in treating conditions such as Parkinson's, epilepsy, and bladder control. Also known as neuromodulation or electroceuticals, it leverages the inflammatory reflex theory. Advancements in neuroscience and immunology include understanding reflex mechanisms and mapping homeostatic neural circuits. Challenges involve maintaining glycemic control and developing visual prostheses. This transformative technology signifies a paradigm shift in medical treatments, emphasizing electrical interventions for various ailments, showcasing its potential in reshaping healthcare strategies and improving patient outcomes.

REFERENCES

1. Arnold, A. (n.d.). *The evolution of bioelectronic medicine*. *Set Point Med*, 1-16.
2. Bansal, N., Matta, P., & Walia, M. K. (2019). *Bioelectronic medicines, a review*. *Int J Pharma Sci Res*, 8(10), 213-216.
3. Anikeeva, P., Pikov, V., Grill, W. M., & Pasricha, P. J. (2014). *Bioelectronic medicines, a research roadmap*. *Nat Rev Drug Discov*, 13(6), 399-400.
4. Pavlov, V. A., Chavan, S. S., & Tracey, K. T. (2020). *Bioelectronic medicine, From the preclinical studies on the inflammatory reflex to new approaches in the disease diagnosis and the treatment*. *Cold Spring Harb Perspect Med*, 10, 1-15.
5. Baptista, A., Ferreira, I., & Borges, J. (2013). *Cellulose-based bioelectronic devices*. *Cellulose Med, Pharm Electron Appl*, 1-18.
6. Wright, J. R. K., & McIntosh, H. D. (1973). *Artificial pacemakers: Indications and management*. *Circulation*, 47(5), 1108-1118.
7. Cobelli, C., Renard, E., & Kovatchev, B. (2011). *Artificial pancreas and its past, present, future*. *J Diabetes*, 11(60), 2672-2682.
8. Schiller, P. H., & Tehovnik, E. J. (2008). *Visual prosthesis*. *Perception*, 37(10), 1529-1559.
9. Kinsman, E. W., & McIntosh, H. D. (1973). *Artificial pacemakers. Indication and management of the artificial pacemaker*, 5(XLVII), 1108-1118.
10. Löffler, S., Libberton, B., & Richter-Dahlfors, A. (2015). *Organic bioelectronic tools for biomedical applications*. *Electronics*, 4(4), 879-908.
11. Lee, S. H., & Park, T. H. (2010). *Recent advances in the development of bioelectronic nose*. *Biotechnology and bioprocess engineering*, 15, 22-29.
12. Tracey, K. J., & Olofsson, P. S. (2017). *Bioelectronic medicine technology targeting the molecular mechanisms for therapy*. *J Intern Med*, 282(1), 3-4.
13. Bouton, C., & Olofsson, P. S. (2019). *Bioelectronic medicines, an unexpected path to new therapies*. *J Intern Med*, 286, 237-239.
14. Pavlov, V. A., & Tracey, K. J. (2019). *Bioelectronic medicines, updates, challenges, and paths forward*. *Pavlov Trachy Bioelectron Med*, 5(1), 1-4.
15. Park, T. H., Song, H. S., & On, E. H. (2011). *Recent advances in bioelectronic and bioelectronic noses and their biomedical applications*. *J Enzyme Microb Technol*, 48, 427-437.
16. Löffler, S., Libberton, B., & Dahlfors, A. R. (2015). *Organic bioelectronic tools for biomedical applications*. *J Electron*, 4, 879-908.
17. Schiller, P. H., & Tehovnik, E. J. (2008). *Visual prosthesis*, 37, 1529-1559.
18. Tonyushkina, K., & Nichols, J. H. (2009). *Glucose meter, a review of technical challenges to obtaining accurate results*. *J Diabetes Sci Technol*, 7(3), 971-980.



EXPRESSION OF THE IDEAS OF PATRIOTISM AND PRINCIPALITY IN THE CREATION OF ALISHER NAVO'I

Ahmedov Hoshim Hakimovich

*Alisher Navo'i Tashkent State University of Uzbek Language and Literature
Candidate of Philological Sciences, Associate Professor*

Article DOI: <https://doi.org/10.36713/epra15265>

DOI No: 10.36713/epra15265

ANNOTATION

In this article, the writings of the Uzbek classic poet Nizamiddin Mir Alisher Navoi on the topic of homeland and patriotism were analyzed. The poet's artistic skill was revealed in the poetic samples taken from various works. Comments were made on the subject of Navoi as a citizen and as a sage, thinker and creator.

KEY WORDS: *classic literature, the work of Alisher Navoi, the topic of homeland and patriotism.*

INTRODUCTION

All writings and attitudes of world-famous creators about existence and the universe have always been in the attention of the public. We all know that the honor of a nation is usually made known to the world thanks to wise people - geniuses. Because such people's thinking is sharp and prone to predictions. Apart from that, talented people advance human life, the development of a particular nation, state by several years, even several centuries. Thanks to forward-thinking people, there will be a sharp increase in all aspects of social life, and the standard of living of the population will increase.

New steps towards well-being will be taken. According to the testimony of "Waqfia", Husayn Boygaro praises Navoi first and foremost as a great creator and sage who "opened a gem shop for the people, spread this gem to the people", and calls him "the sun of the sky of grace". It is also important that Boykara also emphasizes the unique talent of the poet, saying that "what you wrote in one moment, Atorud cannot finish in a hundred years" [1, Abdurashid Abdugafurov. "Lessons from the Big Five," p.9].

Nizamiddin Mir Alisher Navoi is a blessed person, a symbol of happiness engraved on the forehead of our nation, a great person who made a great contribution to perpetuating the name of the nation. His great five epics – "Xamsa" and the masterpiece of Uzbek national poetry – "Xazoyinul-maoni" are considered invaluable literary treasures. The name of our great poet is not glorified and honored by the world community for nothing. Davlatshah Samarkandi, a contemporary of the great poet, remembers the nation as "religion is the patron of the state, Sharia and the pink refuge of the nation". [2. "Tazkirat ush-shuaro", page 189].

Alisher Navoi's life was mostly spent in Herat, the capital of the medieval country of Khurasan. This area, its huge capital city - Herat, is mentioned with pride and pride in several of his works: "Waqfia", "Munshaat" and especially in the epic "Khayratul-Abror". Among the valuable sources, we can especially mention Khondamir's work "Makorimul-akhloq". First of all, let's dwell on the epic "Hayratul-Abror", which describes the description of Khurasan and Herat with great satisfaction. [3. Navoi. "Hayratul-Abror", 1989].

This epic is dedicated to moral and philosophical issues and was written in 1483. 64 chapters, 20 articles. It consists of 20 stories and it consists of 7976 verses (3988 stanzas). The first introductory epic of "Khamasa".

In this epic, after the praises of Allah, Muhammad, peace and blessings be upon him, there are five expressions of wonder that speak of God's power. After that, various topics are discussed. At the end of the work - Chapter 19, the characteristics and definitions of Khurasan, Herat and Husain Boykara are described. This chapter of the work is particularly distinguished by the fact that it clearly reveals Alisher Navoi's patriotism and the fact that he is a devoted person.

Navoi compares Herat and Khurasan to paradise:

Ziynat aro ravzai rizvondir ul,

Ravzani qo'y, mulki Xurosondur ul.

Anga jahon ko'ksi kelibdur sifot,



Anda ko'ngul xittai poki Hirot. (That is, Khurasan is a paradise-like place, while Herat is a pure city in the middle of a beautiful world). (3, p. 184).

Alisher Navoi gives a beautiful artistic description of the city of Herat, praises its streets and gardens, saying "Deki garden Eram, Dema Eram, say Baitulharam", gives exaggerated artistic descriptions of the surrounding mountains, canals, prosperous markets, and the city's Jame Mosque Al-Aqsa. resembles the majesty of the mosque. We know that the Al-Aqsa Mosque is a holy place in the Islamic world, like Mecca and Medina. When Herat says "a world within another world", he expresses his pride in the upper curtains:

Ollah-ollah ne Hiri, bu Hiri,

Bir-biridin turfa aning har biri. (That is, every corner of Herat is colorful and beautiful). (page 187).

Samarkand, the beautiful city of Movarounnahr in the Middle Ages, and even Egypt, which rocked the history of the world, cannot be compared to the description of the city of Herat:

Misru Samatqand ne monand anga,

Zimmida yuz Misru Samarqand anga. (190 page).

In the end, Anushervan emphasizes that the king Ghazi - Sultan Hossein Boykara, to whom Anushervan also bows in the face of honesty and justice in the development of the country and the capital city of Herat:

Muncha sharaf topti shah insofidin,

Ulki xirad lol erur avsofidin.

Xisravi g'ozhi shahi ravshan ravon,

Adlig'a shogird Anushervon.

Considering Alisher Navoi Sultan Husayn Boykara as a just king, he gives the following wisdom after his description and description:

Adl ila olam yuzini obod qil,

Xulq ila olam elini shod qil. (190 page).

"Ikhlosiya", "Nizomiya" madrasahs, "Shifoia" hospital, Masjid Jome, "Darul-Huffoz" ("Old People's House"), a library with more than 70 calligraphers and many other structures built by Navoi can be named. In Khondamir's work "Makorimul-akhloq" ("Beautiful manners"), dedicated to Alisher Navoi, it is emphasized that Navoi built more than 2000 structures in the way of beautification and charity. We believe that Khondamir is right even when he describes it with great pathos: "The leader of the people of knowledge and lore, the qibla of the people of truth and faith, the trust of the Khakhan state, the close friend of His Majesty the Sultan, the great Hazrat who comes in line with the saying "rich in poverty, heroic in generosity". [4. Khondamir. "Makorimul-akhloq", page 8]. Navoi's younger contemporary, Zayniddin Vasifi, also describes Ul Hazrat as an extremely chaste, generous person and a philanthropist. [5. pp. 93, 104].

Noting the importance of the work of the great artist for the country and the people, the late academician Aziz Qayumov wrote: "The essence of Navoi's work is first of all his carelessness and true humanitarianism. He always glorified man, appreciated his high qualities, promoted pure humanity. He repeatedly emphasized that true humanitarianism is in philanthropy. His:

Odami ersang demagil odami,

Oniki yo'q xalq g'amidin g'ami.

His famous words can be called the jewel of the poet's philosophy" [6. Dear Kayumov. page 149]. In conclusion, even if he writes a whole chapter on this topic, it will not be finished.

SUMMARIZING OUR TOPIC, WE NOTE THAT

1. We witness that one person has carried out thousands of construction and beautification works for the development of the Motherland. And the most important thing is that these works were done completely free of charge, as a donation.
2. Alisher Navoi was personally involved in the prosperity of the country. He never waited for special decrees and royal decrees.
3. He was always aware of the situation of people in need of assistance, and was ready to organize appropriate assistance.
4. He was always aware of the life of students and looked after their financial support.
5. He became the closest adviser and assistant of the tsar - Husayn Boygaro in the rule of justice in the country. That is why Babur praises Herat for no reason.
6. Many historians also recognize that Alisher Navoi played an important diplomatic role in state affairs. After all, the fact that Husayn Boygaro's government has been developing in peace without wars for almost 40 years is actually a great achievement.
7. It would be an epic story to tell about the sacrifices of this man for the sake of the country and its development.



REFERENCES

1. Абдуғафуров А. Буюк бешик сабоқлари. Мақолалар. Т.: Ф. Ғулом номидаги Адабиёт ва санъат нашриёти. 1995. – 185 б.
2. Давлатшоҳ Самарқандий. Шoirлар бўстони (Тазкират уш-шуаро). Тазкира. Б. Аҳмедов таржимаси. Т.: Ф. Ғулом номидаги Адабиёт ва санъат нашриёти. 1981. – 224 б.
3. Навоий Алишер. МАТ. VII жилд. “Ҳайрат ул-аброр”. – Т.: Фан, 1991. – 392 б.
4. Хондамир Ғ'iyosiddin. Makorimul-axloq. Т.:Yoshlar nashriyot uyi. 2018. – 232 b.
5. Восифий З. Бадоеъул – вақоъ. (Нодир воқеалар). Т.: Ф. Ғулом номидаги Адабиёт ва санъат нашриёти. 1979. – 216 б.
6. Қаюмов А. Алишер Навоий. Т.: “Ёш гвардия”. 1976. – 160 б.



A REVIEW ON ROLE OF ARTIFICIAL INTELLIGENCE: IN DIAGNOSIS OF DISEASE AND DRUG MANAGEMENT

Prajapati Hardikkumar Bharatbhai, Dr. Anuradha P. Prajapati, Dr. Sachin Narkhede, Dr. Shailesh Luhar

Smt. B. N. B. Swaminarayan Pharmacy College Salvav

Article DOI: <https://doi.org/10.36713/epra15266>

DOI No: 10.36713/epra15266

ABSTRACT

Artificial Intelligence (AI) revolutionizes healthcare through advanced algorithms, analyzing patient data for precise disease diagnosis and optimized drug management. Despite challenges in data privacy and ethical deployment, AI's transformative potential holds promise for improved patient care. Collaboration and innovation will drive the future of AI in healthcare, shaping a dynamic landscape.

KEYWORDS: Disease Diagnosis, Drug Management, Machine Learning, Personalized Medicine

INTRODUCTION ^(1,2)

Artificial intelligence (AI) is revolutionizing healthcare and biomedical research, exemplified by the Aravind Eye Care System's deployment of automated image classification for diabetic retinopathy screening. This is particularly significant in addressing the global impact of diabetes-related eye conditions affecting 90 million individuals and being a major cause of adult blindness. Fundus photography, employed for monitoring diabetic retinopathy, becomes more accessible with AI, given the scarcity of ophthalmologists in various regions globally. Over the years, AI research has evolved, giving rise to virtual assistants like Apple's Siri and Amazon's Alexa, capable of understanding natural language. Presently, AI's transformative influence extends beyond virtual assistants to healthcare, finance, transportation, academia, and research. In academia, AI enhances education through intelligent tutoring systems, improving student learning outcomes. In research, AI's ability to analyze large datasets unveils intricate patterns, leading to breakthroughs in genomics and drug discovery. AI also contributes to healthcare by creating diagnostic tools and personalized treatment plans. AI algorithms analyze medical images (X-rays, MRIs, ultrasounds, CT scans), enhancing diagnostic accuracy and efficiency. Its versatility extends to answering patient queries, aiding surgeries, and contributing to pharmaceutical development. This improves patient care outcomes by enabling precise treatment plans. AI's potential to revolutionize healthcare includes disease diagnosis, drug management, and personalized treatment plans.



Figure No 1: Application of AI in Healthcare

Artificial Intelligence in Disease Diagnosis ⁽³⁻⁸⁾

Real-time data analysis is crucial for detecting infectious diseases promptly, impacting society, the economy, and the world. AI's benefits extend to creating robotic surgeons, advancing healthcare beyond data processing. Kumar and Singla (2021) explore diverse AI applications in disease detection modeling. AI enables machines to learn like humans, identifying patterns and images. In healthcare, AI revolutionizes data handling for patient care by employing system planning. Real-world data, prone to errors, undergoes preprocessing to eliminate discrepancies. Information cleansing addresses anomalies, and information osmosis amalgamates data from diverse sources, correcting errors. The final step involves standardizing data for computational use, with various approaches available. In information mining computations, data evolution is crucial for maximal accuracy, focusing on reducing information to more useful levels. Information gathering involves testing and preparing data indexes. Analytical modeling assesses the probability of a given event based on input factors, particularly effective in illness prediction.

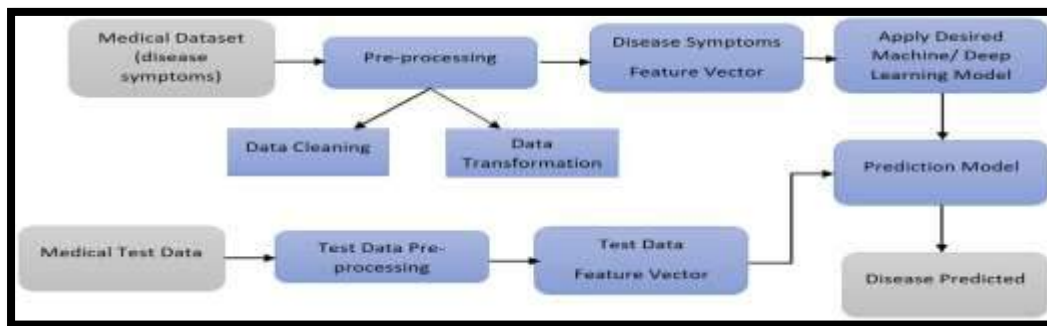


Figure No 2: Framework for Disease Detection System

Artificial Intelligence Techniques in Disease Diagnosis and Prediction ⁽⁹⁻¹⁷⁾

1. Machine Learning Application In Diagnosis Image-Based Diseases

Machine Learning (ML) is a rapidly expanding field, particularly in medical imaging analysis within AI. ML, vital for computer-aided diagnosis and illness detection, leverages various imaging techniques like CT, PET, tomosynthesis, MRI, tomography, and diffuse optical tomography. ML relies on data, automatically identifying patterns to make predictions or decisions in unpredictable scenarios. Recent applications include analyzing electronic health records with natural language processing for disease diagnosis. Explainable AI techniques like SHAP are crucial for transparency in medical decision-making. Generative models like GANs create artificial medical images, enhancing data for improved model performance, chosen based on specific challenges and data types.

2. Deep Learning Applications In Diagnosis Image-Based Diseases

Deep Learning (DL) stands out as a powerful technology, particularly in the realm of medicine, where it automatically learns intricate features and patterns. DL, especially through Convolutional Neural Networks (CNN) and other variants like Deep Neural Networks (DNN) and Recursive Neural Networks (RNN), has transformed medical image-based diagnosis. DL's superiority lies in automated feature extraction, extensive data analysis capabilities, and unparalleled accuracy, making it particularly effective for large datasets. Techniques such as Region Aggregation Graph Convolutional Network (RAGCN) showcase DL's application in medical imaging, dividing images into segments and employing Graph Convolutional Networks (GCNs) for precise feature extraction. Other methods, like the lesion-attention pyramid network (LAPNet), use attention mechanisms for targeted lesion identification in medical images. It's enhancing its role in disease prediction and diagnosis.

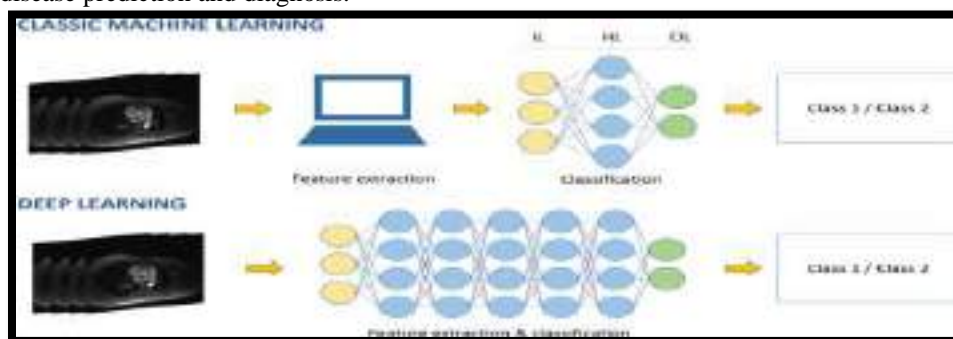


Figure No. 3: Comparison of Machine and Deep Learning



Diagnostic use of AI

- **Medical Imaging:** AI algorithms trained on medical images like X-rays, MRIs, and CT scans can detect abnormalities with remarkable accuracy, often surpassing the abilities of even experienced human radiologists. This leads to earlier and more precise diagnoses, allowing for timely interventions and improved patient outcomes.
- **Genomics:** AI can analyze genetic data to identify mutations and risk factors associated with various diseases. This personalized approach to diagnosis paves the way for preventative measures and targeted treatment strategies.
- **Electronic Health Records (EHRs):** AI can analyze EHRs, which contain a patient data, to identify patterns and predict the onset of diseases. This can help prevent illnesses.

Main Advantages of Applying AI to Healthcare Diagnosis ⁽¹⁸⁾

1. **Increase precision:** A disease can be accurately diagnosed at an early stage thanks to AI algorithms that can analyse enormous volumes of medical data. Reducing diagnostic errors.
2. **Quicker Response Time:** Fast test result diagnosis is another important advantage of AI in healthcare. When compared to manual diagnosis, AI analyse test results quickly.
3. **Personalised Health Care:** AI in healthcare also enables patients to receive personalised medication regimens and therapies. Finding patterns and correlations requires a thorough examination of individuals' clinical data, genetic information, and treatment outcomes.
4. **Forecasting and Analysis:** AI evaluates patient data from their electronic medical records (EMRs) in real time and forecasts how their therapies will work.
5. **Clinical Advisory Services:** AI can also be used by medical professionals to recommend appropriate treatments for illnesses and assist physicians in selecting the best course of action.

Challenges of Artificial Intelligence in Disease Diagnosis ^(23, 24)

1. **Generalisation and Clinical Usefulness:** The clinical usefulness of AI systems is limited because they frequently fail to achieve dependable generalizability, medical data sets.
2. **Ethical Considerations:** Using AI to diagnose diseases is fraught with ethical problems, such as data protection and privacy difficulties.
3. **Model Validation and Accuracy:** It's critical to guarantee the precision and dependability of AI models. Preventing misdiagnoses and fostering trust among the medical community.
4. **Interpretability and Explainability:** Healthcare practitioners may find it difficult to comprehend the reasoning behind diagnoses due to the interpretability of AI models.
5. **Data Quality and Bias:** The accuracy and equity of disease diagnosis may be impacted by biased predictions caused by biases in the datasets.
6. **Integration with healthcare Workflow:** For AI to be widely adopted, it must be ensured that healthcare procedures are enhanced rather than disrupted.
7. **Cost and Resource Allocation:** Overcoming financial obstacles and guaranteeing accessibility for healthcare facilities with restricted funding are problems.
8. **Regulatory Frameworks and Standards:** Lack of uniform regulatory frameworks for artificial intelligence in healthcare prevents the technology from being widely used.

Challenges Faced By the Researcher in Diagnosis of Disease ⁽¹⁾

1. **Limited Size of Data:** Lack of data to train the model was the most prevalent issue across the majority of the trials. A limited sample size suggests a smaller training set.
2. **Excessive dimensions:** High dimensionality is data-related problem in cancer research.
3. **Effective method for selecting features:** To eliminate the data cleaning processes and produce high illness prediction accuracy, computational efficient selection method is needed.
4. **Generalizability of Models:** A prediction model that has been validated on a single site has been suggested by the majority of investigations.
5. **Clinical Application:** To help the medical professional confirm the diagnosis decisions, these models must be evaluated in a clinical scenario.



Case Study: Detection of Hypertension Disease ⁽¹⁾

Researchers have harnessed the power of Artificial Intelligence (AI) to diagnose hypertension, utilizing input data like blood pressure and demographics. Krittanawong et al. (2018) condensed recent developments, showcasing AI's capability to predict hypertension early and study its risk factors. Arsalan et al. (2019) used public datasets like DRIVE and STARE for retinal imaging to identify hypertension, achieving impressive accuracy metrics. Kanegae et al. (2020) employed XGBoost and Ensemble models, with XGBoost excelling in predicting hypertension risk. Koshimizu et al. (2020) used AI to analyze vast data, predicting circulatory strain and exploring artificial neural networks for blood pressure control. However, Mueller et al. (2020) raised concerns about AI's application to extensive hypertension datasets, emphasizing the potential for dubious outcomes. Kwon et al. (2020) applied AI to predict pulmonary hypertension through electrocardiography. Sakr et al. (2018) evaluated various AI techniques, emphasizing AI's role in providing forward-thinking, personalized, and preventative healthcare insights for hypertension.

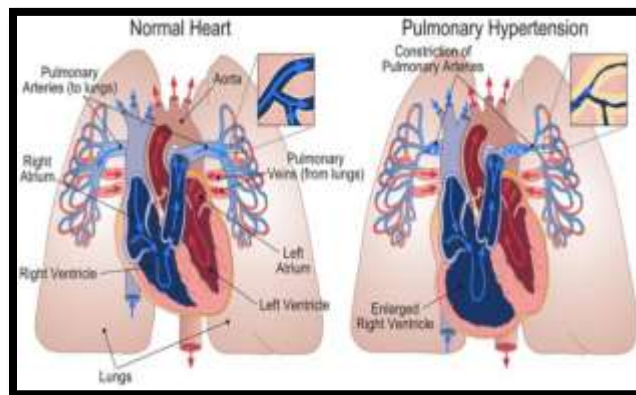


Figure No 4: Pulmonary Hypertension.

Artificial Intelligence in Drug Management ⁽¹⁹⁻²¹⁾

AI speeds up procedures, increases productivity and its enhanced human knowledge to solve problems. The main parts of artificial intelligence in drug management are:

- **Drug Discovery and Development:** AI can streamline the drug discovery process by analyzing vast chemical libraries and predicting the efficacy and potential side effects of new drugs. This significantly reduces the time and cost.
- **Personalized Medicine:** AI can analyze predict how they will respond to specific drugs. This approach optimizes treatment efficacy while minimizing side effects.
- **Dosage Optimization:** AI determines the optimal dosage for maximum effectiveness and minimal adverse effects. This personalized approach to medication management ensures the best possible therapeutic outcomes.

AI in Drug Discovery

Drug development and research have been transformed by AI in many ways. Among AI's major contributions in this field are the following:

1. **Target Identification:** AI helps in the development of drugs that can alter biological processes by identifying targets and molecular pathways linked to disease.
2. **Virtual Screening:** AI helps researchers save time and resources by selecting compounds for experimental testing by modelling chemical interactions and estimate binding affinities.
3. **Structure-Activity Relationship (SAR) Modeling:** AI models have the ability to connect a chemical structure to its biological action and create compounds with desired properties.
4. **De Novo Drug Design:** AI broadens the chemical space and supports the creation of novel therapeutic candidates by adding knowledge from chemical libraries and experimental data.
5. **Optimization of Drug Candidates:** To maximise their efficacy and reduce any possible negative effects.
6. **Drug Repurposing:** AI expedites and lowers the cost of drug research by repurposing current medications for novel uses.
7. **Toxicity Prediction:** In clinical studies, this helps researchers minimise potential negative reactions and prioritise safer drugs.

**Resources and Applications: Advancements in AI in Drug Discovery are** ⁽²²⁾

- 1. AI in Drug Discovery: Revolutionizing Processes:** Drug development procedures have been dramatically transformed by AI approaches, which solve issues with speed, precision, and efficiency. Large-scale datasets are analysed.
- 2. AI's Role in Personalized Medicine:** Treatment efficacy is increased and adverse effects are decreased when treatment plans are customised based on information specific to each patient. AI-driven tactics make use of patient-specific data to provide a more accurate knowledge.
- 3. Applications in Drug Discovery Pipelines:** AI-powered computational methods greatly cut down on the time and resources needed for traditional methods.
- 4. Advancements in Drug Research & Development:** This can help with the identification of novel medication targets and the understanding of disease causes. AI-driven pharmaceutical has the potential to improve clinical trial success rates and solve unmet medical needs.
- 5. Decoding the Potential: Transforming Drug Discovery:** AI helps researchers make data-driven decisions by deciphering complex biological facts, which improves the efficiency of the drug discovery process.
- 6. Challenges and Opportunities:** To fully utilise AI in personalised medicine and drug discovery, cooperation amongst researchers, physicians, and regulatory agencies is essential.

Clinical Significance: AI has a clinical role in medication management, offering instruments for effective analysis and decision-making in medical environments. AI-driven medication administration and treatment processes have the potential to significantly improve patient care.

Pre-clinical and clinical development: AI-based methods can help choose candidates for pre-clinical trials by finding pertinent biomarkers for human diseases, predicting harmful side effects, and selecting a patient cohort by filtering a high-dimensional set of clinical factors.

FDA approval and post-market analysis: Utilizing Natural Language Processing (NLP), scientific literature can be mined to report side effects, such as drug toxicity or resistance, and to create automated assessments for FDA approval or patent applications. Pharmaceutical businesses may be able to maximise their commercial resources by using machine learning-based methods to predict a product's potential sales.

Challenges and Considerations

Data Privacy and Security: The vast amount of data used in AI healthcare applications raises concerns about privacy and security. Robust data governance frameworks are crucial to ensure patient data is protected.

Algorithmic Bias: AI algorithms trained on biased data can perpetuate existing healthcare disparities. Careful data selection and algorithm development are essential to mitigate bias and ensure equitable healthcare delivery.

Human-AI Collaboration: AI should not replace, but rather, augment the expertise of healthcare professionals. Effective human-AI collaboration is key to maximizing the benefits of AI in diagnosis and drug management.

CONCLUSION

Artificial intelligence (AI) in healthcare has enormous potential to revolutionise medication administration and disease detection. Along with improving medical diagnosis efficiency and accuracy, the integration of machine learning, natural language processing, and other AI technologies speeds up the process of finding new drugs and optimising existing ones. However, to guarantee that AI in healthcare continues to help patients and the medical community, thorough evaluation of the ethical implications and continued attempts to address difficulties are crucial.

REFERENCES

1. Yu, K. H., Beam, A. L., & Kohane, I. S. (2018). *Artificial intelligence in healthcare. Nature biomedical engineering*, 2(10), 719-731.
2. Secinaro, S., Calandra, D., Secinaro, A., Muthurangu, V., & Biancone, P. (2021). *The role of artificial intelligence in healthcare: a structured literature review. BMC medical informatics and decision making*, 21, 1-23.
3. Minaee, S., Kafieh, R., Sonka, M., Yazdani, S., & Soufi, G. J. (2020). *Deep-COVID: Predicting COVID-19 from chest X-ray images using deep transfer learning. Medical image analysis*, 65, 101794.



4. Kumar, Y., & Singla, R. (2021). Federated learning systems for healthcare: perspective and recent progress. In *Federated Learning Systems: Towards Next-Generation AI* (pp. 141-156).
5. Tengnah, M. A., Sooklall, R., & Nagowah, S. D. (2019). A predictive model for hypertension diagnosis using machine learning techniques. In *Telemedicine technologies* (pp. 139-152). Academic Press.
6. Sarao, V., Veritti, D., & Lanzetta, P. (2020). Automated diabetic retinopathy detection with two different retinal imaging devices using artificial intelligence: A comparison study. *Graefe's Archive for Clinical and Experimental Ophthalmology*, 258, 2647-2654.
7. Keenan, T. D., Clemons, T. E., Domalpally, A., Elman, M. J., Havalilo, M., Agrón, E., & Chew, E. Y. (2021). Retinal specialist versus artificial intelligence detection of retinal fluid from OCT: age-related eye disease study 2: 10-year follow-on study. *Ophthalmology*, 128(1), 100-109.
8. Abdar, M., Yen, N. Y., & Hung, J. C. (2018). Improving the diagnosis of liver disease using multilayer perceptron neural network and boosted decision trees. *Journal of Medical and Biological Engineering*, 38, 953-965.
9. Bibault, J. E., & Xing, L. (2020). Screening for chronic obstructive pulmonary disease with artificial intelligence. *The Lancet Digital Health*, 2(5), e216-e217.
10. Sajedian, A., Ebrahimi, M., & Jamialahmadi, M. (2012). Two-phase Inflow performance relationship prediction using two artificial intelligence techniques: multi-layer perceptron versus genetic programming. *Pet Sci Technol*, 30(16), 1725.
11. Wolberg, W. H., Street, W. N., & Mangasarian, O. L. (1994). Machine learning techniques to diagnose breast cancer from image-processed nuclear features of fine needle aspirates. *Cancer Letters*, 77(2-3), 163.
12. Cao, R., Bajgirani, A. M., Mirak, S. A., Shakeri, S., Zhong, X., Enzmann, D., & others. (2019). Joint prostate cancer detection and Gleason score prediction in mp-mri via focalnet. *IEEE Transactions on Medical Imaging*, 38(11), 2496.
13. Li, C., Zhang, Y., Weng, Y., Wang, B., & Li, Z. (2023). Natural language processing applications for computer-aided diagnosis in oncology. *Diagnostics*, 13(2), 286.
14. Nordin, N., Zainol, Z., Noor, M. H. M., & Chan, L. F. (2023). An explainable predictive model for suicide attempt risk using an ensemble learning and Shapley additive explanations (SHAP) approach. *Asian Journal of Psychiatry*, 79, 103316.
15. Chen, Y., Lin, Y., Xu, X., Ding, J., Li, C., Zeng, Y., & others. (2023). Multi-domain medical image translation generation for lung image classification based on generative adversarial networks. *Computer Methods and Programs in Biomedicine*, 229, 107200.
16. Li, X., Jiang, Y., Liu, Y., Zhang, J., Yin, S., & Luo, H. (2022). RAGCN: region aggregation graph convolutional network for bone age assessment from x-ray images. *IEEE Transactions on Instrumentation and Measurement*, 71(1).
17. Bajwa, J., Munir, U., Nori, A., & Williams, B. (2021). Artificial intelligence in healthcare: transforming the practice of medicine. *Future Healthcare Journal*, 8(2), e188.
18. Emeritus. (n.d.). AI and ML: Benefits of AI in Healthcare. Retrieved from <https://emeritus.org/blog/ai-and-ml-benefits-of-ai-in-healthcare/>
19. Qureshi, R., Irfan, M., Gondal, T. M., Khan, S., Wu, J., Hadi, M. U., & Alam, T. (2023). AI in Drug Discovery and its Clinical Relevance. *Heliyon*, 9(6), e08098.
20. Chen, W., Liu, X., Zhang, S., & Chen, S. (2023). Artificial intelligence for drug discovery: Resources, methods, and applications. *Molecular Therapy-Nucleic Acids*, 23, 301-312.
21. Vora, L. K., Gholap, A. D., Jetha, K., Thakur, R. R., Solanki, H. K., & Chavda, V. P. (2023). Artificial intelligence in pharmaceutical technology and drug delivery design. *Pharmaceutics*, 15(7), 1916.
22. Paul, D., Sanap, G., Shenoy, S., Kalyane, D., Kalia, K., & Tekade, R. K. (2021). Artificial intelligence in drug discovery and development. *Drug Discovery Today*, 26(1), 80.
23. Kelly, C. J., Karthikesalingam, A., Suleyman, M., & others. (2019). Key challenges for delivering clinical impact with artificial intelligence. *BMC Medicine*, 17(1), 195.
24. Mirbabaie, M., Stieglitz, S., & Frick, N. R. J. (2021). Artificial intelligence in disease diagnostics: A critical review and classification on the current state of research guiding future direction. *Health Technol*, 11, 693-731.



A REVIEW ON NUTRITIONAL MANAGEMENT IN OSTEOPOROSIS

**Nitin E. Patil¹, Dr. Kantilal B. Narkhede², Dr. Anuradha P. Prajapati³,
Dr. Sachin B. Narkhede⁴, Dr. Shailesh Luhar⁵, Oza Vrushant⁶**

1,2,3,4,5,6 Smt B.N.B Swmainarayan Pharmacy College

Article DOI: <https://doi.org/10.36713/epra15263>

DOI No: 10.36713/epra15263

ABSTRACT

Osteoporosis is condition of bone being porous because of various factors such as lack of nutrition, age, some therapeutic remedies like steroids, disease condition such as hypertension, hyperthyroidism, and diabetes mellites. There are various allopathic treatment remedies to treat the osteoporotic patients such as Bisphosphonates, Calcitonin. But since these all are allopathic remedies they have some short of side effects with them. So, use of nutrition base product which are natural and have no or negligible side effects. These products are calcium, vit D & k, Essential fatty acids, dietary protein, and dairy products. Use of these product can improve the bone health from the osteoporotic condition.

INTRODUCTION

Osteoporosis, literally a condition of porous bones, affects 10 million people a year in the United States and 200million people worldwide. In addition, 18 million people have low bone mass (osteopenia), which puts them at risk for osteoporosis. The basic problem is that bone resorption (breakdown) outpaces bone deposition (formation). In large part this is due to decrease or depletion of calcium from the body—more calcium is lost in urine, faces, and sweat than is absorbed from the diet. Bone mass becomes so depleted that bones fracture, often spontaneously, under the mechanical stresses of everyday living. For example, a hip fracture might result from simply sitting down too quickly. Osteoporosis afflicts the entire skeletal system. In addition to fractures, osteoporosis causes shrinkage of vertebrae, height loss, hunched backs, and bone pain. Osteoporosis primarily affects mid-aged and elderly people, 80% of them women. Older women suffer from osteoporosis more often than men for two reasons: (1) Women's bones are less massive than men's bones, and (2) production of oestrogens in women declines dramatically at menopause, while production of the main androgen, testosterone, in older men wanes gradually and only slightly. Oestrogens and testosterone stimulate osteoblast activity and synthesis of bone matrix. Besides gender, risk factors for developing osteoporosis include a family history of the disease, thin or small body build, an inactive lifestyle, cigarette smoking, a diet low with calcium and vitamin D, more than two alcoholic drinks a day, and the use of certain medications. Although the bone is adequately mineralised, it is fragile and microscopically abnormal, with loss of internal structure. Peak bone mass occurs around 35 years and then gradually declines in both sexes. Low oestrogen levels after the menopause are associated with a period of accelerated bone loss in women. Thereafter bone density in women is less than in men for any given age. A range of environmental factors and diseases are also associated with decreased bone mass and are implicated in development of osteoporosis. Some can be influenced by changes in lifestyle. Exercise and calcium intake during childhood and adolescence are thought to be important in determining eventual bone mass of an individual, and therefore the risk of osteoporosis in later life. As bone mass decreases, susceptibility to fractures increases. Immobility causes reversible osteoporosis, the extent of which corresponds to the length and degree of immobility. For instance, during prolonged periods of unconsciousness, osteoporotic changes are uniform throughout the skeleton, but immobilisation of a particular joint following fracture leads to local osteoporotic changes in involved bones only. Osteoporosis is diagnosed by taking a family history and undergoing a bone mineral density (BMD) test. Performed like x-rays, BMD tests measure bone density. They can also be used to confirm a diagnosis of osteoporosis, determine the rate of bone loss, and monitor the effects of treatment. There is also a relatively new tool called FRAX® that incorporates risk factors besides bone mineral density to accurately estimate fracture risk. Patients fill out an online survey of risk factors such as age, gender, height, weight, ethnicity, prior fracture history, parental history of hip fracture, use of glucocorticoids (for example, cortisone), smoking, alcohol intake, and rheumatoid arthritis. Using the data, FRAX® provides an estimate of the probability that a person will suffer a fracture of the hip or other major bone in the spine, shoulder, or forearm due to osteoporosis within ten years. [16-17]

In 2015, direct medical costs totalled \$637.5 million for fatal fall injuries and \$31.3 billion for nonfatal fall injuries. During the same year, hospitalizations cost an average of \$30,550 per fall admission, totalling \$17.8 billion. By 2025, the cost of fractures in



the United States is expected to exceed \$25 billion each year to treat more than three million predicted fractures. Management of osteoporosis and its associated consequences is necessary to improve quality of life and reduce economic burden on the health care system. It will also help to decrease medical visits, hospitalizations, and nursing home admission.^[1]

In recent years, major therapeutic advances in osteoporosis treatment have been made as scientists gain a greater understanding of bone morphology and the underlying mechanisms causing osteoporosis. This article will review the pathophysiology, etiology, screening, and diagnosis of osteoporosis; selected professional guidelines and pharmacological management; pharmacological options, and the cost-effectiveness of those options.^[1]

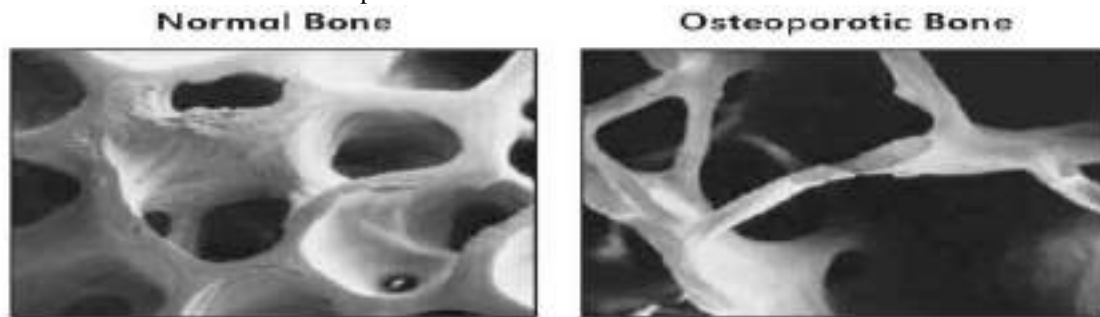


Fig.1 Comparison Between Normal and Osteoporotic Bone [19]

CAUSES AND RISK FACTORE

Nutritional deficiency ^[2]

Health-promoting behaviours, such as consuming a healthy diet, can reduce the impact of chronic diseases such as osteoporosis and cardiovascular diseases. A dietary pattern with high intake of dairy products, fruits and whole grains may contribute positively to bone health, and a study on Chinese older women in Hong Kong showed that higher "vegetables–fruits" and "snacks–drinks–milk products" pattern scores were associated with reduced risk of cognitive impairment. Consumption of nutrient such as calcium, vit D and K helps to improve bone health.

Genetic Factor ^[2]

The genetics of osteoporosis, a key focus in bone biology research, reveals that bone mineral density (BMD) variation is largely influenced by genetic factors. The vitamin D receptor (VDR) gene, specifically the BsmI polymorphism (genotype bb), has a significant impact on BMD, particularly in the lumbar spine. This variant is associated with higher calcium absorption and increased BMD levels, affecting bone metabolism through various mechanisms.

Medication ^[2]

Synthetic glucocorticoids are administered to treat disorders caused by autoimmune, pulmonary, and gastrointestinal diseases, as well as in patients receiving organ transplantation and with malignancies.

Hyperthyroidism ^[2]

Primary hyperparathyroidism (PHPT) is a calcium metabolic disorder with the highest incidence in postmenopausal women. Several studies have shown decreased BMD in patients with PHPT.

Smoking ^[2]

Smoking is a risk factor for osteoporosis and is associated with decreased bone mass and an increased risk of fractures.

Hypertension ^[3]

Studies have shown that high blood pressure is associated with abnormalities of calcium metabolism. The mechanism by which this occurs is due to a defect in the kidney's ability to handle calcium.

Diabetes ^[3-4]

Postmenopausal women who have diabetes or in whom Diabetes develops are at higher risk for hip fracture than Unaffected postmenopausal women.



COMPLICATRION

Fragility Fracture ^[5]

A fragility fracture is defined as a fracture that occurs because of a low-energy force that is insufficient to break normal bone. The most common locations for these fractures are the spine, hip, pelvis, proximal humerus, forearm, and wrist. Current estimates state that for the average Caucasian woman older than 50, the lifetime risk of a fragility fracture ranges from 33% to 45%. The incidence of these fractures increases dramatically in persons older than 65.

Hip Fracture ^[5]

Hip fractures remain the most serious fragility fractures in terms of morbidity and mortality; about half of these individuals never regain their previous functional capacity. One-year mortality rates are estimated to be in the range of 14% to 36%. The nature of the fall must be determined, as these patients often have multiple medical comorbidities; possible causes of the fall, such as stroke, myocardial infarction, or dehydration, must be delineated because circumstances have an impact on medical optimization for surgery.

Colle's Fracture ^[6]

During the acute period after a Colle's fracture, substantial pain, and restriction in function OCCU. Often, potentially long-term functional consequences can be minimized by physical therapy and exercise; unfortunately, some individuals with wrist fractures experience restricted activity, chronic pain, and loss of function. This may be especially true in patients in whom algodystrophy develops, also known as reflex sympathetic dystrophy, which requires immediate initiation of treatment.", 2o in most patients, however, quality of life changes resulting from distal forearm fractures are not overwhelming.

Pain ^[6-7-8]

Pain from osteoporosis challenges the patient's coping skills, often in a way that causes a decline in physical and psychological well-being. Two types of osteoporotic pain exist: (1) acute pain that accompanies a fracture and (2) chronic pain that develops over time. Each type of pain creates a unique predicament for the individual with osteoporosis as well as for the health care professional handling the case.

Psychological Disfunction ^[6]

The physical deformity and functional limitations associated with osteoporosis are evident in individuals with established disease. The psychological impact, although not visible, can be as serious and debilitating.

PATHOPHYSIOLOGY

Compromised bone strength predisposing a person to an increased risk of fracture is defined as osteoporosis. Bones provide structure for the body, protection for the organs, and storage for minerals, such as calcium and phosphorus, that are essential for bone development and stability.

Skeletal formation begins during the sixth week of embryonic development. The skeletal mass of infants doubles in the first year of life, and 37% of the total skeletal mass is accumulated during adolescence. Skeletal growth continues until genetic height is attained, but bone mineralization continues until the third decade. Calcium, vitamin D and weight bearing activity are the key components of bone growth. Other factors, including growth hormone, are involved in optimal bone production, but their roles have not been fully elucidated.

Factors which have a role in regulating bone function are hormones and growth. Oestrogen and testosterone have inhibitory effect of bone breakdown on bone remodelling. Cytokines which influence remodelling are identified, such as receptor activator of the nuclear factor kappa-B ligand (RANKL) osteoprotegerin (OPG) of tumour necrosis factor (TNF) receptor and RANKL is produced by osteoblasts that bind to RANK receptors on osteoclasts, leading to the activation and maturation of osteoclasts and culminating in bone resorption. The production of OPG by osteoblast cells counterbalances maturation of osteoclasts and their activity by acting as a decoy receptor of RANKL. Thus, a relative concentration of OPG and RANKL in bone determines its strength and mass. Recent advances in molecular bone biology have identified a potent protease cathepsin K (CatK) which is secreted by activated osteoclasts during bone resorption. Resulting in degradation of bone matrix and breakdown of mineral components of the bone tissue. Parathyroid hormone plays an important role in bone formation by indirectly increasing the proliferation of osteoblasts through regulation of calcium homeostasis. ^[9-12]

ALLLOPATHYC REMIDIES ^[18]

Two types of agents are currently used for treatment of osteoporosis:

1. Antiresorptive drugs that decrease bone loss.
 - a. Bisphosphonates



- b. Calcitonin
 - c. selective oestrogen receptor modulators (SERMs)
 - d. calcium.
2. Anabolic agents that increase bone formation
 - a. PTH
 - b. teriparatide.

NEUTRITIONAL MANAGEMENT

Nutritional management in osteoporosis required certain nutrients that full fill the need of body to maintain the bone density. It includes certain conventional nutrients with regular intact of that n day to day life and certain supplement that maintain the bone health.

Vitamin D ^[13-14]

Vitamin D plays an essential role in maintaining bone strength and muscle function. This nutrient/cofactor is involved in the intestinal absorption of calcium and phosphorus for bone mineralization and the maintenance of muscle mass as well as various beneficial effects on other organ systems.

Vitamin D is synthesized in the skin in response to sun exposure and taken as part of a balanced diet. Older people synthesize lower levels of vitamin D in their skin (they also tend to have less exposed skin than younger people) and their diets are often low in nutrients. Many older people suffer from vitamin D deficiency.

CALCIUM ^[15]

Peak bone mass is usually reached around age 30; therefore, physical activity and recommended doses of calcium and vitamin D during adolescence and early adulthood will ensure peak bone mass. Calcium is an essential element for the human body and is necessary for many cellular functions. Calcium is not only important for bone health, but it is also essential for neuromuscular activity, blood clotting and normal heart function.

Dietary Protein Intake ^[15]

Malnutrition and malnutrition are common in older people and can lead to deficiencies in essential nutrients. Malnutrition, especially protein-energy malnutrition in many older people, is a major risk factor for sarcopenia and frailty. In a small prospective study of Australian hip fracture patients (72% female), 58% of patients admitted were malnourished and 55% had vitamin D deficiency. Raynaud-Simon and colleagues found estimated the prevalence of protein-energy malnutrition to be 4-10% in older people living at home, 15-38% in care facilities, and 30-70% in older hospitalized patients. Questionnaires such as the Mini Nutritional Assessment (MNA) or SNAQ65+ have been validated in the elderly and are useful for assessing nutritional status in this regard.

Essential Fatty Acids (EFAs) ^[14]

Recent research confirms that adequate and balanced levels of AGEs in the diet have a positive effect on bone health and that a deficiency in AGEs can be a major cause of osteoporosis. Although the complex mechanisms of bone physiology are not fully understood, many molecular factors integral to bone formation and resorption are controlled or influenced by the availability and action of AGEs. The discovery that animals deficient in essential fatty acids develop severe osteoporosis has prompted new research into the role of these essential nutrients in bone health.

Vitamin k ^[14]

VTK is a fat-soluble molecule that occurs naturally in two forms: (a) VTK-1 (phylloquinone) is synthesized by plants and is abundant in green leafy vegetables and some vegetable oils (soy, canola, and olive); (b) VTK-2 (menadione) collectively refers to a group of compounds commonly synthesized by bacteria that normally colonize the colon, as well as the intestinal metabolism of VTK-1. The "K" component of VTK is derived from the German word for "coagulation" because this essential molecule is an essential coenzyme involved in blood clotting, but recent research has also recognized VTK as a cofactor in many cell-associated biochemical pathways. Growth, brain development 106 and bone health.

CONCLUSION

In osteoporotic condition use of the nutritional supplements like calcium, vit D & K, essential fatty acid, dietary protein, and other supplement has significant improvement in the bone health. These nutrients directly have role in the bone formation and reduce the depletion of bone by various in vivo mechanisms. So, these nutrients play an important role in the bone formation which is required in the osteoporotic condition.



REFERENCE

1. Tu, K. N., Lie, J. D., Wan, C. K. V., Cameron, M., Austel, A. G., Nguyen, J. K., Van, K., & Hyun, D. (2018). Osteoporosis: A review of treatment options. *Pharmacy and Therapeutics*, 43*(2), 92-93.
2. Poursmaeili, F., Kamalidehghan, B., Kamarehei, M., & Goh, Y. M. (2018). A comprehensive overview on osteoporosis and its risk factors. *Therapeutics and Clinical Risk Management*, 14*, 2029-2049.
3. Alagiakrishnan, K., Juby, A., Hanley, D., Tymchak, W., & Sclater, A. (2003). Role of vascular factors in osteoporosis. *Journal of Gerontology: Medical Sciences*, 58A*(4), 362-366.
4. Nguyen, T. V., Eisman, J. A., Kelly, P. J., & Sambrook, P. N. (1996). Risk factors for osteoporotic fractures in elderly men. *American Journal of Epidemiology*, 144*(3), 255-262.
5. Varacallo, M. A. (2014). Osteoporosis and its complications. *Medicine Clinics of North America*, 98*, 817-831.
6. Gold, D. T., Shipp, K. M., & Lyles, K. W. (1998). Managing patients with complications of osteoporosis. *Endocrinology and Metabolism Clinics of North America*, 27*(2), 485-494.
7. Griffith, J. F., & Genant, H. K. (2012). New advances in imaging osteoporosis and its complications. *Endocrine*, 42*(1), 39-51.
8. Eginster, J. Y., & Burlet, N. (2006). Osteoporosis: A still increasing prevalence. *Bone*, 38*(2 Suppl 1), S4-S9. doi: 10.1016/j.bone.2005.11.024
9. Ferrari, S., Bianchi, M. L., Eisman, J. A., Foldes, A. J., Adami, S., Wahl, D. A., & Stepan, J. J. (2012). Osteoporosis in young adults: Pathophysiology, diagnosis, and management. *Osteoporosis International*, 23*, 2735-2748.
10. Awasthi, H., Mani, D., Singh, D., & Gupta, A. (2018). The underlying pathophysiology and therapeutic approaches for osteoporosis. *Medical Research Reviews**, 1-34.
11. Alexandre, C., & Vico, L. (2011). Pathophysiology of bone loss in disuse osteoporosis. *Joint Bone Spine*, 78*, 572-576.
12. Föger-Samwald, U., Dovjak, P., Semrad, U. A., Schindl, K. K., & Pietschmann, P. (2020). Osteoporosis: Pathophysiology and therapeutic options. *EXCLI Journal*, 19*, 1017-1037.
13. Rizzoli, R., Branco, J., Brandi, M. L., Boonen, S., Bruyère, O., Cacoub, P., & Cooper, C. (2014). Management of osteoporosis of the oldest old. *Osteoporosis International*, 25*, 2507-2529.
14. Genuis, S. J., & Schwalfenberg, G. K. (2007). Picking a bone with contemporary osteoporosis management: Nutrient strategies to enhance skeletal integrity. *Clinical Nutrition*, 26*, 193-207.
15. Sunyecz, J. S. (2008). The use of calcium and vitamin D in the management of osteoporosis. *Therapeutics and Clinical Risk Management*, 4*(4), 827-836.
16. Tortora Gerard j, Derrickson Bryan, principles of anatomy and physiology, 14th edition WILEY publication, page no.188
17. Waugh A, Grant A, Ross & Wilson Anatomy and physiology in health and illness pub, 11th edition, page no. 431
18. Rang HP, Ritter JM, Flower RJ, Henderson G, Rang & Dale's pharmacology, Elsevier publication, 6th edition, page no. 473-440.
19. www.ncbi.nlm.nih.gov



TARGETING EPIDERMAL GROWTH FACTOR RECEPTOR FOR CANCER TREATMENT

**Chitroda Devalben Narendrabhai¹, Dr. Anuradha P. Prajapati², Mrs. Bhoomi S. Patel³,
Dr. Sachin B. Narkhede⁴, Dr. Shailesh Luhar⁵**

^{1,2,3,4,5}Smt. B.N.B. Swaminarayan Pharmacy College, Salvav-Vapi, India

Article DOI: <https://doi.org/10.36713/epra15285>

DOI No: 10.36713/epra15285

ABSTRACT

The Epidermal Growth Factor Receptor (EGFR) is a pivotal player in cellular signalling pathways and its dysregulation is implicated in various cancers. Targeting EGFR has emerged as a promising strategy for cancer treatment. This abstract provides Comprehensive analysis of EGFR-targeted therapies, including small molecule tyrosine kinase inhibitors and monoclonal antibodies, reveals their efficacy in suppressing aberrant signalling cascades associated with tumor growth. Mechanisms of resistance, biomarkers for patient stratification, and ongoing clinical trials are discussed to highlight the evolving landscape of EGFR-targeted cancer therapies. The multifaceted nature of EGFR signaling necessitates a personalized approach, emphasizing the need for precision medicine to optimize therapeutic outcomes. This abstract encapsulates the significance and challenges of targeting EGFR for cancer treatment, providing a foundation for further research and clinical advancements in the field.

KEYWORDS: Epidermal Growth Factor Receptor (EGFR), Cancer Treatment, Tyrosine Kinase Inhibitors, Monoclonal Antibodies, Biomarkers, Precision Medicine

INTRODUCTION:⁽¹⁻⁵⁾

The Epidermal Growth Factor Receptor (EGFR), a member of the ErbB family, is a pivotal transmembrane receptor tyrosine kinase regulating cell proliferation, survival, and differentiation. Ligand binding induces receptor dimerization, activating downstream pathways crucial for cellular processes. The receptor's structure encompasses ligand-binding, transmembrane, and intracellular tyrosine kinase domains. Dysregulation of EGFR contributes to various cancers, necessitating targeted therapeutic interventions.

EGFR Dysregulation in Cancer

EGFR dysregulation, manifested in overexpression and mutations, underlies numerous cancers. Notable instances include Non-Small Cell Lung Cancer (NSCLC), Colorectal Cancer (CRC), Breast Cancer, Head and Neck Squamous Cell Carcinoma (HNSCC), and Glioblastoma Multiforme (GBM). Mechanisms include gene amplification, activating mutations, and autocrine signalling, fostering uncontrolled cell growth and tumorigenesis.

Significance of Targeting EGFR

EGFR's significance as a therapeutic target is underscored by its aberrant activation in cancer, broad applicability across multiple cancer types, and its role as a prognostic indicator. Targeted therapies, such as Tyrosine Kinase Inhibitors (TKIs) like gefitinib and erlotinib, and Monoclonal Antibodies such as cetuximab and panitumumab, have been developed to counter EGFR dysregulation. Combination therapies, integrating EGFR inhibitors with other agents, are explored to optimize treatment outcomes.

MOLECULAR STRUCTURE AND SIGNALING PATHWAYS OF EGFR^(6,7)

- Extracellular Ligand-Binding Domain:**
The N-terminal extracellular domain of EGFR comprises four subdomains (I-IV) and a cysteine-rich region. Ligand-binding primarily occurs in subdomains I and III, where ligands like EGF and TGF- α bind. Conformational changes upon ligand binding promote receptor dimerization, facilitated by disulfide bonds formed by cysteine residues.
- Transmembrane Domain:**
The hydrophobic transmembrane domain spans the lipid bilayer of the cell membrane, composed of hydrophobic amino acids that anchor the receptor. It plays a crucial role in transmitting signals from the extracellular ligand-binding domain to the intracellular tyrosine kinase domain.
- Intracellular Tyrosine Kinase Domain:**



The C-terminal intracellular domain houses the tyrosine kinase domain responsible for phosphorylating tyrosine residues on the receptor and downstream signalling proteins. Ligand-induced receptor dimerization leads to autophosphorylation of specific tyrosine residues, serving as docking sites for various signalling proteins.

4. Activation Mechanism:

Ligand binding induces a conformational change, promoting receptor dimerization. This brings the intracellular tyrosine kinase domains into proximity, facilitating transphosphorylation. Autophosphorylation of tyrosine residues in the intracellular domain activates the kinase, initiating downstream signalling.

OVERVIEW OF DOWNSTREAM SIGNALING PATHWAYS ACTIVATED BY EGFR^(8,9,10)

- MAPK (Mitogen-Activated Protein Kinase) Pathway
- PI3K (Phosphoinositide 3-Kinase)/AKT Pathway
- JAK/STAT (Janus Kinase/Signal Transducer and Activator of Transcription) Pathway
- PLC γ (Phospholipase C gamma) Pathway
- Cross-Talk and Integration of Signalling
- Dysregulation in Cancer and Therapeutic Implications

EGFR OVEREXPRESSION MECHANISMS IN CANCER^(11,12)

1. Gene Amplification:

Gene amplification leads to an increased copy number of the EGFR gene, resulting in elevated EGFR protein production. This mechanism is frequently observed in various tumors, including lung, breast, and glioblastoma.

2. Mutation in EGFR Gene:

Mutations, especially in the tyrosine kinase domain, lead to constitutive activation of the receptor, promoting continuous signalling that drives cell proliferation and survival. EGFR mutations are prevalent in non-small cell lung cancer (NSCLC) and enhance sensitivity to EGFR-targeted therapies.

3. Promoter Hypomethylation:

Epigenetic changes, such as hypomethylation of the EGFR promoter, increase transcription and expression of EGFR. This phenomenon is associated with several cancers, including glioblastoma and head and neck squamous cell carcinoma.

4. Transcriptional Factors:

Transcriptional factors like STAT3 and AP-1 can enhance EGFR expression in response to various stimuli. Dysregulation of these factors contributes to sustained EGFR expression in cancer cells.

5. Post-transcriptional and Post-translational Modification:

Aberrant microRNA expression reduces degradation of EGFR mRNA, leading to overexpression. Additionally, disruptions in ubiquitin-mediated protein degradation pathways contribute to increased stability and accumulation of EGFR protein.

EPIDERMAL GROWTH FACTOR RECEPTOR OVEREXPRESSION AND MUTATION IN CANCER:⁽¹³⁾

EGFR overexpression is a prevalent occurrence in diverse human cancers, significantly influencing prognosis and treatment outcomes. Elevated EGFR levels correlate with unfavourable prognoses in bladder, breast, cervical, esophageal, head and neck, ovarian, and stomach cancers. Despite also being overexpressed in colorectal cancer (CRC), non-small cell lung cancer (NSCLC), and glioblastoma multiforme (GBM), controversies surround its prognostic significance, particularly in CRC and NSCLC.

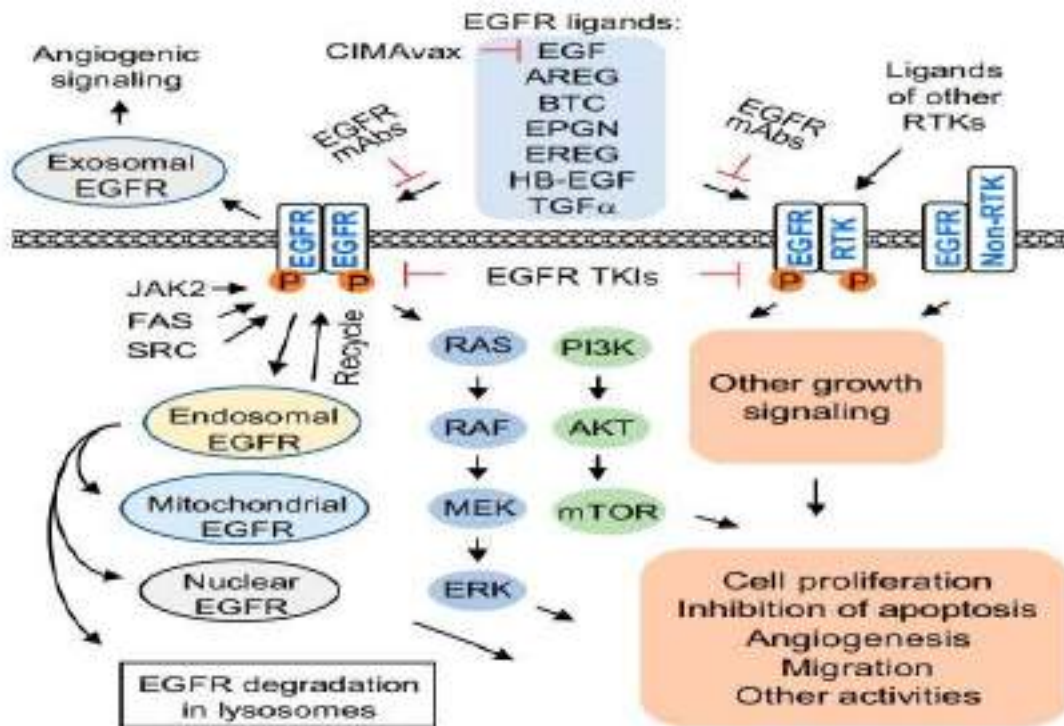


Figure EGFR signalling and trafficking and the effects of EGFR inhibitors

The mechanism driving EGFR overexpression is intricate and varies across cancer types. In GBM, gene amplification is a major driver, while in CRC and NSCLC, amplification plays a smaller role, with overexpression occurring more frequently through alternative mechanisms. In head and neck squamous cell carcinoma (HNSCC), gene amplification is not the primary cause, with ligand-induced upregulation and increased protein synthesis suggested as contributing factors.

MECHANISMS OF ACTIONS AND THERAPEUTIC ACTIVITIES OF CLINICALLY USED EPIDERMAL GROWTH FACTOR RECEPTOR (EGFR) INHIBITORS⁽¹³⁾

Tyrosine Kinase Inhibitors (TKIs) targeting Epidermal Growth Factor Receptor (EGFR) have ushered in a transformative era in non-small cell lung cancer (NSCLC) treatment. Sixteen approved EGFR TKIs, categorized as reversible (gefitinib, erlotinib) or irreversible (Osimertinib, afatinib), exhibit distinct mechanisms. Osimertinib, highly potent against various EGFR mutants, stands out for its effectiveness in overcoming resistance, a common challenge in NSCLC.

Resistance mechanisms encompass EGFR mutations or amplifications, activation of other receptor tyrosine kinases (RTKs) like AXL, HER2, IGF1R, MET, as well as mutations in KRAS and PIK3CA. Allosteric EGFR inhibitors present a promising strategy to tackle resistance, emphasizing the dynamic landscape of cancer research.

Monoclonal antibodies (mAbs) like cetuximab and panitumumab play pivotal roles in managing CRC and HNSCC. Cetuximab, an IgG1 mAb, hinders ligand-induced EGFR activation through subdomain 3 binding and elicits antibody-dependent cellular cytotoxicity (ADCC). Panitumumab, an IgG2 mAb, shares efficacy in CRC despite lacking ADCC induction. Necitumumab's efficacy, limited even with chemotherapy, highlights the challenges in mAb treatments.

The anti-EGF vaccine, CIMAvax, undergoes evaluation for NSCLC therapy. Though outcomes in the U.S. trial are pending, insights from a Cuban phase 3 trial reveal its potential to induce anti-EGF antibodies and lower serum EGF levels. The modest outcomes underscore the complexities in targeting EGFR pathways, emphasizing the need for comprehensive understanding and ongoing research.

INHIBITION OF EGFR SIGNALING PATHWAYS^(14,15)

The Epidermal Growth Factor Receptor (EGFR) serves as a linchpin in cellular regulation, dictating processes like proliferation, survival, and differentiation. Its aberrant activation, implicated in various cancers, positions it as a prime target for cancer therapy. Inhibiting EGFR signalling pathways has emerged as a promising strategy to curtail the unbridled growth and survival of cancer cells.



The intricate EGFR signalling cascade unfolds as a complex network, set in motion by ligand binding to the receptor. Activated EGFR propels downstream signalling through pathways such as Ras-Raf-MEK-ERK and PI3K-AKT, orchestrating the modulation of gene expression and fuelling cell growth. Dysregulation of these pathways stands out as a hallmark in numerous cancers, rendering EGFR an appealing therapeutic target. Inhibition of EGFR is achieved through diverse approaches, notably small-molecule tyrosine kinase inhibitors (TKIs) and monoclonal antibodies.

While EGFR-targeted therapies marked an initial triumph, persistent challenges have surfaced, demanding continued innovation. Resistance mechanisms pose a substantial hurdle, with tumor cells evolving secondary mutations in the EGFR gene, conferring resilience against TKIs. This necessitates a nuanced approach, exploring alternative therapeutic targets and inventive combination therapies to augment treatment efficacy.

The clinical application of EGFR inhibitors has uncovered adverse effects, notably skin rash and gastrointestinal toxicity. These side effects, while manageable, underscore the need for a balanced approach, weighing therapeutic benefits against potential drawbacks. The field actively explores strategies to mitigate these side effects, encompassing dose adjustments and supportive care measures. The evolution of EGFR-targeted therapies reflects the dynamic nature of cancer research. Ongoing efforts strive to decipher the intricacies of EGFR signalling and address the existing challenges. A comprehensive understanding of resistance mechanisms is imperative to unveil new vulnerabilities in cancer cells, paving the way for innovative interventions.

RESISTANCE TO EGFR-TARGETED THERAPIES^(16,17)

Acquired resistance to cancer therapies, encompassing targeted treatments and chemotherapy, stands as a formidable challenge within oncology. Tumors, over time, can evolve adaptive mechanisms that allow them to circumvent the impact of initially efficacious treatments. Among these mechanisms, secondary mutations in crucial cancer-related genes play a pivotal role in conferring resistance to targeted therapies. An understanding of acquired resistance and the emergence of secondary mutations is essential for developing strategies to overcome or prevent treatment failure.

Secondary mutations are genetic alterations occurring after the initiation of treatment, leading to the reactivation of oncogenic signalling pathways. Notable instances of acquired resistance involve targeted therapies against the Epidermal Growth Factor Receptor (EGFR) in non-small cell lung cancer (NSCLC) and chronic myeloid leukaemia (CML) with tyrosine kinase inhibitors. The T790M mutation in EGFR and mutations such as T315I in BCR-ABL kinase domain are examples of secondary mutations that interfere with drug binding, rendering treatments less effective.

PERSONALIZED MEDICINE AND EGFR TARGETING^(18,19)

The identification of biomarkers predicting the response to Epidermal Growth Factor Receptor (EGFR) inhibitors is paramount for tailoring treatment strategies in cancer patients. Biomarkers serve as essential tools in discerning patients likely to derive benefits from EGFR inhibitor therapy, thereby guiding treatment decisions and enhancing overall outcomes.

1. EGFR Mutations
2. EGFR Gene Copy Number
3. EGFR Protein Expression
4. KRAS Mutations

CLINICAL SUCCESSES AND CHALLENGES⁽²⁰⁾

In Non-Small Cell Lung Cancer (NSCLC), Erlotinib and Gefitinib, EGFR tyrosine kinase inhibitors (TKIs), have demonstrated significant success, particularly in patients with activating EGFR mutations. Clinical trials, such as IPASS, showcased improved progression-free survival and overall response rates compared to standard chemotherapy in EGFR-mutant NSCLC patients, establishing these drugs as standard first-line treatments for this subgroup. Osimertinib, a third-generation EGFR TKI, addresses the T790M resistance mutation and has proven effective in clinical trials, earning approval as the standard of care for T790M-positive NSCLC.

In Colorectal Cancer (CRC), Monoclonal antibodies Cetuximab and Panitumumab, targeting EGFR's extracellular domain, have succeeded in metastatic CRC. Combined with chemotherapy, these antibodies enhance response rates and overall survival, leading to their incorporation into standard treatment regimens for metastatic CRC. Molecular profiling further refines treatment, identifying specific subgroups that benefit most from EGFR-targeted therapies, such as RAS wild-type tumors showing a more favourable response compared to RAS-mutated tumors.

For Head and Neck Squamous Cell Carcinoma (HNSCC), Cetuximab, when combined with radiation, is approved for treating locally advanced cases. This combination demonstrates improved locoregional control and overall survival compared to radiation alone, establishing its place in the standard treatment approach for certain patients with locally advanced HNSCC.



ADVERSE EFFECTS AND LIMITATIONS OF EGFR INHIBITORS⁽²⁰⁾

Adverse Effects

1. Skin Toxicities
Skin rash, particularly on the face and upper body, is a common side effect. While generally manageable, severe cases may necessitate dose reduction or interruption. The exact mechanism remains not fully elucidated but is believed to stem from the inhibition of normal EGFR functions in the skin.
2. Gastrointestinal Effects
Diarrhea, ranging from mild to severe, is a frequent side effect associated with EGFR inhibitors. Management may involve anti-diarrheal medications or dose adjustments, reflecting the impact of EGFR inhibition on the gut epithelium.
3. Hematologic Effects
Neutropenia, characterized by a decrease in neutrophil counts, increases infection risk. Regular monitoring of blood counts is imperative during treatment.
4. Hepatotoxicity
Elevated liver enzymes, including transaminases, may occur with EGFR inhibitors, necessitating regular liver function tests to monitor for hepatotoxicity.
5. Ocular Toxicities
Conjunctivitis and dry eyes are potential ocular toxicities linked to EGFR inhibitors. Supportive measures, including lubricating eye drops, may be recommended.
6. Cardiac Effects
EGFR inhibitors may induce hypertension, necessitating close monitoring and management with antihypertensive medications.

Limitations

1. Development of Resistance
2. Patient Selection
3. Skin Rash as a Predictive Marker
4. Limited Efficacy in Some Cancers

CONCLUSION

Targeting the Epidermal Growth Factor Receptor (EGFR) represents a promising avenue in cancer treatment. This is synthesizing a comprehensive analysis of EGFR-targeted therapies, showcasing the efficacy of small molecule tyrosine kinase inhibitors and monoclonal antibodies in suppressing aberrant signalling cascades linked to tumor growth. The discussion on resistance mechanisms, biomarkers, and ongoing clinical trials highlights the evolving landscape of EGFR-targeted cancer therapies. Acknowledging the multifaceted nature of EGFR signalling, the abstract underscores the necessity of a personalized approach and emphasizes precision medicine to optimize therapeutic outcomes. Serving as a succinct encapsulation of the significance and challenges in targeting EGFR for cancer treatment.

REFERENCES

1. Yarden, Y., & Sliwkowski, M. X. (2001). *Untangling the ErbB signalling network*. *Nature reviews Molecular cell biology*, 2(2), 127-137.
2. Hynes, N. E., & Lane, H. A. (2005). *ERBB receptors and cancer: the complexity of targeted inhibitors*. *Nature Reviews Cancer*, 5(5), 341-354.
3. Lynch, T. J., Bell, D. W., Sordella, R., Gurubhagavatula, S., Okimoto, R. A., Brannigan, B. W., ... & Haber, D. A. (2004). *Activating mutations in the epidermal growth factor receptor underlying responsiveness of non-small-cell lung cancer to gefitinib*. *New England Journal of Medicine*, 350(21), 2129-2139.
4. Cunningham, D., Humblet, Y., Siena, S., Khayat, D., Bleiberg, H., Santoro, A., ... & Van Cutsem, E. (2004). *Cetuximab monotherapy and cetuximab plus irinotecan in irinotecan-refractory metastatic colorectal cancer*. *New England journal of medicine*, 351(4), 337-345.
5. Vermorken, J. B., Mesia, R., Rivera, F., Remenar, E., Kawecki, A., Rottey, S., ... & Hitt, R. (2008). *Platinum-based chemotherapy plus cetuximab in head and neck cancer*. *New England Journal of Medicine*, 359(11), 1116-1127.
6. Garrett, T. P., McKern, N. M., Lou, M., Elleman, T. C., Adams, T. E., Lovrecz, G. O., & Ward, C. W. (2002). *Crystal structure of a truncated epidermal growth factor receptor extracellular domain bound to transforming growth factor α* . *Cell*, 110(6), 763-773.
7. Zhang, X., Gureasko, J., Shen, K., Cole, P. A., & Kuriyan, J. (2006). *An allosteric mechanism for activation of the kinase domain of epidermal growth factor receptor*. *Cell*, 125(6), 1137-1149.
8. Vanhaesebroeck, B., Stephens, L., & Hawkins, P. (2012). *PI3K signalling: the path to discovery and understanding*. *Nature reviews Molecular cell biology*, 13(3), 195-203.
9. Darnell Jr, J. E. (1997). *STATs and gene regulation*. *Science*, 277(5332), 1630-1635.
10. Rhee, S. G. (2001). *Regulation of phosphoinositide-specific phospholipase C*. *Annual review of biochemistry*, 70(1), 281-312.



11. Costello, J. F., Plass, C., & Cavenee, W. K. (2000). Aberrant methylation of genes in low-grade astrocytomas. *Brain tumor pathology*, 17, 49-56.
12. Dhillon, A. S., Hagan, S., Rath, O., & Kolch, W. (2007). MAP kinase signalling pathways in cancer. *Oncogene*, 26(22), 3279-3290.
13. Yang, L., Bhattacharya, A., Li, Y., Sexton, S., Ling, X., Li, F., & Zhang, Y. (2022). Depleting receptor tyrosine kinases EGFR and HER2 overcomes resistance to EGFR inhibitors in colorectal cancer. *Journal of Experimental & Clinical Cancer Research*, 41(1), 1-19.
14. Lynch, T. J., Bell, D. W., Sordella, R., Gurubhagavatula, S., Okimoto, R. A., Brannigan, B. W., ... & Haber, D. A. (2004). Activating mutations in the epidermal growth factor receptor underlying responsiveness of non-small-cell lung cancer to gefitinib. *New England Journal of Medicine*, 350(21), 2129-2139.
15. Mendelsohn, J., & Baselga, J. (2000). The EGF receptor family as targets for cancer therapy. *Oncogene*, 19(56), 6550-6565.
16. Yarden, Y., & Pines, G. (2012). The ERBB network: at last, cancer therapy meets systems biology. *Nature Reviews Cancer*, 12(8), 553-563.
17. Engelman, J. A., & Janne, P. A. (2008). Mechanisms of acquired resistance to epidermal growth factor receptor tyrosine kinase inhibitors in non-small cell lung cancer. *Clinical Cancer Research*, 14(10), 2895-2899.
18. Paez, J. G., Janne, P. A., Lee, J. C., Tracy, S., Greulich, H., Gabriel, S., ... & Meyerson, M. (2004). EGFR mutations in lung cancer: correlation with clinical response to gefitinib therapy. *Science*, 304(5676), 1497-1500.
19. Douillard, J. Y., Oliner, K. S., Siena, S., Tabernero, J., Burkes, R., Barugel, M., ... & Patterson, S. D. (2013). Panitumumab-FOLFOX4 treatment and RAS mutations in colorectal cancer. *New England Journal of Medicine*, 369(11), 1023-1034.
20. Mok, T. S., Wu, Y. L., Thongprasert, S., Yang, C. H., Chu, D. T., Saijo, N., ... & Fukuoka, M. (2009). Gefitinib or carboplatin-paclitaxel in pulmonary adenocarcinoma. *New England Journal of Medicine*, 361(10), 947-957.



RELEVANCE OF VOICE QUALITY AND MELODY WHEN READING THE QURAN

Rakhmatov Ikboljon Izzatullo ugli

Doctoral Student in "Fiqh and Kalam" Department of ICESCO, International Islamic Academy of Uzbekistan

ABSTRACT

In this article, the tones leading to the recitation of the Qur'an with a beautiful voice mentioned in the hadiths, and the attention to its correct formation are given.

KEY WORDS. *Holy Quran, tajweed, recitation, voice, tone, breath.*

In the verses and hadiths, he encourages the believers to read the Qur'an in a beautiful tone and revives their feelings of desire. A future amateur with a desire to become a wife rushes to recite the Koran with pleasure and enthusiasm... However, soon the expected "fruit does not ripen": for some reason I can't imitate, my voice is becoming dull, the recitation of such and such a belly is good, but mine is unpleasant, the heart, the head it hurts too, my throat hurts all the time, I spoil the tajweed in order to recite it beautifully, but when I recite it with excellent tajweed, the tone is not right.

Although it is repeated, we emphasize again: these legitimate questions and problems make both students of formal religious education and other categories of people think, almost everyone has experienced them. Therefore, the time has come to study on a scientific basis what the "tarannum" of the recitation, the stability of the voice depends on.

In the recitation of the Qur'an, "melody-tarannum" appears as a "set" of several factors or conditions. These factors are mainly three and they are:

- 1) the appearance of recitation with or without special preparation in compliance with the rules of tone;
- 2) Recitation of the Qur'an with or without preparation following the instructions for correct use of the voice;
- 3) individuality of the reciter's voice.

It is correct to talk about the "tarannum" aspect of recitation only when these factors are combined. If one is there and the other is not, the song will not come to the surface. Let's talk about them in more detail.

1) Recitation occurs with or without preparation in accordance with the rules and regulations

Another important aspect of learning the science of tone and voice management is that during recitation, the tone and sonority of the voice should be fulfilled while complying with the rules of tajwid. It is important to master vocal art, a science that teaches the correct use of tones, to be able to use the voice stably in order to perform without problems such as voice trembling, shortness of breath, sore throat, shortness of breath, while performing tajwid and recitation rules. And some reciters went to a music club in their childhood, learned the basics of music theory, sang various hymns and songs. This is the reason why their recitations have higher qualities compared to the recitations of others. In some cases, some of our readers, who understand the essence of vocal art, turn to vocal specialists. However, it is necessary to be careful that a vocal specialist must first thoroughly understand the rules of tajwid, and then in voice education, he must always follow the rules of tajwid, the quality and mood of vowels and consonants, and emphasize the Arabic voice. we can't say. This action is equivalent to teaching the rules of writing poetry in a foreign language without first learning the alphabet and grammar of another foreign language.

2) The appearance of recitation in compliance with the rules of correct use of the voice

The role of this factor in recitation is incomparable. If the reciter, who is aware of the knowledge of tone, does not follow the "rules of correct use of the voice", he will harm himself and others. Even if the listener does not have a clear, mentally analyzed opinion on this situation, he feels it in his heart and feels its unpleasantness. The science that teaches these "rules of correct use of the voice" is called "Vocal Art" in a foreign language. "Voc" means voice in Latin, and "Vocal" means "Voice" by taking the suffix "al" to serve the areas where the voice factor is high. it is accepted in the context of "increasing and developing the sonority". In it, hygiene and care of the voice, rules of breathing, ability to perform vowels and consonants without difficulty with the help of the voice apparatus in high quality, and to be the owner of a good quality voice until the end of life are achieved. With this, a person's (performer's) ability to create melodic sounds using the vocal organs is developed. In a simple to complex format, the voice is gradually brought from the level of "untrained voice" to the level of "professional voice" skills.



Indeed, man is the most perfect musical instrument. Because the one who made this "instrument" is Allah subhanahu wa ta'ala. This is the correct perception of the human vocal apparatus, i.e. respiratory organs, vocal cords, mouth, throat, lips, palate, teeth, and ears. What is required of a person is to "play the instrument" correctly. Vocal art comes in handy in this matter.

The rules of correct breathing in vocal art, the stable and smooth functioning of the voice, the causes of flat or, on the contrary, compression, the expansion of the voice range (from the lower part, the peak-response-the upper part of the response), breathing (strength, width and depth), the voice to be careful, to be able to divide the voice into the natural type (tenor, baritone, bass, etc. depending on its thickness and softness) and to choose the pitch accordingly, to form (discover) a unique unique voice, to learn the text of the words during the performance (pure Arabic in the recitation of the Qur'an) the quality and mood of letters, short and long movements and words) being able to pronounce clearly and clearly in harmony with tones (following the rules of tajwid with tone and intonation (the correct approach to a certain pitch in the human voice), how to improve the sonority, brightness and strength of the voice accessibility and many other important issues are addressed.

As long as the vocal rules are not observed during recitation, for example, the breathing rules: take a breath; holding your breath; sending breath; distribution of breath; saving breath; if important aspects such as stopping breathing are not taken into account, over time, the voice will become more and more dull and weak. In fact, the voice is like a "sword", the more it is treated and used correctly, the more it becomes "sharper" (clarified, polished, activated) and is a great gift of God given to us.

3) The uniqueness of the reciter's voice. This aspect of the reciter is called "timbre" in a foreign language

Timbre (French: timbre) is a sound quality, color, color of sound, especially the timbre of each human voice is unique and unique. That is, a person's voice is formed under the influence of his race, gender, character, height, color, skull, facial structure, origin, parents, ancestors, social environment, national customs and traditions. For this reason, just as fingerprints are not repeated, so are people's voices. Two reciters who have mastered melody and vocal art at a high level and have the same voice type (men: bass-low; baritone-middle; tenor. Women: alto-low; mezzo-middle; soprano-high voice) are the same, on the same pitch and one Although they recite the same recitation in different statuses, their voice timbres keep changing in different tones. People mainly talk about this particular aspect of the voice, pay attention to it, appreciate it and praise it. In the people, the expression referring to this is called "the breath is sweet". It is this aspect that is the basis of such words as "good voice", "beautiful recitation", "there is no music in the flute and tanbur", "the voice given by God", "the voice that no one has" in hadiths and other reports. However, this "timbre" aspect is also subject to the three important conditions of the tone, and without the first and second conditions, it is impossible to achieve the intended goal. this word is Latin, and the meaning of the dictionary is fake, fake, lie, and in istilah, it means that the tone is not sounded in a certain pitch, and an extraneous sound is added to the voice.

REFERENCES

1. S. Begmatov "Art of courtship UzDK, Tashkent-2007
2. G.I. Muhammedova "Basics of Singing Techniques" 2007
3. R.Tursunov, S.Mannopov "Methodology of traditional song performance" Tashkent-2003
4. Physiology and hygiene of students Q. S. Sadikov T. Teacher
5. O.A. Ibrahimov, G'.M. Khudoev "History of Music".
6. Islomov Z. Source studies analysis of manuscripts of "muqaddimatu-ladab" in foreign archival funds //The Light of Islam. – 2019. – T. 2019. – №. 4. – C. 41.
7. Maxsudov D. The development of transmitted and rational tafsirs //The Light of Islam. – 2019. – T. 2019. – №. 1. – C. 9.
8. Zokirjonugli Z. A. Approaches to studying the scientific heritage of Alikhantora Soguni //Asian Journal of Multidimensional Research. – 2022. – T. 1
9. Makhsudov D. Muslim world scientists of the temurids period //The Light of Islam. – 2019. – T. 2019. – №. 3. – C. 4.
10. Arslonov Z. Z. THE PLACE OF ALIKHANTORA SOGUNIY IN THE HISTORY OF EAST TURKESTAN //Colloquium-journal. – Голопристанський міськрайонний центр зайнятості= Голопристанский районный центр занятости, 2020. – №. 24-2. – C. 9-11.



A REVIEW ON OVERVIEW OF GENE AND RNA BASED THERAPIES

**Tandel Muskan Vijaykumar¹, Prajapati Hardikkumar Bharatbhai²,
Dr. Anuradha P. Prajapati³, Dr. Sachin Narkhede⁴, Dr. Shailesh Luhar⁵**

^{1,2,3,4,5}Smt. B. N. B. Swaminarayan Pharmacy College Salvav

Article DOI: <https://doi.org/10.36713/epra15300>

DOI No: 10.36713/epra15300

ABSTRACT

Therapeutics based on genes and RNA are revolutionary in medicine because they address the underlying causes of disorders. Enabling precise treatments for genetic problems, enhancing the body's defences, and addressing a variety of ailments ranging from infectious diseases to inherited disorders, these therapies use genes and RNA molecules to correct, replace, or control defective genes.

KEYWORDS: Gene Therapy, RNA based Therapies, Genetic Disorders, mRNA based Vaccines.

INTRODUCTION^[1, 2, 3]

Medicine is revolutionised by gene and RNA-based medicines, which target the underlying causes of disease. Adenosine deaminase deficiency and severe combined immunodeficiency have been successfully treated using gene therapy, which replaces damaged genes. Research on applications for complicated diseases such as Alzheimer's and polygenic malignancies is still ongoing. RNA treatment, which uses RNA molecules to manipulate biological pathways, becomes more popular. Effective COVID-19 vaccine development is powered by a subset called messenger RNA (mRNA) treatment. The FDA has authorised RNA treatments, which show promise in treating a variety of ailments. These therapies have been proven effective in clinical trials. When combined, gene and RNA therapies offer highly accurate, state-of-the-art medical treatments that are redefining the healthcare landscape with focused precision.

Gene^[4]

Genes are orderly sequences of nucleotides on chromosomes that encode features inherited from parents. Genes are the basic building blocks of heredity. Gene therapy shows promise for addressing genetic problems at their core and provides hope for the treatment or elimination of inherited conditions.

Gene Therapy^[5-7]

Gene therapy typically involves the insertion of a functioning gene into cells to correct a cellular dysfunction or to provide a new cellular function. It is defined as the administration of genetic material to modify, manipulate gene expression or alter the properties of living cells for therapeutic purposes. The primary goal is to introduce therapeutic genetic material into a patient's cells to correct a genetic defect, replace a faulty gene, or enhance the body's ability to fight against specific diseases.

Objectives

Gene therapies can work by several mechanisms:

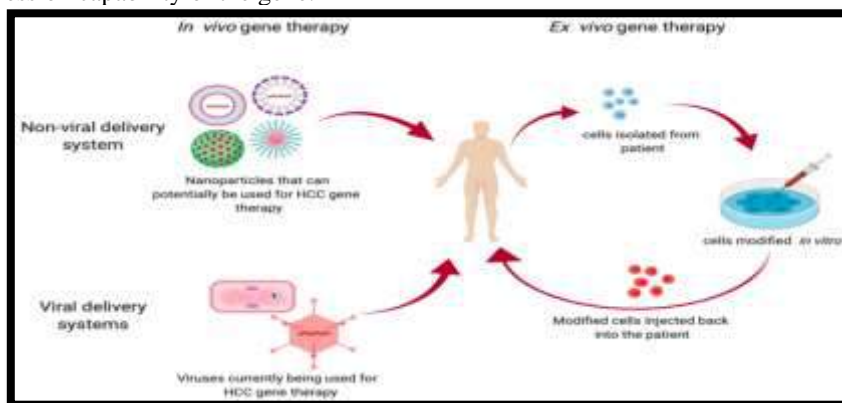
- Replacing a disease-causing gene with a healthy copy of the gene
- Inactivating a disease-causing gene that is not functioning properly
- Introducing a new or modified gene into the body to help treat a disease

Types Of Gene Therapy: ^[4]

Somatic Gene Therapy	Germline Gene Therapy
Therapeutic genes transferred into the somatic cell	Therapeutic genes transferred into the germ cell
E.g. Introduction of genes into bone marrow cells, blood cells, skin cells etc.	E.g. Introduction of genes into eggs and sperms.
Will not be inherited later generations.	It is heritable and passed on to later generation.

Mechanism of Gene Therapy: ^[8,9]

- 1) **Ex Vivo Gene Therapy:** The ex vivo gene therapy can be applied to only selected tissues (e.g., bone marrow) whose cells can be cultured in the laboratory. The technique of ex vivo gene therapy involves the following steps:
 - Isolate cells with genetic defect from a patient.
 - Grow the cells in culture.
 - Introduce the therapeutic gene to correct gene defect.
 - Select the genetically corrected cells (stable trans-formants) and grow.
 - Transplant the modified cells to the patient.
- 2) **In Vivo Gene Therapy:** The direct delivery of the therapeutic gene (DNA) into the target cells of a particular tissue of a patient constitutes in vivo gene therapy. These include liver, muscle, skin, spleen, lung, brain and blood cells. The success of in vivo gene therapy mostly depends on the following parameters:
 - The efficiency of the uptake of the therapeutic gene by the target cells.
 - Intracellular degradation of the gene and its uptake by nucleus.
 - The expression capability of the gene.

**Figure 1: In Vivo and Ex Vivo Gene Therapy****Vectors in Gene Therapy** ^[5, 10, 11]

Facilitating the transfer of genetic information into a cell are vehicles simply called as

Vectors. Vectors can be divided into viral and non-viral delivery systems. Viral vectors have played a central role in gene therapy because of their superior gene delivery capacity compared to non-viral vectors. Moreover, the virus-based transgenic expression, depending on the needs, for both short-term and long-term duration can be achieved.

Viral Vector

- a. **Adenovirus Vectors:** Since the advent of gene transfer in mammalian cells, adenoviruses (Ad) vectors have been commonly used as viral delivery vehicles. They are non-enveloped viruses possessing a double-stranded DNA (dsDNA) genome.
- b. **Adeno-Associated Virus Vectors:** The small non-enveloped single-stranded DNA (ssDNA) adeno-associated virus (AAV) can only accommodate 4 Kb of foreign DNA, although, the packaging capacity has been improved by constructing fragmented, overlapping, or trans-splicing Dual AAV vectors.
- c. **Herpes Simplex Virus Vectors:** A class of double-stranded DNA viruses that infect a particular cell type, neurons. Herpes simplex virus type 1 is a common human pathogen that causes cold sores. It is a human neurotropic virus, which is mostly used for gene transfer in nervous system. Antibodies to HSV-1 are common in humans.
- d. **Retrovirus and Lentivirus Vectors:** The enveloped single-stranded RNA (ssRNA) retroviruses (RVs) possess a packaging capacity of 8 kb of foreign sequences. The special feature of RVs comprises their reverse transcriptase activity, which allows the production of dsDNA copies of the RNA genome for integration into the host genome.

Non-Viral Vector

- a. **Naked plasmid DNA:** A series of approaches for naked plasmid DNA based gene delivery strategies have been reported in recent years like, naked plasmid DNA transfer method where in a cytotoxic T-lymphocyte antigen 4- immunoglobulin (CTLA4-Ig) gene was delivered using a naked plasmid DNA.
- b. **Cationic lipids:** Cationic liposomes are an important class of compounds suitable for carrying negatively charged DNA. There are at present several commercial transfection reagents that are based on cationic lipids like DOTMA(Lipofectin), DOTAP, DOSPA, DOSPER, DDAB, DODAC, Neophectin (PCL-2), DMRIE, DC-Chol, DOGS (Transfectam).



- c. **Polymeric gene carriers:** Synthetic polycationic polymers have gained wide attention as non-viral vectors for gene delivery. Polyplexes form these polymers spontaneously as a result of electrostatic interaction between phosphate groups of DNA and oppositely charged groups of polycationic polymer.

Gene Therapy Approaches^[12]

1. **Gene Addition:** Vectors, which are often viruses, are used to deliver the working gene to the cell's nucleus, where the DNA is stored. Sometimes the therapy is designed for the new gene to insert itself into the main DNA storage while other times it will stay next to the main DNA storage, like an extra set of instructions.
2. **Gene Silencing:** It is where the delivered genetic material prevents or inhibits the activity of a gene that is already present in a cell. Gene silencing often decreases the amount of a specific protein being made.
3. **Gene Editing:** Genetic material is sent to directly edit or change pieces of DNA already located within a cell to correct the protein being made by that DNA. Gene editing uses technology that is highly precise to make these types of changes.

Evolving Technologies and New Gene Therapy Platforms^[13, 14]

Genome Editing: Gene therapy is defined as the addition of new genes to human cells.

- 1) **Zinc finger nucleases (ZFNs):** Zinc finger nucleases (ZFNs) are specialised nuclease domains with a specific DNA-binding domain that act as molecular scissors in gene editing. Zinc finger domains that have been engineered to precisely recognise and bind particular DNA sequences work in tandem with the nuclease to cause double-strand breaks. This activates cellular repair pathways to precisely alter the genomic code.
- 2) **Transcription activator-like effector nucleases (TALENs):** Transcription Activator-Like Effector Nucleases, or TALENs, are molecular tools used in gene editing that use modular proteins from bacteria that are harmful to plants to precisely recognise DNA and cause specific genetic alterations.
- 3) **Meganucleases:** Enzymes called meganucleases, often referred to as homing endonucleases, are specialised DNA sequence-specific enzymes that are present in microbes such as bacteria and archaea. They are useful for precise genome editing in applications like genetic engineering and gene therapy because of their lengthy recognition sites.
- 4) **CRISPR/Cas nucleases:** Genetic manipulation is revolutionised by the revolutionary genome editing technologies known as CRISPR/Cas nucleases. CRISPR and Cas proteins, which work as a bacterial immune system and are led by RNA, allow for precise DNA editing, providing previously unheard-of accuracy in research and possible medicinal uses.

APPLICATION OF GENE THERAPY:^[11]

- 1) **Cystic fibrosis (CF):** It is a progressive lung disease causing respiratory issues. Directly delivering the CFTR gene to lung cells is promising, yet challenges arise from the lung's barriers. Advances in gene transfer, tissue engineering, and animal models drive ongoing CF research for improved treatments in overcoming these obstacles.
- 2) **Cancer Treatment:** Viral vectors are used in gene therapy for cancer patients to change their genes, or immune cells are edited to better target tumours, lessen adverse effects, and boost immune response.
- 3) **Severe combined immunodeficiency (SCID):** Particularly the IL2RG gene mutation variant, may be possible through gene therapy. This strategy has demonstrated efficacy in restoring immunological function by introducing a functioning gene copy by viral vectors, providing promise for long-term treatment.
- 4) **Muscular dystrophy:** It is characterised by muscle degradation. Viral vectors are used in emerging gene therapy to deliver a functioning dystrophin gene, which may decrease or stop muscle deterioration and provide hope for better treatments.
- 5) **Alzheimer's disease:** Potential approaches involve modifying genes to enhance neuroprotection, reduce beta-amyloid accumulation, or boost cognitive resilience. While in early stages, these strategies aim to address the underlying causes of Alzheimer's, offering hope for more effective treatments.
- 6) **Parkinson's disease:** It introduces genes that increase dopamine production. This strategy, which uses viral vectors for targeted delivery, shows promise in symptom relief, but early-stage development still faces obstacles with long-term efficacy and targeting.

Progress and Current Trends in Gene Therapy:^[15-17]

CAR T cells Therapy

Utilising the power of genes and RNA molecules, gene and RNA therapies represent ground-breaking developments in medicine. With the use of methods like CRISPR-Cas9 and viral vectors, which allow for precise DNA editing, gene therapy treats hereditary problems. RNA therapies work by altering RNA molecules, such as mRNA, which is present in COVID-19 vaccines and other mRNA-based vaccinations.

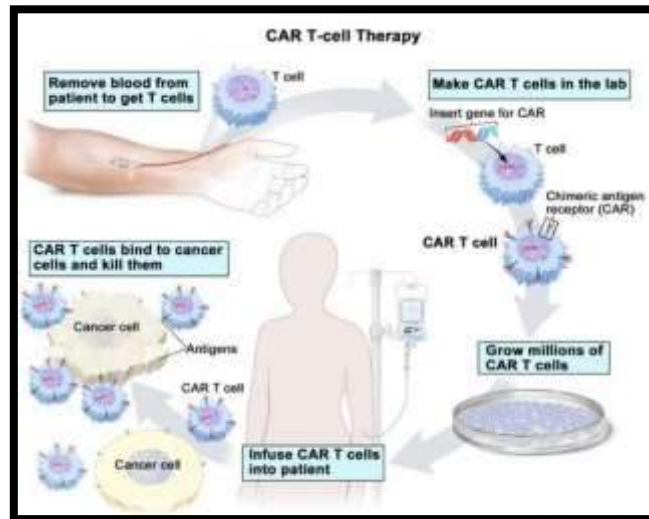


Figure 2: CAR T-Cell Therapy

RNA BASED THERAPEUTICS^[3, 18, 19]

The discovery of the genetic code in 1868 provided the impetus for RNA therapies, a next-generation method of treating disease. These medications control gene expression by utilising Watson-Crick base-pairing, offering economical, effective substitutes for conventional treatments. Types of RNA Based therapeutics:

- 1) **Messenger RNAs (mRNAs):** By using messenger RNA to direct cells to produce proteins, mRNA therapies transform medical intervention.
- 2) **Antisense oligonucleotides (ASOs):** These brief synthetic sequences have a specific binding affinity for complementary RNA, so providing tailored regulation of gene expression at the pre-mRNA or mRNA level. This therapeutic approach can be used to a variety of medical conditions, including neurological illnesses, muscular dystrophies, malignancies, and genetic abnormalities.
- 3) **Small interfering RNAs (siRNAs):** In RNA interference (RNAi), small interfering RNAs (siRNAs) play a critical role in controlling gene expression. Double-stranded RNA molecules known as siRNAs specifically target genes in RNA therapies, directing the RNA-induced silencing complex to inhibit or degrade messenger RNAs.
- 4) **MicroRNAs (miRNAs):** These are small, conserved RNA molecules that bind to target mRNAs to control the expression of certain genes. They were first identified in 1993. Compared to their synthesised RNA counterparts, miRNAs have reduced immunogenic risks due to their powerful targeting capabilities, which allow them to downregulate a wide range of genes.
- 5) **Aptamers:** Aptamers are short single-stranded RNA, DNA, or RNA-DNA hybrids that fold into precise structures, much like chemical antibodies. This allows them to bind selectively to a variety of targets that are found by the SELEX method. Aptamers offer diverse therapeutic mechanisms:
 - (1) Target-specific aptamers can deliver therapeutic agents to specific cells or tissues.
 - (2) They can act as agonists, functionally activating their target molecules.
 - (3) Serving as antagonists, aptamers block interactions in disease-associated pathways.

Recent Advancement in RNA based Therapies^[20-22]

mRNA Vaccine: mRNA vaccines, which function as flexible cell instruction manuals, are a novel method to disease prevention. The COVID-19 pandemic demonstrated their unparalleled efficacy and rapidity of development, as evidenced by the FDA's approval of the Pfizer-BioNTech and Moderna vaccines. RNA therapeutics goes beyond treating infectious diseases and includes cancer vaccines, illustrating the ever-changing field of preventive approaches for a range of illnesses.

CircRNAs Therapies: Unlike mRNAs, circular RNAs are unique single-stranded molecules with closed loops that have certain characteristics. Because circRNAs are safer, less immunogenic, and more stable than viral vectors and DNA treatment, they have the potential to be used in nucleic acid therapy. CircRNAs can function as both non-coding RNAs that regulate biological processes and protein-producing mRNAs. It also highlights the possibility for precision medicine and tailored treatments.

Applications of RNA Therapies^[23-26]

1. **Cancer Therapy with siRNA:** Small interfering RNA (siRNA) can selectively suppress the expression of disease-causing genes, holding great promise in the treatment of human diseases, including malignant cancers. Identification of genetic drivers is crucial for advancing cancer therapeutics. There were 19.3 million new cancer cases and 10.0 million deaths worldwide in 2020. It is estimated that cancer incidence cases will rise to 28.4 million in 2040.



- mRNA Vaccines with siRNA:** Combining siRNA with mRNA vaccines offers a novel approach to vaccine development. COVID-19 vaccines are an example of mRNA vaccines, which use genetic instructions to trigger immunological responses. By precisely modulating immune responses, integrating siRNA has the potential to improve vaccination efficacy through its capacity to specifically block gene expression.
- Antisense Oligonucleotides (ASOs) for Genetic Disorders:** Antisense oligonucleotides (ASOs) are powerful agents against genetic illnesses. ASOs, which are engineered to engage with particular RNA molecules, regulate gene expression at the fundamental level, providing a means of treatment for ailments such as muscular dystrophy, spinal muscular atrophy, and uncommon genetic disorders.
- RNA Therapeutics for Neurodegenerative Diseases:** RNA therapies, which use different RNA molecules to target disease-causing factors directly or to modify gene expression, offer a promising strategy to treat neurodegenerative illnesses. MicroRNAs, which are small RNA molecules, have the ability to control gene expression associated with neurodegenerative diseases. RNA therapies have the ability to provide individualised treatments as research advances, providing optimism for better results in this difficult subject.
- RNA Therapeutics in Cardiovascular Diseases:** Cardiovascular disease (CVD) is the leading cause of death and disability in developed countries despite advances in risk stratification strategies and treatment RNA therapeutics show promise in revolutionizing cardiovascular disease treatment. MicroRNA (miRNA) therapies target aberrant miRNA expression linked to heart conditions, while messenger RNA (mRNA) therapies aim to enhance protective protein expression.

CONCLUSION

Treating diseases with genetic foundations, such as muscular dystrophy and cancer, may be possible with the use of RNA-based therapeutics and gene therapy. By correcting genetic flaws, these cutting-edge methods hope to cure ailments that were once thought to be incurable and offer long-term comfort.

REFERENCES

- Baja, S., & Hutoagner, G. (n.d.). RNA-based therapeutics: From antisense oligonucleotides to miRNAs. *Cells*, 9(1), 137.
- Kim, Y. K. (2022, April). RNA therapy: Rich history, various applications and unlimited future prospects. *Experimental & Molecular Medicine*, 54(4), 455-465.
- Zogg, H., Singh, R., & Ro, S. (2022, March 1). Current advances in RNA therapeutics for human diseases. *International Journal of Molecular Sciences*, 23(5), 2736.
- Patil, S. R., Al-Zoubi, I. A., Raghuram, P. H., Misra, N., Yadav, N., & Alam, M. K. (2018, December 1). Gene therapy: A comprehensive review. *International Medical Journal*, 25(6), 361-364.
- Verma, G., & Mishra, M. K. (2016, August 16). A review on gene therapy: History, vectors, technologies and application. *World Journal of Pharmacy and Pharmaceutical Sciences*, 5(10), 1334-1355.
- <https://www.fda.gov/vaccines-blood-biologics/cellular-gene-therapy-products/what-gene-therapy>
- Lejman, J., Panuciak, K., Nowicka, E., Mastalerczyk, A., Wojciechowska, K., & Lejman, M. (2023, January 6). Gene therapy in ALS and SMA: Advances, challenges and perspectives. *International Journal of Molecular Sciences*, 24(2), 1130.
- <https://www.biologydiscussion.com/gene/therapy/gene-therapy-ex-vivo-and-in-vivo-gene-therapy-with-diagram/9969>
- Reghupaty, S. C., & Sarkar, D. (2019, August 28). Current status of gene therapy in hepatocellular carcinoma. *Cancers*, 11(9), 1265.
- Lundstrom, K. (2023, March 7). Viral vectors in gene therapy: Where do we stand in 2023? *Viruses*, 15(3), 698.
- Yazdani, A., Alirezaie, Z., Motamedi, M. J., & Amani, J. (2018, September 30). Gene therapy: A new approach in modern medicine. *International Journal of Medical Reviews*, 5(3), 106-117.
- <https://patienteducation.asgct.org/gene-therapy-101/gene-therapy-approaches>
- Maeder, M. L., & Gersbach, C. A. (2016, March 1). Genome-editing technologies for gene and cell therapy. *Molecular Therapy*, 24(3), 430-446.
- Mollanoori, H., & Teimourian, S. (2018, June). Therapeutic applications of CRISPR/Cas9 system in gene therapy. *Biotechnology Letters*, 40, 907-914.
- Ginn, S. L., Amaya, A. K., Alexander, I. E., Edelstein, M., & Abedi, M. R. (2018, May). Gene therapy clinical trials worldwide to 2017: An update. *The Journal of Gene Medicine*, 20(5), e3015.
- Li, Q., Wang, K., & Zhou, J. (2023, March 21). Comprehensive overview of CAR-T cell therapy, engineering process and future prospects. *Highlights in Science, Engineering and Technology*, 36, 376-384.
- Ahmed, M. M. (2021, May 26). CAR-T cell therapy: Current advances and future research possibilities. *Journal of Scientific Research in Medical and Biological Sciences*, 2(2), 86-116.
- Pradeep, S. P., Malik, S., Slack, F. J., & Bahal, R. (2023, April 1). Unlocking the potential of chemically modified peptide nucleic acids for RNA-based therapeutics. *RNA*, 29(4), 434-445.
- Kim, Y. K. (2022, April). RNA therapy: Rich history, various applications and unlimited future prospects. *Experimental & Molecular Medicine*, 54(4), 455-465.
- Zhang, C., & Zhang, B. (2023, January). RNA therapeutics: Updates and future potential. *Science China Life Sciences*, 66(1), 12-30.
- Zhu, Y., Zhu, L., Wang, X., & Jin, H. (2022, July 23). RNA-based therapeutics: An overview and prospectus. *Cell Death & Disease*, 13(7), 644.



-
22. Sun, M., & Yang, Y. (2023, May 5). *Biological functions and applications of circRNA: Next generation of RNA-based therapy*. *Journal of Molecular Cell Biology*, *mjad031*.
 23. Huang, J., & Xiao, K. (2022, July 29). *Nanoparticles-based strategies to improve the delivery of therapeutic small interfering RNA in precision oncology*. *Pharmaceutics*, *14*(8), 1586.
 24. Hill, S. F., & Meisler, M. H. (2021, September 10). *Antisense oligonucleotide therapy for neurodevelopmental disorders*. *Developmental Neuroscience*, *43*(3-4), 247-252.
 25. Lee, M. J., Lee, I., & Wang, K. (2022, January 12). *Recent advances in RNA therapy and its carriers to treat the single-gene neurological disorders*. *Biomedicines*, *10*(1), 158.
 26. Laina, A., Gatsiou, A., Georgiopoulos, G., Stamatelopoulos, K., & Stellos, K. (2018, July 25). *RNA therapeutics in cardiovascular precision medicine*. *Frontiers in Physiology*, *9*, 953.



THE SILENT STRUGGLE: A QUALITATIVE STUDY ON MENSTRUAL CHALLENGES AMONG UNIVERSITY WOMEN RESEARCHERS

Monika Sangral¹, Sunil Kumar²

¹Doctoral Student/ Research Scholar, School of Education, Lovely Professional University, Phagwara, Punjab, India

²Doctoral Student/ Research Scholar, Department of History central university of Himachal Pradesh, Kangra, Himachal Pradesh, India

ABSTRACT

Background

In Middle Income countries the main problems are mainly related to health like physical Health, Mental health, psychological problems etc. mensuration is one of the main challenges in women life. In our countries like India, where mensuration is criticised, it can be particularly difficult. So that why this paper examines challenges related to mensuration for young women pursuing PhD in lovely professional university, Phagwara, Punjab, India. Life course interviews were conducted with 10 young women ages 25- 30 pursuing PhD in lovely professional university. Thematic analysis helps us to recognised to problems and challenges related to mensuration in young women life. And what's problems faced during their mensuration period and what's the issues they are tackling at that time.

Methods

This study aims convenient sampling was applied to select participants. Different approaches are used to collect data and triangulate data: in-depth interviews, observation, Photovoice We analyses the data with the help of content analysis and frequency cum percentage.

KEYWORDS: Health, Menstrual, Women, Problem's, Knowledge about menstrual hygiene; Practice; Hygiene; Peri-pad; Reproductive age; Genitalia Menstruation

Abbreviations: FGD: Focus Group Discussion

INTRODUCTION

Menstruation is a natural aspect of the female reproductive cycle, which begins when girls reach puberty and are ready for sexual maturity. It is a female-specific issues. A lady bleeds from her uterus through her vagina during her menstruation. While the uterine contraction regulates how much blood is lost, the hypothalamus, pituitary, and ovarian functions determine the monthly rhythm. Three to seven days are the length of the menstrual cycle. The menarche, or the start of menstruation, varies depending on ethnicity and family, but for the majority of girls, it begins between the ages of 10 and 14 and 45 to 55. Geographical conditions, racial considerations, nutritional standards, environmental impacts, and participation in physically demanding activities, among others If the lady does not get pregnant during a certain cycle, 28 days. The age of menarche can be affected by any deviation from the twenty-eight-day rhythm, even if it is only two or three days. In her lifetime, a woman will have about 500 periods. The amount of blood lost is thought to be between 50 and 200 ml. They weren't allowed to contact any men, go get water, go into the kitchen, or worship the gods when they were menstrual since they were thought to be holy. Due to menstruation difficulties, adolescent females frequently go to the outpatient endocrinology clinic. In the countryside, women use homemade sanitary napkins, which are not adequately cleaned, during menstruation. Periodic menstruation is a risk factor. for a number of major illnesses. Because menstrual hygiene and management issues are not currently being discussed in discussions about policies, there is a need for funding and other initiatives. The urethra in females is rather short and prone to ascending infections. Teenage females may experience a variety of issues without completely comprehending the reasons behind them. The importance of menstruation, the emergence of secondary sexual traits, the choice of a sanitary menstrual absorbent, and its proper disposal should all be explained to the girls. Menstrual hygiene education and sex education should both be made mandatory so that people can talk freely about these topics without experiencing uneasy.

OBJECTIVE

1. To assess the experiences of women research scholars during menstrual period
2. To identify issues and challenges faced (including health) by women research scholars due to their menstruation.



MENSTRUATION

A menstrual cycle typically lasts 28 days. The first day of one period marks the beginning of the cycle, which concludes on the first day of the following period. On day 14, the typical lady ovulates. Some women suffer slight lower stomach pain, spotting, or bleeding at this period, while others show no symptoms at all. If a woman engages in sexual conduct just before and during ovulation, she is typically more likely to become pregnant (fertile).

What is a Period?

The endometrium, which lines the uterus, sheds during the menstrual phase of the female reproductive cycle. Throughout a woman's reproductive life, this happens. The endometrium prepares itself to support a foetus with each monthly cycle. Increased amounts of progesterone and oestrogen contribute to the walls' thickening. The menstrual flow, which leaves the body through the vagina during the period if fertilisation is unsuccessful, is made up of the endometrium, blood, and mucus from the vagina and cervix hair. When a female gets her period for the first time can vary depending on stress, exercise, and food. A young lady should speak with her doctor, according to the American College of Obstetricians and Gynaecologists, if she hasn't begun menstruating by the age of 15, or if her breast buds, pubic hair, or underarm hair haven't appeared by the age of 13.

How long does a cycle of menses last?

An average menstrual cycle for women who are menstruation lasts 28 days. It begins on the first day of the previous period and concludes on the first day of the subsequent one. But women's cycles can vary in duration, especially in the first year or two after a young woman's first period. Ladies might have

What time does menstruation begin?

A young lady in the United States often experiences her first menstrual period at around age 12. This usually occurs 2 to 3 years after her breasts first begin to develop. She also just became aware of her underarm and pubic During the first few years, there may be cycles as short as 21 days or as long as 45 days. Anything outside of this range, though, might need medical treatment.

Women Sanitary Health in India

In India, women, and schoolgirls in particular, have the difficult burden of preserving their sanitary health while the pandemic is still going on. The "Ujjwala Sanitary Napkin" plan, under which women were to have access to reasonably priced sanitary pads, was introduced by the Indian government in 2018. Government schools now have vending machines that give away free sanitary pads to female students. However, a crucial link in the supply chain for these pads has been weakened as a result of the ongoing closure of such schools during the state-wide lockdown, leading to an unexpected shortage of sanitary napkins. This puts economically vulnerable women at a heightened risk for illnesses and difficulties linked to poor sanitation. What is even more alarming is that the manufacture of sanitary napkins has been severely limited as a result of the n areas like Jharkhand and Maharashtra, lockdown and movement restrictions are still in effect. Even in the most developed cities, the availability of menstrual hygiene products, which includes disposable and reusable sanitary pads, is extremely unpredictable, and it is nearly non-existent in rural areas that are located distant from major supply hubs. Due to the unavailability of public transit, the restrictions on mobility during the lockdown, the raised prices brought on by stocking and black marketing, women who could afford the pads at their regular pricing nevertheless are unable to obtain them. Education about menstrual hygiene is frowned upon in India. It can be awkward for women to ask a male family member—who typically brings home purchases from the market—for sanitary supplies. Particularly in rural places, women are are housebound and rely on male or senior female family members to get sanitary items. Women are unable to practise personal sanitary hygiene, such as changing menstrual pads, washing cloth pads, and drying them in sunlight for proper disinfection, due to the lack of clean, private, safe water and sanitation facilities. Girls reduce their food and water intake to reduce potty usage, so they don't have to change pads as frequently because pads are scarce. Over time, these habits can cause serious health problems. The social division that still exists in India today has been made clear by the COVID-19 crisis. Because of this, Indian society has maintained a patriarchal mentality over the years which a difference in rank exists between men and women. Men are recognised as the family's independent breadwinners, while women are seen as dependents whose main responsibility is to take care of the home. As a result, women are unable to become economically independent and must rely on males to buy sanitary items, which are now much more expensive due to a supply shortfall. Due to the economic subjugation and the lack of gender equality, which allows men to assume the dominant role in the home, women's needs are entirely dependent on men. The discrimination continues because economic status also plays a significant impact. The Both gender inequality and the income gap between men and women are serious issues. While upper class ladies can easily have their sanitary goods delivered to their homes, the poor and downtrodden still struggle to make ends meet when it comes to purchasing even the most basic of sanitation supplies. Women have been oppressed as a result of the gender and economic disparity, especially those from rural or marginalised groups who lack access to education and whose maintenance of sanitary conditions becomes a luxury in the absence of awareness campaigns. The government's ongoing disregard for women and girls is evident in its refusal to publicise sanitation awareness campaigns or to include sanitary items as basic necessities in the first place. India's basic hygiene requirements. Although sanitary pads were listed by the government as needs, little was done to balance supply and demand interruptions. Additionally, no initiatives



were made to establish sanitary pad distribution sites to take the place of schools. It must stop immediately when women and their needs are treated with such discrimination. The current crisis has set the stage for future issues that will be considerably more severe. Many sanitary pad manufacturing facilities have switched to producing PPE kits, masks, etc. in order to secure a consistent revenue due to the government's virtually non-existent support. The decrease in dedicated units will probably prevent output from returning to normal and result in a scarcity continuing even after the shutdown is over. Two resolutions that recognised the right to sanitary conditions and clean water for all people were adopted by the UN General Assembly, one in 2010 and the other in 2015. The 2015 resolution placed a specific emphasis on sanitation and urged nations to guarantee that women participate fairly in decisions relating to sanitation management and practises. The Pandemic has had a terrible impact on the menstrual health of millions of girls and women in India, and the future is bleak. Menstrual health should be prioritised by the government, integrated into disaster relief plans, and acknowledged as a fundamental right protected by the Indian Constitution.

Hygiene and the Safety Pad

S.NO	Menstrual practices Variables				
1	i)Practices	A) Use of sanitary pads	B) Pieces of cloth	C) newspapers	
		10	0	0	100%
2.	ii) How often do you changes pads/clothes	A) Once	B) Twices	C) More than four	
		0	3	7	70%
3	Frequency of bathing during menstrual period	once	twice	none	
		3	7	0	70%
4	Where do you discard the pads	Pit toilet	Refuce bin	Flush in toilet	
		0	10	0	100%
5	Care of underwear /panty	Wash and expose to sun	Wash and hide	Hide and discard	
		10	0	0	100%
6	Storage of under wear	Clean and covered	Unclean and uncovered		
		10	0		100%
7.	Pre pain menstrual time	Yes	No		
		10	0		100%
8.	Mood swings menstrual time	Yes	No		
		9	0		90%
9.	Period delay time	Yes	No		
		7	3		70%
total					N=10

Analysis of the Data (N=10)

DISCUSSION

Given the findings in the study and reflecting on the objective of the study, it is dear that menstrual hygiene and management is an issue for women research scholars in lovely professional university. Their perceptions were heavily influenced by today time. Investigator identified the issues faced by the women during mensuration. They have bad experienced before started their cycle i.e mood swings, period delay time has been identified in this study. As observed by the researchers. Menstruation is a very complex process involving many different hormones, the sexual organs, and the nervous system. Regular exercise and keeping fit and healthy can help to regulate the menstrual cycle. The women told the observers which would normally be changed around two to four times during menstruation. Instead, the vast majority of women are using pads during their time. This was the good news because almost all the women much more aware about their hygiene and health. But Most of the women feel upset and tension during the first day of menstruation. These women research scholars of lovely professional university experienced upset and tension during their period.



CONCLUSION

The study has highlighted the issues and challenges faced by women research scholars during their periods (menstruation). But the results were that most of the women were much more aware about their hygiene and they know all the things regarding their cycle and maintain proper balance and using safety pads and proper change the pads during that time. After using the pads they can throw them into a dustbin. Only one thing was bad, that most of the women faced bad experiences during their menstruation.

REFERENCES

1. Park P (2005) *Textbook of Preventive and Social Medicine. (18th edn). Bhanot.*
2. Adhikari P, Kadel B, Dhungel SI, Mandal A (2007) *Knowledge and practice regarding menstrual hygiene in rural adolescent girls of Nepal. Kathmandu Univ Med J (KUMJ) 5: 382-386.*
3. Basnet S (2001) *Study on Knowledge and Practice of menstrual hygiene among Rural Women. Journal of Institute of Medicine 3: 22-28.*
4. Bhattacharya S (1999) *Experience of adolescent girls of PCL students. Journal of Institute of Medicine 2: 58-61.*
5. Anuradha C (2007) *menstrual hygiene among adolescent girls.*
6. Dasgupta A, Sarkar M (2008) *Menstrual Hygiene: How Hygienic is the Adolescent Girl? Indian J Community Med 33: 77-80.*
7. El-Gilany AH, Badawi K, El-Fedawy S (2005) *Menstrual hygiene among adolescent schoolgirls in Mansoura, Egypt. Reprod Health Matters 13: 147- 152.*
8. Koff E, Rierdan J (1995) *Early adolescent girls' understanding of menstruation. Women Health 22: 1-21.*
9. Ten V TA (2007) *Menstrual hygiene: A Neglected condition for the achievement of several millennium development goals, Europe External Policy Advisors*



THE ECONOMIC EFFICIENCY OF THE TECHNOLOGY OF INTENSIVE *IN VITRO* PROPAGATION OF CHERRY VARIETIES

Abduramanova Salomat Khudaybergenovna¹, Rustamova Iroda Bakhramjanovna², Saimnazarov Yuldash Bekmirzayevich³

¹Doctor of Agricultural Sciences, Senior Researcher, Tashkent State Agrarian University

²Doctor of Economical Sciences, Professor, Tashkent State Agrarian University

³Doctor of Biological Sciences, Professor, Rice Research Institute, Uzbekistan

Article DOI: <https://doi.org/10.36713/epra15297>

DOI No: 10.36713/epra15297

ABSTRACT

This article shows that the relevance of the method of microclonal propagation and cultivation of plants under in vitro condition as a cost-effective technology for the production of planting materials that allows growing plants in sufficient quantities for scientific and production purposes has been substantiated.

By determining the efficiency of new generation growth stimulants, which were not previously used in intensive in vitro culture, and comparing them with the standard growth substances used in clonal micropropagation, an economic evaluation of the technology of cultivating cherry rootstocks in intensive in vitro conditions, developed in the laboratory "Biotechnology" of the scientific research institute of horticulture, viticulture and winemaking named after Academician Mahmud Mirzayev and its efficiency was carried out. The economic appraisal of the technology of reproduction of promising cherry rootstocks in intensive in vitro conditions includes the selection of the object for the introduction of innovations, the description of the technology, the calculation of costs and the determination of economic evaluation indicators.

KEY WORDS: *innovation, cherry rootstocks, technology, cost, profit, coefficient of resource efficiency, coefficient of gross growth of innovations, coefficient of shooting, efficiency.*

INTRODUCTION

Today, an average of 9 billion tons of cherries are grown annually in 65 countries around the world. In this regard, "Turkey 800,000 tons, USA - 448,000 tons, Russia – 273 tons, and Iran - 250,000 tons are the leaders, in recent years, Uzbekistan has entered the top five in terms of gross cherry production and export volume." The productivity of the cherry plant today is 254,000 t/ha, the creation of new dwarf varieties and rootstocks of cherry that allows to increase its productivity to a high level in most of the cherry-growing countries of the world, the development of the most effective agrotechnical measures for intensive cherry orchards issues remain relevant [1, 2, 3, 7].

In all the countries that are the leaders in the cultivation of cherry (*Cerasus avium*) in the world, orchards of the stone fruits are being established. Since cherry is a vigorous growing fruit plant, its intensive orchards contain only seedlings grown on low-vigorous rootstocks. Scientific research is being carried out on the reproduction only *in vitro* condition of low-vigorous rootstocks such as Gisela, Maxma-14, Colt which are used in intensive cherry orchards in the world. By choosing the optimal nutrient medium for these rootstocks, micrografting varieties to rootstocks, developing effective methods of adapting micrografted plants to external environmental conditions, it is possible to grow high-quality cherry seedlings and reduce their cost [8,9, 10, 11, 12].

Label et al (1989) mentioned the use of *in vitro* propagation technologies of wild cherry for commercial clonal propagation of cherry and the effects of exogenous plant hormones on cherry explants [5].

Also, Mihaljevic et al mentioned that surface sterilization of explants is the most important step when preparing explants from trees growing in the field in order to prevent fungal and bacterial damage in microclonal reproduction[6].

In addition, Sisco (2011) studied the technologies of *in vitro* propagation of Gisela-5 rootstock. Explants from shoot tips and leaf axil buds were used [4].



Selected stem tips from wild cherry (*Prunus avium L.*) and F 12/1 and Charger grafts brought from British forests and listed in MS medium.

RESEARCH METHODOLOGY

The economic evaluation of the technology of intensive *in vitro* propagation of promising cherry rootstocks includes the selection of the object for the introduction of innovations, the description of the technology, the calculation of costs and the determination of indicators of economic evaluation.

The methods used were based on a systematic approach and generally accepted and validated methods used in scientific research on fruit crops. The results of experimental studies were calculated to assess the economic efficiency of innovative technologies used in agriculture using the “Borland C + + Bulder 6” program and the “O`ITS” electronic program [13].

To determine the economic evaluation of innovative technology, a methodology was developed that includes economic indicators such as the coefficient of resource saving, the coefficient of gross growth of innovations and the level of innovativeness of technology [13, 14].

According to the results of the research, it was proved that the microclonal method of vegetative reproduction of cherries under *in vitro* condition is highly effective and economically feasible.

ANALYSES AND RESULTS

Economic efficiency of micrografted varieties and low-vigorous Krimsky-5, Gisela-5, Gisela-6 and Colt rootstocks of cherry grown under *in vitro* condition was calculated in the years 2019-2022 in “Alisher Fayz-Muruvvat” farm in Tashkent district of Tashkent region, in fertile mulberry seedlings growing “in vitro” laboratory at the “Silk, seedling” cluster farm in Marhamat district of Andijan region, in the Samarkand research station and the Surkhandarya research station of the Research Institute of horticulture, viticulture and winemaking named after Academician M. Mirzayev.

According to the results of the research, the economic efficiency of cherry rootstocks was as follows: the rootstock yield of Krimsky-5 variety was 75,000 pieces per hectare, production costs were 89,141 thousand soums, the cost of production was 1,18 thousand soums, the realization price was 5 thousand soums, revenue was 375,000 thousand soums, profit was 285,859 soums, and profitability was 320,7% (Tables 1 and 2).

Thus, the production costs of growing cherry rootstocks in traditional conditions were 33750 thousand uzbek soums, while under *in vitro* conditions were 89141 thousand uzbek soums, the cost of cherry rootstocks per 1.0 ha of land was 450 uzbek soums, in *in vitro* conditions 1180 uzbek soums, and the cost difference was 738,5 uzbek soums. Economic efficiency in terms of technology amounted to 244,609 thousand uzbek soums.

Table 1

Calculation of production costs for the cultivation of cherry rootstocks in traditional and *in vitro* conditions on one hectare of land, Thousand uzbek soums

No	Indicators	(Traditional) Standart	<i>In vitro</i>
1	Rootstock yield	70000	70000
2	Production costs	33750	89141
3	Cost of product	0,45	1,18
4	Realization price	1	5
5	Income	75000	375000
6	Benefit	41250	285859
7	Profitability	122,2	320,7

The resource-efficient coefficient in the cultivation of cherry rootstocks under *in vitro* condition was 2.64. The coefficient of gross growth of innovation was 0.85. The rootstocks shooting coefficient was 60% in the (traditional) standard method and 95% in the *in vitro* method. Due to the use of this technology, the resources were spent twice as much as compared to the traditional method, and according to the obtained result a profitability rate was 320,7 percent due to the high level of rootstocks shooting and sales price.

The resource saving coefficient (K_p) is characterized by the ratio of the total costs of the adopted technologies to the total costs of traditional technologies.

$$K_p = \frac{ИЧХ_{\dot{y}_3}}{ИЧХ_a}$$

K_p –The resource saving coefficient



$ИЧX_{\bar{y}_3}$ – production costs of the technology in use

$ИЧX_a$ – production costs of traditional technology.

The gross growth coefficient of innovation is characterized by the ratio of the gross profit of the adopted technologies ($\bar{Я}\Phi_{\bar{y}_3}$) to the gross profit of the growth of technologies ($\Delta\bar{Я}\Phi$).

Table 2
Economic efficiency of in Vitro Growing of Cherry Rootstocks, 2019-2022

Cherry Rootstocks	Indicators						
	Rootstock Yield, Pcs	Production Costs, Thousand Soums	Price Of The Product, Soums	Realization Price, Thousand Soums	Gross Income, Thousand Soums	Net Profit	Profitability, %
Option 1 MS-control							
Krimskiy-5	70	89141	1273,4	5000	350000	260859	292,6
Gisela-5	70	89141	1273,4	5000	350000	260859	292,6
Gisela-6	63	89141	1414,9	5000	315000	225859	253,4
Colt	68	89141	1310,9	5000	340000	250859	281,4
Option 2 DKW							
Krimskiy-5	75	89141	1188,5	5000	375000	285859	320,7
Gisela-5	65	89141	1371,4	5000	325000	235859	264,6
Gisela-6	65	89141	1371,4	5000	325000	235859	264,6
Colt	72	89141	1238,1	5000	360000	270859	303,9
Option 3 MS-improved							
Krimskiy-5	75	89141	1188,5	5000	375000	285859	320,7
Gisela-5	72	89141	1238,1	5000	360000	270859	303,9
Gisela-6	68	89141	1310,9	5000	340000	250859	281,4
Colt	72	89141	1238,1	5000	360000	270859	303,9
Option 4 WPM							
Krimskiy-5	72	89141	1238,1	5000	360000	270859	303,9
Gisela-5	65	89141	1371,4	5000	325000	235859	264,6
Gisela-6	62	89141	1437,8	5000	310000	220859	247,8
Colt	68	89141	1310,9	5000	340000	250859	281,4

$$И_k = \frac{\Delta\bar{Я}\Phi}{\bar{Я}\Phi_{\bar{y}_3}}$$

Resource saving means the state of achieving the increase (or not decrease) of the results obtained in the process of using resources in terms of quantity and quality, in the conditions of relative stability of the amount of resource consumption. In this case, the main function of resource saving is the question of saving resource consumption, that is, saving resources by using less resources in the production of products (rendering services) or by using new innovative technologies in the use of resources.

When the production costs for the cultivation of cherry rootstocks in traditional and *in vitro* conditions were calculated, the labor cost was 24,000 thous.soums, the cost of seedlings was 5780 soums, the cost of water was 1200 thous.soums, and the fuel costs were 1425 thousand soums, and the total costs were 44,325,000 soums (see Table 3).

Table 3
Calculation of production costs for cultivation of cherry varieties under traditional and *in vitro* conditions, 2019-2022.
Thousand soums

	Indicators	Technologies	
		Standard (Traditional)	<i>In vitro</i>
1	Salary (labor costs)	36000	18000
2	Costs for seedling	5700	-
3	Laboratory costs	-	4054,5
4	Greenhouse costs	-	4191
5	Electricity costs	-	2655
6	Natural gas costs	-	300
7	Water costs	1200	450
8	Fuel costs	1425	-
	Total costs	44325	29651,4



When calculating production costs for growing cherry rootstocks under *in vitro* condition, salary costs were 18,000 thous.soums, laboratory costs 4054,50 thous.soums, greenhouse costs were 4191 thousand soums, electricity costs were 2655 thousand soums, and natural gas costs 300 thous.soums, water costs were 450 thousand soums and total costs were estimated to be 29651.4 thousand soums.

On the basis of resource-saving measures, it is necessary to organize the achievement of a timely and qualitative result through the least resource consumption per unit of processing facilities.

According to the results of the table, production costs for growing cherry seedlings in traditional and *in vitro* conditions on one hectare of land are given. Labor costs for workers were determined based on certain requirements (traditionally) for the cultivation of cherry varieties in the standard way, 36,000 thousand soums, and labor costs for *in vitro* conditions amounted to 18,000 thousand soums. 5,700,000 soums were spent on growing cherry seedlings (traditionally) in a standard way.

Table 4
Indicators of economic efficiency of growing cherry seedlings (10 ha) in 2019-2022.
Thousand soums

No	Indicators	Traditional (st)	<i>In vitro</i>
1	Seedling	5550	5550
2	Production costs	44325	29651,4
3	Product cost	8,0	5,3
4	Realization price	25	30
5	Income	138750	166500
6	Benefit	94425	136848,6
7	Profitability	213,0	461,5

The production costs of growing cherry seedlings were 44,325 thousand soums in the (traditional) standard method, and 29,651,4 thousand soums by *in vitro* method.

The cost of a cherry variety on 10 hectares of land in the (traditional) standard way was 8.0 thousand soums, while under *in vitro* conditions 5.3 thousand soums, the yield was 213.0% in standard method (see table 4).

Thus, it is necessary to organize the basis of resource saving measures to achieve timely and quality results through the least resource consumption at the expense of the unit of the processing facility.

Due to the use of this technology, resources are used less than the traditional ones, and the obtained result is a doubling of the profitability level due to the high level of shooting of rootstocks and the selling price of the micrografted cherry seedlings. 461.5% profitability was achieved in the cultivation of cherry seedlings under *in vitro* condition.

CONCLUSIONS AND SUGGESTIONS

When a seedling is grown in the (traditional) standard way, it will be ready in 2.5 years. 70 thousand pieces seedlings will be spent on 1 ha land. However, due to weather conditions, agrotechnical measures and viability of seedlings, the yield of seedlings will be 60% of the total number.

While using *in vitro* method, a rootstock is grown in 6 months, and after grafting it the seedling is ready in 1 year. 73.5 thousand pieces are spent on 1 ha land.

REFERENCE LIST

1. Abduramanova S. Kh. *Microclonal propagation of cherry (cerasus avium) cuttings and scientific justification of micrografting technology. Dissertation work prepared for the degree of Doctor of Agricultural Sciences (DSc). Tashkent. 2023. 249 p*
2. Bosnjakovic D, Ognjanov V, Barac G, Ljubojevic M, Pranjić A and Dugalic K. 2013. *Micropropagation of low-vigorous rootstock selections for sweet and sour cherry. Voc'arstvo 47(183): 121-128.*
3. Saimnazarov Y.B., Abduramanova S.Kh. *In vitro multiplication of cherry rootstock Krymsk@5 (VSL). // International journal for innovative research in multidisciplinary field - Volume 5, - Issue 1, India, 2019. - P. 77-81. Impact Factor: 6.497.*
4. Sisko M. 2011. *In vitro propagation of Gisela 5 (Prunus cerasus × P. canescens). Agricultura 8: 3134.*



5. Label P., Cornu D., Sotta B and Miginiac E. 1989. Internal levels of plant growth regulators during *in vitro* culture of wild cherry (*Prunus avium* L.). *Annals of Forest Science* 46: 117-120.
6. Mihaljevic I., Dugalic K., Tomas V., Viljevac M., Pranjić A., Smelik L., Puskar B. and Jurkovic Z. 2013. *In vitro* sterilization procedures for Micropropagation of 'oblacinska' sour cherry. *Journal of Agricultural Sciences* 58(2): 117-126.
7. Бурунов Ф., Кудратиллаев Ж., Валиева М. Технология микрочеренкования в процессе микроклонального размножения подвоев черешни. //Сборник материалов между. Научно-практ. Конф. "Состояние, проблемы, перспективы межрегионального плодородства и виноградарства". – Ташкент: "Info Capital Group", 2018. – с. 160-163.
8. Высоккий В. А. Культура изолированных тканей и органов плодовых растений: оздоровление и микроклональное размножение / В. А. Высоккий // *Сельскохозяйственная биология*. – 1983. – № 7. – С. 42–47.
9. Hammatt N and Grant N.J. 1997. Micropropagation of mature British wild cherry. *Plant Cell, Tissue and Organ Culture* 47: 103-110.
10. Джигадло Е. Н. Совершенствование методов селекции, создание сортов вишни и черешни, их подвоев с экологической адаптацией к условиям центрального региона России. Автореферат дис. на соиск. учен. степени доктора с/х наук. Брянск, 2006.
11. Деменко В. И., Грушечкин В. Г. Размножение вишни методом *in vitro* // *Сельскохозяйственная биология: Ежемесячный научно-теоретический журнал*. М., 1983. № 7. С. 51–53.
12. Еремина О.В. Использование генофонда *Prunus avium* L. при создании сортов и подвоев черешни для возделывания по современным интенсивным технологиям на юге России: автореферат дис. ... доктора сельскохозяйственных наук. Краснодар, 2016.
13. Рустамова И.Б., Ўсимликчилик тармоғида инновацион технологиялардан фойдаланишнинг самарадорлигини баҳолаш "O`ITS" электрон дастури. Ўзбекистон Республикаси Адлия вазирлиги ҳузуридаги интеллектуал мулк агентлиги. Электрон ҳисоблаш машиналари учун яратилган дастурнинг расмий рўйхатдан ўтказилганлиги тўғрисидаги Ғувоҳнома № DGU 06980. 04.10.2019.
14. Рустамова И.Б., Жўраев Ф.М. Боғдорчиликда инновацион технологияларни иқтисодий баҳолаш бўйича таъсиялар ТДАУ Таҳририят-нашриёт бўлими. 2023, 50 бет.



NON-VERBAL EXPRESSIONS OF THE EYES IN THE HOLY QUR'AN

Muydinov Pakhlavon Kaxramonovich

Uzbekistan International Islamich Academy PhD Researcher

ABSTRACT

The eye is the most important part of human non-verbal communication. A person's eyes can reveal the lies he tells with his tongue. Many non-verbal expressions can be made with the eyes.

KEYWORDS: *Quran, non-verbal, eye, look, expression, gaze.*

In the history of mankind, the eye is an important part of the body from the point of view of the attention directed towards it. A lot of things have been said about him, be it in terms of importance among members, or in terms of their beauty. Even poets, writers, writers and classical scholars were the most mentioned buyers of this body part. Because the eyes are the door of the soul and the door of the soul. It provides the most accurate information about a person's inner feelings and emotions. Even if the information given by the language to the mind is false, the eye cannot handle a lie.

One of the rarest dictionary books of the Arab world, Ibn Manzur's "لسان العرب" set aside 9 pages for the word "eye" and gave it more than thirty meanings. In particular, the eye is an organ of the sense of sight and sight, a spy, a looker. Also, the watcher, the controller, the guard, and again the spring that flows from the earth, is the sun, money, dinar, dirham, wealth, gold, truth and ore.¹

The word "eye" appears in 63 verses of the Holy Qur'an in different meanings. In particular, in several verses, it was mentioned that the eye represents the meaning of vision, which performs the function of communication. Allah Almighty says in verse 13 of Surah Imran, "There has already been for you a Sign in the two armies that met (in combat) One was fighting in the cause of Allah, the other resisting Allah. **these saw** with their own eyes. Twice their number. But Allah doth support with His aid whom He pleaseth. In this is a warning for such as have eyes to see." "these saw"² is the expression "رَأَى الْعَيْنَ" in Arabic, and Ibn Ashur called it "true sight" in his commentary.

Ibn Ashur says: "Seeing here means perceiving with the eyes. Indeed, on the day of the Battle of Badr, the disbelieving community saw twice as many Muslims as their number, and they were defeated with fear in their hearts."³

Allah Almighty has blessed man and his other creatures, including the jinn, with the all-seeing eye as stated in verse 179 of Surah A'raf. Eyes are an important part of establishing communication before verbal communication. In Surah Balad, Allah says "أَلَمْ نَجْعَلْ لَهُ عَيْنَيْنِ" i.e. "Didn't He give him two eyes?" said.

Communication through the sense of sight is practiced from the first days of the baby's birth. On the other hand, it takes at least 1-2 years for a baby to start communicating through language.

Along with the task of establishing communication, eyes express emotions and human feelings. Eyes express piety and fear through tears. Or, it also reflects happiness. At the same time, shedding cold tears means a person's happiness, joy and happiness. As mentioned in the 26th verse of Surah Maryam, "فَكُلِي وَاشْرَبِي وَقَرِي عَيْنًا" means "Eat, drink and please the eyes".

¹ *Lisan ul Arab – Ibn Manzur; dar ul Maarif; 2016*

² *The Holy Quran, translation and commentary by Yusuf Ali; King Fahd nashri; Madina, 1946*

³ *Lugatul al Jasadi fi AlQurani AlKariym, Doktor Kamol Abdulaziz, Daru assaqofiyatu linnashr, Qohira, 2010*



The Holy Qur'an also tells us another function of the eye, which expresses the desire for that thing, when a person stares at something for a long time, through the 88th verse of Surah Hijr. "Don't look at the things that we enjoyed some groups from them. Don't feel bad for them. Spread your wings to the believers!"⁴

With the help of our eyes, we can also express some of our feelings towards others. The Holy Qur'an says this in the 31st verse of Surah Hud about humiliating and mocking others with the eyes: "... I do not say that God will not do good to those who look down on you." Allah knows best what is in their hearts. Otherwise, I will surely be one of the wrongdoers."⁵

In the Holy Qur'an, the word *عَيْن* expresses the following situations and meanings:

1. The eye of God, i.e. Basir, who surrounds everything with knowledge.
2. The eye that is the best observer.
3. The eye that performs the function of communication.
4. The eye that represents emotional states and feelings.
5. The eye embodies the blessing promised by Allah to His servants in Paradise.
6. The eye is a means of realizing pleasure.
7. The eye is a tool for following sins.
8. To express beauty according to the shape of the eye.
9. Eye means spring.

The Arabic dictionary provides information about the many meanings of the verb "to look" and most of those meanings are found in the Holy Qur'an. According to "Lisonul Arab", "gazing" is an emotional process of the eye. Javhari says "Looking is the perception of something by the eye"⁶.

The meaning of looking with the eyes expresses this meaning only when the auxiliary verb *إلى* is added to the verb to look. For example, the sentence *نَظَرْتُ إِلَى* gives the translation "I looked at him" in the sense of being done with the eyes. On the contrary, if it is said *نَظَرْتُ فِي الأَمْرِ*, the meaning of the sentence is not to look with the eyes, but to think, to make the heart think.⁷

A look *النظر* is an opinion about something by which you measure or set standards. In another sense, "the one who is looking at you - *نَظَرَ إِلَيْكَ* -" is used. For example, *نَظَرَ إِلَيْكَ الجَبَلُ* is used in the sense that the mountain looks at you, the mountain appears to you. *وَ إِذَا أَخَذْتَ فِي طَرِيقِ كَذَا فَنَظَرَ إِلَيْكَ الجَبَلُ فَخَذَ عَنْ يَمِينِهِ أَوْ بَسَارِهِ* if you go this way a mountain will come out in front of you and pass on its right or left side.

Qarash *نَظَرَ* also has the meaning of thanks. Allah Almighty's " *وَ لَا يَنْظُرُ إِلَيْهِمْ يَوْمَ الْقِيَامَةِ* " It is mentioned in the hadith, " *عَدِلَايَ إِنَّ اللَّهَ لَا* " is used. For example, *نَظَرَ إِلَى صُورَتِكَ وَ أَمْوَالِكَ* is used in the sense that the mountain looks at you, the mountain appears to you. *وَ إِذَا أَخَذْتَ فِي طَرِيقِ كَذَا فَنَظَرَ إِلَيْكَ الجَبَلُ فَخَذَ عَنْ يَمِينِهِ أَوْ بَسَارِهِ* if you go this way a mountain will come out in front of you and pass on its right or left side. Ibn Asir says: "The meaning of this view is charity, mercy, and love. Because looking is a proof of love and leaving the look is a proof of anger and hatred.

The language of the Holy Qur'an includes the word "look" in the sense of thinking and reasoning. This meaning comes from the depth of the behavior of the eye, which provides the brain with the greatest information and documents that are used to form ideas and beliefs and aid in thinking. There are many verses that emphasize this meaning. In the Holy Qur'an, it is mentioned in this way in 38 places, and in 95% of them it is in the form of a mutual request. That is, the thinking view is the most exemplary example for the answer to the question. In 79% of them, we find the verses that are considered to be the answer to what the gaze is. These are deep questions.⁸

It is appropriate to cite this hadith as a proof that this language was used in the lives of the Prophet. It is narrated from Aisha, may Allah be pleased with her: "One of the blessings that Allah gave me is that the Messenger of Allah, may Allah bless him and grant him peace, died in my house, during the days when he was by my side, and in my arms. At the moment of death, God united his saliva with my saliva. At that time, my brother Abdurrahman came in. He had a miswak in his hand. I saw the Prophet (pbuh) looking at him, and I knew that he (pbuh) loved miswak and said, "Shall I bring it to you?" I said. They nodded "Yes". I took it. They put it in their mouths. It was a bit rough. "Shall I soften? I said. They nodded "Yes". I loosened the ends of the miswak with my teeth. There was a bowl of water next to them. Putting his hands on him and rubbing his face with them, he said: "There is no god but Allah." "Of course, there is an intoxication of death," they said. Then I poured water on his hands. He, may God bless him

⁴ Al Hijr 88

⁵ Al Huud, 31.

⁶ *Lugatul al Jasadi fi AlQurani AlKariym, Doktor Kamol Abdulaziz, Daru assaqofiyatu linnashr, Qohira, 2010*

⁷ *Lisan ul Arab - Ibn Manzur; dar ul Maarif; 2016*

⁸ *Lugatul al Jasadi fi AlQurani AlKariym, Doktor Kamol Abdulaziz, Daru assaqofiyatu linnashr, Qohira, 2010*



and grant him peace, used to whisper to God: "Rafiqul Ala, Rafiqul Ala." They continued until their souls were seized and their hands fell down.⁹

After reading the hadith mentioned above, we understood that the believers understood that they wanted to use the miswak held in the hands of their brother Abdurrahman from the eyes of their mother Aisha, may God bless her. However, no desire was expressed here. From this hadith we have observed not one but three non-verbal communication. At first, when Aisha looked into the eyes of the Prophet, he looked at the miswak as if he wanted her, and the reflection of that desire in the eyes of another eye that was looking at her eyes. proves how important a communication tool is. During the hadith, Aisha asked the Prophet, peace be upon him, "Shall I bring him to you?" "When asked, he nodded his head saying "Yes" and the second time he gestured in the same way to the offer to soften the miswak, it is proof that body language is the most important means of communication in all times and places. It is clear from this that Rasulullah SAW used both eyes to convey information.

If we look at the Qur'an, we will come across examples in several places where it talks about the language of the eyes, about the meanings that it reflects the human gaze. The book contains some actions performed by the eye that come with the word eye or with words that express the functions of the eye, such as look, gaze, insight, stare, and stare.

“ Whenever there cometh down a Sura, they look at each other, (saying), "Doth anyone see you?" Then they turn aside: Allah hath turned their heart (from the light); for they are a people that understand not. “¹⁰

Shaykh Sha'ravi says in his commentary on this verse: "They want to say something, but they cannot speak with their tongues, and they talk to each other with their eyes and glances. Nazarda is like "has anyone seen you?" They spoke as if they had the word. You can see this in the facial expressions of a person who listens to a speaker and sees something he doesn't like about what he's hearing."¹¹

In the interpretation of this verse, Razi said strange things. According to him, every time a verse is revealed from the Holy Qur'an and it mentions the qualities of hypocrites and their painful consequences, the hypocrites suffer from hearing this verse and cannot bear to hear it. For this reason, they leave the place where the Qur'an is being read and ask each other through their eyes if anyone has seen what they have gone out to. That is, if someone sees you, they will tell you not to go out, so that they do not find out about your hypocrisy.

REFERENCES USED

1. *The Holy Quran, translation and commentary by Yusuf Ali; King Fahd nashri; Madina,1946.*
2. *Lugatul al Jasadi fi AlQurani AlKariym, Doktor Kamol Abdulaziz, Daru assaqofiyiyatu linnashr,Qohira,2010.*
3. *Abu Hamid Ghazali, "Mukoshafatul Qulub", page 498, corrected reprint, Gafur Ghulam, Tashkent, 2018.*
4. *Lugatul al Jasadi fi AlQurani AlKariym, Doktor Kamol Abdulaziz, Daru assaqofiyiyatu linnashr,Qohira,2010.*
5. *Islomov Z. International Islamic Academy of Uzbekistan—a result of the reforms worth to the centuries //The Light of Islam. – 2018. – T. 1. – №. 1.*
6. *Islomov Z. The role of the international Islamic academy of Uzbekistan in the development of Islamic studies //The Light of Islam. – 2019. – T. 2019. – №. 1. – C. 1.*
7. *Islomov Z. Source studies analysis of manuscripts of “muqaddimatu-ladab” in foreign archival funds //The Light of Islam. – 2019. – T. 2019. – №. 4. – C. 41.*
8. *Islomov Z. et al. WRITING DOWN OF HADITHS IN THE VII-VIII CENTURIES: APPROACHES AND METHODS //PSYCHOLOGY AND EDUCATION. – 2021. – T. 58. – №. 1. – C. 5536-5545.*
9. *Maxsudov D. Развитие исламоведения (корановедения) в Узбекистане: история и современность //Вестник КазНУ, Серия Религиоведение. – 2020. – Т. 21. – №. 1. – С. 60-67.*
10. *Maxsudov D. Razvitie islamovedeniya (koranovedeniya) v Uzbekistane: istoriya i sovremennost' //Chabarshy. Dintanu serijasy. – 2020. – T. 21. – №. 1. – C. 60-67.*
11. *Maxsudov D. The development of transmitted and rational tafsirs //The Light of Islam. – 2019. – T. 2019. – №. 1. – C. 9.*
12. *Makhsudov D. Muslim world scientists of the temurids period //The Light of Islam. – 2019. – T. 2019. – №. 3. – C. 4.*
13. *Makhsudov D. Manuscripts of abul barakat al-nasafi's works on furu' Al-Fiqh //Asian Journal of Multidimensional Research. – 2023. – T. 12. – №. 1. – C. 31-34.*
14. *Makhsudov D. IX-XV asrларда Мовароуннахрда ёзилган тафсириларнинг хусусиятлари //Молодой ученый. – 2020. – №. 14. – С. 311-314.*
15. *Makhsudov D. R. Mufassirs of Mawarannahr //ISJ Theoretical & Applied Science, 12 (80). – 2019. – C. 539-543.*

⁹ Abu Hamid Ghazali, "Mukoshafatul Qulub", page 498, corrected reprint, Gafur Ghulam, Tashkent, 2018

¹⁰ Al Tawbah 127

¹¹ *Lugatul al Jasadi fi AlQurani AlKariym, Doktor Kamol Abdulaziz, Daru assaqofiyiyatu linnashr,Qohira,2010*



16. *Makhsudov D. R. МУФАССИРЫ МАВЕРАННАХРА В СРЕДНИХ ВЕКАХ //Theoretical & Applied Science. – 2019. – №. 12. – С. 539-543.*
17. *Makhsudov D. A GENIUS OF THE WORLD //Theoretical & Applied Science. – 2019. – №. 5. – С. 544-548.*
18. *Ugli A. Z. Z. THE PLACE OF ALIKHANTORA SOGUNIY IN THE HISTORY OF EAST TURKESTAN //Colloquium-journal. – Голопристанський міськрайонний центр зайнятості, 2020. – №. 24 (76). – С. 32-33.*
19. *Arslonov Z., Ergashev H. ALIKHANTORA SOGUNIY'S VIEWS ON POLITICAL GOVERNANCE IN EAST TURKESTAN //Студенческий вестник. – 2020. – №. 32-2. – С. 84-85.*
20. *Zokirjonugli Z. A. Approaches to studying the scientific heritage of Alikhantora Soguni //Asian Journal of Multidimensional Research. – 2022. – Т. 1*
21. *Zokirjonugli Z. A. APPROACHES TO STUDYING THE SCIENTIFIC HERITAGE OF ALIKHANTORA SOGUNI.*
22. *Arslonov Z. Z. THE PLACE OF ALIKHANTORA SOGUNIY IN THE HISTORY OF EAST TURKESTAN //Colloquium-journal. – Голопристанський міськрайонний центр зайнятості= Голопристанский районный центр занятости, 2020. – №. 24-2. – С. 9-11.*



THE SCIENTIFIC SIGNIFICANCE OF THE WORK "NAWABIG'UL-KALIM"

Bakirov Begzod

Foundation Doctoral Student, International Islamic Academy of Uzbekistan

ABSTRACT

This article is devoted to the scientific significance of Mahmoud Zamakhshari's work "Nawabig'u-l-kalim", in which we also considered the genre, size, applied artistic arts and the comments written on it.

KEYWORDS: *rhetoric science, aphorism, eloquence, wise words, prose poetry, ilmu maoniy, ilmu bayan, ilmu badi'.*

One of Mahmoud Zamakhshari's works written during his stay in Makkah "Nawabigul-kalim" in some places it is also referred to as "Al-kalim an-nawabig'". According to this small book edition, the work uses about 2,659 words (including auxiliaries, prepositions, and conjunctions that belong to the Arabic letter word group).

"Nawabigul-kalim" is a collection of Zamakhshari's aphorisms, and the wise expressions in it are both ideologically and artistically at a high level.¹

The scientific significance of the work "Nawabigul-kalim" is important from the following aspects:

1. First of all, an idea is given about Mahmud Zamakhshari's lexicon and the grammatical structure of the Arabic language at that time;
2. To reveal the artistic arts related to the science of puberty used in the work and to have information about their types;
3. To have information about Mahmoud Zamakhshari's skill in using lexical units;
4. Studying this work, which has been written several reviews, published several times in Arab countries, and even translated into Latin, as the work of our ancestors;
5. Presenting the rich heritage of our ancestors to the younger generation is not only a translated work, but also a critical and analytically conducted scientific work is one of the urgent issues;
6. One of the great changes taking place in our independent Uzbekistan at the moment - at a time when special importance is attached to the proper assessment and further development of our rich and ancient cultural heritage, history, religion, values, culture, the scientific work to be carried out on the work is one of the priority tasks at the state level. is;
7. Mahmud Zamakhshari through this work, the stability of society, the future of the nation, the strength of the state, the loyalty of citizens, especially young peoplegeneration to perfection, it is correct to say that it serves humanity, interest in knowing the past of ancestors, raising it in the spirit of respect, raising perfect individuals who love life, have high confidence in the future;
8. This work, which is important in the whole Islamic spirituality and culture, mainly contains wisdom-aphorisms, which are distinguished by their ideological and artistic perfection. His texts call a person to faith, purity, goodness, knowledge, kindness, honesty, spirituality and enlightenment, and to appreciate spiritual masterpieces.

A copy of the manuscript of the work "Nawabigul-kalim" is kept in Baghdad in the Iraqi National Museum (No. 563), and in Berlin (No. 8676) and Leiden (No. 891 and 92).² This work, written in prose style, is mainly a collection of proverbs, advice and teachings, covering various topics. This work has been published several times in Arab countries. The Cairo edition of the work in 1914 and 1927, and the edition made by Muhammad al-Kisti al-Bayruti in Beirut in 1306 AH are considered among its first editions. In addition, the critical edition, which was researched by Professor Bahiyja Baqir al-Husni, was published in 1971 in "al-Arab" magazine. In 1772, the

¹Rustamov Alibek. Mahmoud Zamakhshari. Tashkent, Science, 1971. 32 pages, p. 17.

²Abu-l Kasim Mahmud az-Zamakhshari. "Nozik iboralar". - T.: "Kamalak". 1992, p. 80.



Dutch scientist Henrich Albert Schultein translated this work of Mahmoud Zamakhshari into Latin. In 1876, the French orientalist Barbier Maynard published a study with a French translation of the work. The work was also translated into Turkish by Mustafa Isomuddin and published in Istanbul in 1283 Hijri.

"Nawabigul-kalim", a number of commentaries were also written, among them Sa'duddin al-Taftazani, a great scholar who served in the palace of Amir Temur in Samarkand³"An-Ni'am as-sawabig' fi sharhi-n-nawabig'" (ar. النعم السوابغ في شرح الكلم النوابغ) is noteworthy. This commentary was written in 1354 (755 Hijri) and published in Leiden in 1772 and Cairo in 1869 (1286 Hijri). In our country, "Nawabig'ul-kalim" is primarily the son of Mullah Rustam⁴ was translated into Uzbek by Ubaydulla Uvatov, and later Ubaydulla Uvatov translated the book into Uzbek and published it in 1992 under the name "Nozik iboralar". This translation of the work (including the words in the comments) was 4937 words. Apart from these translated scientific works, we did not witness any research in the Uzbek language.

A manuscript copy of the commentary written by the Khorezm scholar Abu-l-Hasan ibn Abdul-Wahhab al-Khivaki (it was written in 770 AH) is kept in Berlin (number 8675).⁵

The treatise "Nozik iboralar", which has an important place not only in the works of Mahmud Zamakhshari, but also in the entire Islamic culture, mainly consists of proverbs and tafsir plates, glorifies the ideas of the Qur'an, encourages a person to be a believer, have faith, and have pure intentions. , encourages the appreciation of spiritual masterpieces⁶.

LIST OF USED LITERATURE

1. Uvatov U. *Abu-l-Qasim Mahmud Az-Zamakhshari. Nozik iboralar.* - T.: Kamalak, 1992.
2. Sa'duddin al-Taftazani. *An-Ni'am al-Sawabig' fi Sharh in-Nawabig'.*
3. Ali Muhammad Hasan. *Asrar ul-bayan.* - Cairo, 2005.
4. Rustamov Alibek. *Mahmud Zamakhshari. Tashkent, Science, 1971. 32 pages, p. 15.*
5. 1998s.110. *ابو القاسم محمود بن عمرو بن احمد، الزمخشري. اساس البلاغة ببيروت لبنان: در العلمية،*
6. <http://khorazmiy.uz/uz/pages/view/454>
7. Uvatov Ubaidulla. *Mahmud Zamakhshari/U. Uvatov.*-T.: "O'zbekiston", 2011.-48 p., p. 27
8. Rustamov Alibek. *Mahmud Zamakhshari. Tashkent, Science, 1971. 32 pages, 12 p.*
9. Z. Islamov, S. Saidjalolov. *Mahmud Zamakhshari and the science of jurisprudence.* - T.: "Movarounnahr", 2011. - B 8
10. Maxsudov D. *Razvitiye islamovedeniya (koranovedeniya) v Uzbekistane: istoriya i sovremennost' //Chabarshy. Dintanu serijasy.* - 2020. - T. 21. - №. 1. - C. 60-67.
11. Maxsudov D. *The development of transmitted and rational tafsirs //The Light of Islam.* - 2019. - T. 2019. - №. 1. - C. 9.
12. Makhsudov D. *Muslim world scientists of the timurids period //The Light of Islam.* - 2019. - T. 2019. - №. 3. - C. 4.
13. Makhsudov D. *Manuscripts of abul barakat al-nasafi's works on furu'Al-Fiqh //Asian Journal of Multidimensional Research.* - 2023. - T. 12. - №. 1. - C. 31-34.
14. Makhsudov D. *IX-XV asrlarda Movarounnaxrda ezilgan tafsiirlarning xususiyatlari //Молодой ученый.* - 2020. - №. 14. - C. 311-314.
15. Makhsudov D. R. *Mufasssirs of Mawarannahr //ISJ Theoretical & Applied Science, 12 (80).* - 2019. - C. 539-543.
16. Makhsudov D. R. *МУФАССИРЫ МАВЕРАННАХРА В СРЕДНИХ ВЕКАХ //Theoretical & Applied Science.* - 2019. - №. 12. - C. 539-543.
17. Makhsudov D. *A GENIUS OF THE WORLD //Theoretical & Applied Science.* - 2019. - №. 5. - C. 544-548.
18. Ugli A. Z. Z. *THE PLACE OF ALIKHANTORA SOGUNIY IN THE HISTORY OF EAST TURKESTAN //Colloquium-journal.* - Голопристанський міськрайонний центр зайнятості, 2020. - №. 24 (76). - C. 32-33.
19. Arslonov Z., Ergashev H. *ALIKHANTORA SOGUNIY'S VIEWS ON POLITICAL GOVERNANCE IN EAST TURKESTAN //Студенческий вестник.* - 2020. - №. 32-2. - C. 84-85.

³Saaduddin Mas'ud bin Umar bin Abdullah Taftazani. (712-793 h.= 1312-1390 m). From the scholars of Arabic language, narration and logic. He was born in Taftazani, one of the cities of Khorasan. Those who lived in Sarax and were buried there. He is the author of many works, reviews and essays. See: "Al-A'lam" Khayriddin bin Muhammad bin Ali bin Faris Zirikli. Chapter 7. Page 219.

⁴One of the famous scientists who grew up in our country, popularly known as "domla Hindistoniy" and " mavlaviy Hindistoniy ", Sheikh Muhammadjon Mulla Rustam o'g'li was born in 1892 AD (1310 Hijri) in the village of Chorbog' near Kokand. (See: "Hidayat" magazine, 2010, issue 10)

⁵U. Uvatov. "Nozik iboralar", Tashkent, 1992, p. 80, p. 27.

⁶<https://kitobkhon.com/uz/kitob/nozik-iboralar>



20. Zokirjonugli Z. A. *Approaches to studying the scientific heritage of Alikhantora Soguni //Asian Journal of Multidimensional Research.* – 2022. – T. 1
21. Zokirjonugli Z. A. *APPROACHES TO STUDYING THE SCIENTIFIC HERITAGE OF ALIKHANTORA SOGUNI.*
22. Arslonov Z. Z. *THE PLACE OF ALIKHANTORA SOGUNIY IN THE HISTORY OF EAST TURKESTAN //Colloquium-journal.* – Голопристанський міськрайонний центр зайнятості= Голопристанский районный центр занятости, 2020. – №. 24-2. – С. 9-11.
23. Islamov Z. *Codicological Analysis of Manuscripts of “Mukaddamatu-l-Adab” of Mahmud Zamakhshari in the Funds of the World //The Light of Islam.* – 2020. – T. 2020. – №. 2. – С. 30-36.
24. Islomov Z. *International Islamic Academy of Uzbekistan—a result of the reforms worth to the centuries //The Light of Islam.* – 2018. – T. 1. – №. 1.



SOCIO-ECONOMIC IMPORTANCE OF GLOBAL WHEAT PRODUCTION BY REGION

Donaev Sheroli Burkhonovich

Tashkent State Technical University

ANNOTATION

The article analyzes the growth rates of food production, the average annual production of wheat per capita worldwide, and the global production by region based on statistical data. the dynamics of production, consumption and sale of wheat have been developed by the author.

KEY WORDS: *Cereal products, food prices, food products, global grain production, food production, consumption.*

For the twenty-four years since the beginning of the second millennium, the world's demand for food has been steadily increasing, driven primarily by population growth, record harvests, rising incomes, and increasingly are shown as diversified diets. Despite of food prices continued to fall in the early 2000s, the prices of staple grains began to rise from 2004 and have continued to do so.

The current growth rate of food production cannot keep up with the rapidly growing demand for food. In addition, the food industry is seriously affected by natural disasters and cataclysms, such as droughts, depletion of water resources, and unfavorable climatic conditions, which occur in major food supplying countries. Global grain production fell by 2.1 percent in 2006, while a spike in oil prices in 2007 led to a sharp rise in fertilizer prices and higher food production costs. As food prices reach unprecedented levels, economies are looking for ways to protect themselves from food shortages and new price shocks. Some food exporting countries have already imposed restrictions on food exports. Several major importers have started buying grain products at any price to supplement domestic supply.

Because of the above-mentioned reasons and various other factors, the main goal of current economic paper is to increase economic efficiency based on the optimal organization of economic instruments and levers of the production process in the food industry, on the basis of the application of innovative measures, certain technology and requires solving tasks such as conservation available resources by simplifying and alleviating processes. Implementation of this research work is intended to study the economic and organizational mechanisms of the existing production process in the grain products network of Uzbekistan, to provide the possibilities of achieving more efficiency compared to the current situation on the basis of the analysis of economic indicators and influencing factors.

It is known that cereal products have an integral part in the daily life of mankind from the earliest times. Today, their importance in our daily diet is not limited to participation as food, but also performs other additional functions. An example of these is the use of various products obtained from them in pharmaceutical, cosmetology, veterinary, construction and other sectors.

A number of complex processes related to their preparation for planting, planting, care, cultivation, harvesting, packaging and storage in the market of grain products show the unique difficulties of this industry. According to studies, global post-harvest grain losses alone amount to US\$ 1 trillion annually ¹. According to surveys conducted among many farmers and grain producers, the main losses are related to storage ².

The global average annual per capita food consumption of wheat, one of the major cereals, is 65.6 kg, which is 37% of the global average annual cereal consumption of 175 kg does. Wheat is the second most consumed grain (as food) after rice (81 kg per year, 46%). Wheat is consumed in 173 countries, with consumption levels exceeding 50 kg per capita per year in 102 countries. Countries

¹ Kumar D, Kalita P. Reducing Postharvest Losses During Storage of Grain Crops to Strengthen Food Security in Developing Countries. *Foods*. 2017 Jan 15;6(1):8. doi: 10.3390/foods6010008. PMID: 28231087; PMCID: PMC5296677. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5296677/> Accessed 11/01/2023

²Food and Agriculture Organization. MEASURING FOOD LOSSES. *Global Strategy to Improve Agricultural and Rural Statistics*. <https://www.fao.org/3/ca6562en/ca6562en.pdf> Slide 13.



with strong wheat consumption traditions, including North Africa, West/Central Asia, and Europe, have particularly high per capita wheat consumption. It consumes 68% of the world's wheat as food, which means an above average amount of wheat is consumed per capita. In terms of world wheat consumption, Europe stands out as the main gross consumer with 26% and America and Africa about 10%, and Asia with a share of 53% (Table 1.1).

Table 1.1.
Dynamics of global wheat production, consumption and sales by region

Region	Annual average					
	Aggregate consumption (Megaton/year)	Food consumption per capita (kg/year)	Aggregate consumption (%)		Feed consumption per capita (%)	
			1994-2013	2014-2017	1994-2013	2014-2017
Asia	375.1	62.8	1.2	2.8	-0.5	0.5
South	146.4	67.6	1.8	2.9	0.0	0.7
West and Central	61.9	132.6	1.7	-1.3	-0.2	-0.5
East and South East	166.8	49.6	0.7	11.8	-0.6	0.3
Africa	70.7	49.5	3.3	1.0	0.1	-0.7
North	45.2	143.8	2.6	-0.1	-0.1	-0.2
South	25.5	25.2	5.1	1.0	1.9	-0.7
America	78.7	61.4	0.7	2.3	-0.1	-0.2
North	41.4	80.4	0.05	4.4	-0.2	0.4
Central and South	37.2	50.5	1.5	-0.1	0.1	-0.6
Europe	196.8	110.5	0.2	2.5	0.1	0.2
Oceania	8.4	75.4	3.5	3.0	0.1	0.4

Source: Erenstein, O., Jaleta, M., Mottaleb, KA, Saunder, K., Donovan, J., Brown, HJ. (2022). *Global Trends in Wheat Production, Consumption and Trade*. In: Reynolds, MP, Brown, HJ. (eds) *Wheat Improvement*. Springer, Cham. https://doi.org/10.1007/978-3-030-90673-3_4

https://link.springer.com/chapter/10.1007/978-3-030-90673-3_4/tables/4

Taking into account the rapid growth of the world's population, the rate of malnutrition in some developing countries increasing year by year, the fact that fruits, vegetables and grain products are the main products in the human diet, their rational consumption and ensuring direct access is one of the most urgent issues of today. In particular, in 2021, 828 million people worldwide experienced scarcity, and this number was 46 million more than in 2020 and 150 million more than in 2019. In the global context, the share of people condemned to hunger has been relatively constant since 2015, but the global pandemic caused by COVID-19 in 2020 and the slowdown of economies as a result of social lockdown measures made this indicator even higher and continued at the same pace in 2021 and made up 9.8% of the world's population. For comparison, this share was 8 percent in 2019, and 9.3 percent in 2020³.

Due to this, the issues of production of food products in the world, their preservation without loss, transportation and distribution are very important. Today, all countries are putting great emphasis on measures such as creating resistant varieties of food products, developing and further improving economical technologies for the use of natural resources, reducing soil and water erosion and rational use of other natural resources, effective use of aeroponics and hydroponics processes to increase productivity.

In recent years, the increasing problems related to water supply in our region, the decrease of fertile land, and the rapid increase in the number of the population, primarily in order to prevent problems that may arise in the near future in providing them with food products It is important to research, analyze and formulate scientifically based conclusions on the economic basis of increasing the efficiency of the production process in the cereal industry, which is one of the main consumer goods.

LIST OF USED LITERATURE

1. Kumar D, Kalita P. *Reducing Postharvest Losses During Storage of Grain Crops to Strengthen Food Security in Developing Countries*. *Foods*. 2017 Jan 15;6(1):8. doi: 10.3390/foods6010008. PMID: 28231087; PMCID: PMC5296677. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5296677/> Accessed 11/01/2023

³UN Report "Food Security and Nutritional Status". <https://who.int/ru/news/item/06-07-2022-un-report--global-hunger-numbers-rose-to-as-many-as-828-million-in-2021> Access date 05.11.2023



2. Food and Agriculture Organization. MEASURING FOOD LOSSES. *Global Strategy to Improve Agricultural and Rural Statistics*. <https://www.fao.org/3/ca6562en/ca6562en.pdf> Slide 13.
3. Erenstein, O., Jaleta, M., Mottaleb, KA, Saunder, K., Donovan, J., Brown, HJ. (2022). *Global Trends in Wheat Production, Consumption and Trade*. In: Reynolds, MP, Brown, HJ. (eds) *Wheat Improvement*. Springer, Cham. https://doi.org/10.1007/978-3-030-90673-3_4
4. https://link.springer.com/chapter/10.1007/978-3-030-90673-3_4/tables/4
5. Kumar D, Kalita P. Reducing Postharvest Losses During Storage of Grain Crops to Strengthen Food Security in Developing Countries. *Foods*. 2017 Jan 15;6(1):8. doi: 10.3390/foods6010008. PMID: 28231087; PMCID: PMC5296677. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5296677/> Accessed 11/01/2023
6. Food and Agriculture Organization. MEASURING FOOD LOSSES. *Global Strategy to Improve Agricultural and Rural Statistics*. <https://www.fao.org/3/ca6562en/ca6562en.pdf> Slide 13.



HUMANISTIC IDEAS: KINDNESS, GENEROSITY, AND TOLERANCE IN THE WORK OF MAVERANNHAR SCIENTISTS

Nematullo Mukhamedov¹, Nurulloh Turambetov²

¹*Doctor of Historical Sciences, International Islamic Academy of Uzbekistan 11, A Kadiri, Tashkent, 100011, Uzbekistan*

²*Teacher of the UNESCO Chair in the Comparative Study of World Religions, International Islamic Academy of Uzbekistan 11, A. Kadiri, Tashkent, 100011, Uzbekistan*

ANNOTATION

During the medieval period in Mawarannahr, eminent scholars such as Imam Bukhari, Imam Tirmizi, Abu Bakr Kaffal Shashi, and Abu Lais Samarkandi were actively engaged in the study and propagation of Islamic sciences. Concurrently, Sufi luminaries like Zangiota, Sheikh Umar Bagistani, and Sheikh Havand Tahir also resided in the region. This period of intellectual activity was juxtaposed with the Mongol invasion, which precipitated a crisis in the socio-cultural fabric of Central Asian societies. It was during this epoch that Islamic trends or tariqats such as Yassawiya, Kubrawiya, and Naqshbandiya emerged.

This study delves into the exploration of the principles of tolerance, humanism, benevolence, and generosity as espoused in the works and activities of scholars like Imam Tirmizi, Abu Bakr Kaffal Shashi, and Sufi figures including Zangiota, Sheikh Umar Bagistani, Sheikh Havand Tahir.

KEY WORDS: *Maverannahr, Central Asia, Imam Bukhari, Termez, Imam Tirmizi, Shash, Hastimam, Abu Bakr Kaffal Shashi, Zangiata, Sheikh Umar Bagistani, Sheikh Khavand Tahir, tolerance, humanism, kindness, generosity.*

INTRODUCTION

The concepts of humanism and tolerance are crucial in scenarios where individuals from diverse national cultures and beliefs coexist within the same geographical area and engage in close social interactions. Historical evidence suggests that the inhabitants of Uzbekistan have adhered to a variety of religions since ancient times. The region has been home to followers of Zoroastrianism, Judaism, Christianity, Islam, and other religions, who have lived without restriction, attained creative excellence, and continue to coexist harmoniously. Existing records substantiate the absence of any significant conflicts, let alone wars instigated by religious differences, within this territory. (Nematullo Mukhamedov & Nurulloh Turambetov, 2021:68-73).

Interreligious tolerance and interethnic harmony in Uzbekistan are not recent phenomena, but rather have deep-seated historical foundations. Historically, Uzbekistan has been a fertile ground for the development of various religions and cults, including Islam, all of which have significantly contributed to the spiritual evolution of the region's population.

Over the course of centuries, Islamic traditions have been intricately woven with the rich cultural heritage of Central Asian peoples. This amalgamation has given rise to a unique Muslim culture in the region, influencing not only spiritual and educational aspects of life but also shaping the trajectory of scientific and educational development.

Uzbekistan, with its cities such as Bukhara, Samarkand, Nasaf (Karshi), Termez, Khiva, and Shash (Tashkent), has been at the epicenter of these historical processes. These cities have gained recognition across the Muslim world as prominent cultural hubs (Mukhamedov Nematullo, 2020:205-208).

MAIN PART

The scientific legacy of regional scientists has underscored human values such as amiability and tolerance, as well as customs. These crucial human values embody principles such as friendliness, philanthropy, modesty, compassion, and benevolence, which were the primary subjects of the scientific and creative legacy of these scientists. This is evidenced by the collections of hadiths by Imam Bukhari, "al-Jameh al-sahih" and "al-Adab al-mufrad" (al-Bukhoriy, 1991: 480), Imam Tirmidhi's "al-Sunan" (Tirmidhi, 1993:208), and the works of Abu Lays Samarkandi "Tafsiri Samarkandi", "Tanbeh al-gafilin" (al-Samarkandiy, 2006:12). Furthermore, this is also apparent in the works of Alisher Navoi, particularly in his philosophical and didactic compositions "Muqomat ul-lugatain",



"Nasoim ul-muhabbat" (Navoi, 2000:6), as well as in the contributions of regional scientists to the worldwide advancement of science, literature, art, and culture.

Imam Muhammad Ismail Bukhari holds a significant position in the field of Islamic studies, renowned as the "Imam of the Muhaddis." His magnum opus, "al-Jami al-sahih," is revered in the Islamic world as the second holy book following the Quran, according to Islamic doctrine. This work is regarded as one of the significant literary.

Termez, one of the oldest cities in the country, has been a hub for the development of science and culture since the early Middle Ages. Medieval sources reveal that over a hundred scientists originated from this city, contributing to various fields including Islamic studies, natural and exact sciences, history, and literature.

The city of Termez, due to its high concentration of scientists, has been dubbed "Madinat ur-Rizhol," translating to the "City of Saints."

The scientists hailing from Termez are globally recognized as Nisbom at-Termizi. Among these notable figures is Imam Tirmizi, one of "Six authentic Muhaddis", who contributed significantly to the field of hadith studies during its "golden age."

Imam Tirmidhi, formally known as Muhammad ibn Isa ibn Saura ibn Musa ibn Zahhak al-Sullami az-Zariyir al-Buqi at-Tirmidhi, and colloquially referred to as Abu Isa, was born in 209 AH (approximately 824 AD). His birthplace was the village of Bug, located near Termez. His family was of average social standing.

The renowned medieval historian, Abu Saad Abdulkarim al-Samani, documented that Imam at-Tirmidhi was not only born but also conducted his work in the village of Bug. This led to him being alternatively referred to as Bugi. He was given the moniker "Zarir" due to his frequent crying, a reaction to the death of his mentor, Imam al-Bukhari. Towards the end of his life, Imam at-Tirmidhi experienced deteriorating eyesight.

Imam at-Tirmidhi is celebrated for his significant contributions to Islamic literature, with "Sunani at-Tirmidhi" ("Jami' at-Tirmidhi") and "Ash-Shamail an-Nabawiyya" ("Ash-Shamail al-Muhammadiyya") being among his most notable works. In these texts, he emphasized the virtue of generosity, associating it with the qualities of prophets.

In "Sunani Tirmidhi", Imam Tirmidhi dedicated an entire chapter to the concept of "Generosity".

In his scholarly analysis of the hadith in "Tuhfa al-Ahwazi bi sharkh "Jami' al-Tirmidhi", Abululo Mubarakfuri posits that a believer who altruistically allocates his wealth to righteous causes is brought closer to divine mercy, accelerates his journey towards paradise, and garners the affection of his fellow beings. This is primarily because individuals tend to appreciate and respect those who exhibit generosity. Conversely, an individual who refrains from fulfilling mandatory religious obligations such as zakat is distanced from divine mercy and paradise, and consequently, incites disdain in the hearts of people.

The term "generous" is used to describe an individual who prioritizes divine satisfaction over his personal wealth when making financial decisions. Such individuals are generally admired and respected for their generosity, irrespective of whether others directly benefit from their actions. In contrast, a stingy individual is characterized by his refusal to contribute obligatory and mandatory alms.

The Sunani Tirmidhi, a compilation of hadiths, includes teachings on topics such as almsgiving, charity, zakat, and assistance.

Imam Tirmidhi described our Prophet (peace be upon him) in his work "Ash-Shamail al-Muhammadiyya" as follows: "...he was the most generous person, the most truthful and gentle person, the most noble family man...".

Imam Tirmidhi collected the most authentic hadiths about generosity, charity, mercy and generosity. Today, the role of hadith in promoting and disseminating virtues such as kindness, generosity, charity and generosity among people is incomparable.

In the Islamic scholarly tradition, the title "Imam" is bestowed upon distinguished figures such as al-Bukhari, at-Termizi, and al-Maturidi, among others. One notable figure who holds this title is Imam Abu Bakr Kaffal Shashi, who was often referred to as "Hazrat Imam" by his contemporaries. His full name is Abu Bakr Muhammad ibn Ali ibn Ismail Kaffal Shashi. In Arabic academic sources, the term "Kabir" is often appended to his name as a mark of respect and honor, signifying "big" or "great".



The Mausoleum of Hazrat Imam, also known as Hastimam, located in the Sebzor of the historical region of Tashkent, is recognized as one of the primary memorial complexes within the capital. The name of this site is derived from the principal shrine situated here - the mausoleum of Abu Bakr Kaffal Shashi, a prominent Imam within the Islamic world, who was born in Tashkent (Shash).

The term "Hastimam" is a condensed version of the phrase "Hazrat Imam". The local populace attributed this name to the site in honor of Imam Kaffal Shashi. Historically, this site served as one of the key educational hubs for scientific, cultural, and religious learning in Tashkent (Muhamedov N., 2015:119-126).

Kaffal Shashi is recognized in historical literature as a figure of generosity and hospitality. This is evidenced in the writings of Egyptian historian Tajuddin Subki in his work "Tabakat Shafia Kubro," where he includes excerpts from Kaffal Shashi's poetry. *"Shashi's verses express his open-door policy, stating that his table is always prepared for any visitor. He further emphasizes that the food served is earned through his hard work, thus ensuring its halal status.*

Shashi's hospitality extends to the extent of serving whatever is available, even if it is as simple as vegetables with vinegar. However, he acknowledges that his generosity may not be reciprocated or appreciated by all, especially those who are uninterested or stingy. This suggests that Shashi's hospitality is not contingent on the response of the recipient but is a reflection of his personal values and principles."

Imam Kaffal Shashi is a prolific author, with numerous works focusing on the areas of Islamic law (fiqh), dialectics, the history of Islam, and hadith studies. His book, "Javami al-Kalim," is particularly noteworthy for its educational and didactic qualities. In this work, Kaffal Shashi concisely and concisely described the hadiths ("sahih"), using not only the commandments of Islam, but also sayings related to upbringing, training, enlightenment, human behavior, etc.

The book "Zhavomi Alkalim" is a collection of various recommendations that can be used in everyday life, regardless of religion, nation and reasons.

It is known that the Mongol invasion led to a crisis in the socio-cultural life of the peoples of Central Asia. However, the national liberation struggle was supported by spiritual and religious principles, in particular the Islamic religion. At this time, such Sufi orders (tarikah) as Kubrawiyya and Naqshbandiyya were formed.

Sufism during this period became the unifying spiritual force of the peoples of Central Asia. One of the representatives of the Sufi leaders (sheikhs) was Zangiota. He is one of the most famous representatives of the Sufi order (tariqa) of Yassawiyya. His real name was Oyhuja ibn Tashhuja. Zangiota was born in the Samarkand Darboza mahalla in the city of Tashkent. Because of his skin color and generosity, he was nicknamed "Zangiota Himmati" ("Generous Zangiota") (Zangiota Himmati, 2001:3).

Most of the inscriptions of historical and architectural monuments found in our country are Quranic verses and hadiths. And in the Zangiota complex we can additionally see rhymed lines in Arabic.

Zangiota's whole life coincided with a period of instability and violence in Transoxiana, caused by the invasion of the Mongols. In these difficult times, Zangiota and about ten of his students, through their efforts and diligence, spiritually supported the people, nourished them with noble universal values, such as: courage, patriotism, hard work, honesty, justice, selflessness, kindness, righteous lifestyle and mercy.

One of the representatives of Sufism was Sheikh Umar Vali Bagistani. He was born in the village of Bagistan, Tashkent region. The date of his birth is unknown, but he died in 691/1291. He led a modest lifestyle, earning an honest living by farming and gardening, setting an example for those around him. Despite the fact that he was one of the prominent Sufis, he did not pursue fame. He strived to be a simple yet genuine person, this can be seen from his instructions to his son Sheikh Khawand Tahir.

These instructions are given in the book of Fakhruddin Ali Safi "Rashahat": "Takhir, do not be a mullah (theologian), do not be a Sufi, do not be this, do not be that, but be a Muslim" (Fakhruddin Ali Safi, 2004: 270-272). This instruction of Bagistani has not lost its relevance today.

Sheikh Khavandi Takhir (Valikhuzhaev B., 1998:53) (d. 1359), son of Sheikh Umar Bagistani, who enjoyed the respect of Bahauddin Naqshbandi himself, born in the village of Bagistan, Tashkent region (Masson M., 1954:116). Thanks to his knowledge, he enjoyed great authority in the Muslim world.



The mausoleum of Sheikh Khavandi Takhur became a sacred place for Muslims (Mahmud Hasaniy, Karomat Kilicheva, 2004:5). In the second half of the 15th century, his great-grandson Khoja Ahrar ordered the construction of a tomb over his coffin, which is now located on the territory of the International Islamic Academy of Uzbekistan.

CONCLUSION

The Central Asian region, primarily encompassing Uzbekistan, is recognized as one of the earliest cradles of human civilization. Uzbekistan, in particular, boasts an urban culture that spans over three thousand years, encompassing multiple cultural strata.

Historically, it is evident that every significant civilization is underpinned by a religious worldview. In this context, Islamic civilization serves as a quintessential example. It is noteworthy that the scholars of Transoxiana have made a significant contribution to the establishment and growth of the multifaceted Islamic civilization, which is both ancient and dynamically evolving.

As previously mentioned, certain attributes such as respect for individuals, deference towards others, reverence for elders irrespective of their nationality or perspectives, have been identified as the paramount virtues of the scholars in these regions. The primary focus is their adherence to the spiritual and educational principles of tolerance and humanism.

It is evident that these profound teachings and hadiths encourage individuals to act benevolently towards others, fostering a sense of generosity and reliability.

LIST OF USED LITERATURE AND SOURCES

1. *Абу Абдуллоҳ Муҳаммад ибн Исмоил ал-Бухорий. Ал-Жоми ас-саҳиҳ (ишонарли тўплам) : 4 ж. – Т. : Қомуслар бош таҳририяти, 1991–1999; Имом Бухорий. Ал-Адаб ал-Муфррад (Адаб дурдоналари) / тарж. Ш. Бобохонов, Н. Абдулмажид. – Т. : Фан, 2006. – 480 б.*
2. *Абу-л-Лайс ас-Самарқандий. Тафсири Самарқандий. – Байрут : Дор ал-кутуб ал-илмийя, 2006; Абу-л-Лайс Самарқандий. Танбиҳул-ғофилин / Дилмурод Қўшоқов тарж. – Т. : Ofset-Print, 2000.*
3. *Алишер Навоий. Муҳокамат ул-луғатайн // Мукаммал асарлар тўплами. – Тошкент : Фан, 2000. – Том. 16; Алишер Навоий. Насойим ул-муҳаббат // Мукаммал асарлар тўплами. – Тошкент : Фан, 2001. – Том. 17.*
4. *Валихўжаев Б. Шайх Хованд Тахур // Мулоқот, 1998, 2-сон. – Б. 53.*
5. *Зангиота Химматий / Подг. к изд. Файзиев Тургул. – Т.: Мовароуннахр, 2001. – С. 3.*
6. *Массон М. Прошлое Ташкента. – Т.: Из-во АН УзССР, 1954. № 2. – С.116.*
7. *Махмуд Хасаний, Каромат Қилмичева. Шайх Хованди Тахур. – Т.: 2004. – С.5.*
8. *Mukhamedov Nematullo Asatullaevich. (2020). HUMANIST IDEAS IN WORK MEDIEVAL SCIENTISTS OF THE OASIS OF TASHKENT. Archive of Conferences, 9(1), 205-208. Retrieved from <https://www.conferencepublication.com/index.php/aoc/article/view/371>*
9. *Muhamedov N. (2015). Keffal Şaşı'nin Diplomatik Faaliyeti. Marmara Türkiyat Araştırmaları Dergisi 2 (2), 119-126. <https://dergipark.org.tr/tr/download/article-file/282071>.*
10. *Nematullo Mukhamedov & Nurullo Turambetov. (2021). The origins of religious tolerance in Central Asia. International journal of social science & interdisciplinary research ISSN: 2277-3630 Impact Factor: 7.429, 10(12), 68–73. Retrieved from <https://www.gejournal.net/index.php/IJSSIR/article/view/105>*
11. *Саҳиҳи Термизий: танланган ҳадислар (Араб тилидан таржима ва сўз боши муаллифи А. Абдуллаев). – Т., 1993. – 208 б.*
12. *Фахруддин Али Сафий. Раиахот/ Подг. к изд. Махмуд Хасаний, Бахриддин Умрзок. – Т.: Абу Али ибн Сино, 2004. – С. 270-272.*
13. *Islamov Z. Codicological Analysis of Manuscripts of “Mukaddamatu-l-Adab” of Mahmud Zamakhshari in the Funds of the World //The Light of Islam. – 2020. – Т. 2020. – №. 2. – С. 30-36.*
14. *Islomov Z. International Islamic Academy of Uzbekistan—a result of the reforms worth to the centuries //The Light of Islam. – 2018. – Т. 1. – №. 1.*
15. *Makhsudov D. R. Mufassirs of Mawarannahr //ISJ Theoretical & Applied Science, 12 (80). – 2019. – С. 539-543.*
16. *Makhsudov D. R. МУФАССИРЫ МАВЕРАННАХРА В СРЕДНИХ ВЕКАХ //Theoretical & Applied Science. – 2019. – №. 12. – С. 539-543.*
17. *Makhsudov D. A GENIUS OF THE WORLD //Theoretical & Applied Science. – 2019. – №. 5. – С. 544-548.*
18. *Ugli A. Z. Z. THE PLACE OF ALIKHANTORA SOGUNIY IN THE HISTORY OF EAST TURKESTAN //Colloquium-journal. – Голопристанський міськрайонний центр зайнятості, 2020. – №. 24 (76). – С. 32-33.*
19. *Arslonov Z., Ergashev H. ALIKHANTORA SOGUNIY'S VIEWS ON POLITICAL GOVERNANCE IN EAST TURKESTAN //Студенческий вестник. – 2020. – №. 32-2. – С. 84-85.*
20. *Zokirjonugli Z. A. Approaches to studying the scientific heritage of Alikhantora Soguni //Asian Journal of Multidimensional Research. – 2022. – Т. 1*
21. *Zokirjonugli Z. A. APPROACHES TO STUDYING THE SCIENTIFIC HERITAGE OF ALIKHANTORA SOGUNI.*
22. *Arslonov Z. Z. THE PLACE OF ALIKHANTORA SOGUNIY IN THE HISTORY OF EAST TURKESTAN //Colloquium-journal. – Голопристанський міськрайонний центр зайнятості= Голопристанский районный центр занятости, 2020. – №. 24-2. – С. 9-11.*



LITERATURE REVIEW OF NEO BANKING: AN ACCEPTABILITY AND COMPATIBILITY STUDY

Elroy Monis¹, Ramesh Pai²

¹Research Scholar, Institute of Management and Commerce, Srinivas University,
Mangalore-Pin code: 575001 Orcid ID: 0000-0002-6282-5767

²Professor, Institute of Management and Commerce, Srinivas University,
Mangalore- Pin 575001 Orcid ID:0000- 0002-0364-7657

ABSTRACT

Purpose: Banking is undergoing a tremendous change in terms of access as well as in terms of business. India is a country where the scope of banking can double and can be one of the largest financial systems in the world. Neo banking is an alternative approach to the conventional banking systems that are in place. Banking cannot be slow it needs to be quick and should deliver services at a faster pace. Hence the entire supply chain should be controlled by the technology and technology alone can scale it up. The purpose of this literature review is to understand how banking industry has undergone a revolutionary change over the years and what factors have affected the banking industry. Neo banking is one of such revolution in the banking industry in today's digital era. Hence this study will encompass an understanding of the previous studies conducted on transformation in banking industry and identify the research gap for the new change in banking through Neo banks. The paper identifies different variables regarding banking and neo banking by conducting a detailed literature review. Thus, the paper aims to understand the various dimensions of banking and the prospects for Neo banking in India through extensive literature review.

KEY WORDS: Neo banking, Banking apps, Neo banking and credit, RBI, Currency, Dollar Vs Rupee, International trade, Commodities, Investment banking, Personal banking, MSME.

1. INTRODUCTION

Banking in general has evolved and scaled up to be one of the greatest industries after the adoption and adaption of Information technology. The technology makes the process competitive and faster. This propels other industries as money can make things move faster. Neo banking can change lot many things as we progress. The advent of Web version 3.0 can make things faster and different for organizations and people. For individuals who are tech-savvy and who can create greater value in their respective industries; neo banking will be a boon and will create wonders in their process of financial transactions. The new banks can deliver all kinds of operations like credit, clearances, payments, currencies, a chain of banking services, etc. Therefore, it is pertinent to state that banks would be difficult to differentiate when compared to an IT company.

2. OBJECTIVE OF THE SCHOLARLY REVIEW

The objective is to understand and know in-depth what exactly is happening across the world in terms of banking processes. India is at the forefront of technology especially since a large pool of people are into software development and advancements. The following are the objectives of the study:

1. To know the technical changes in the banking sector especially neo banking, related to credit, personal, housing, vehicle, gold, MSME loans and such other banking services and products.
2. To understand government's stand on various aspects of the banking sector related to licensing regulation of Neo banks.
3. To determine what factors that customers look out in a banking app, especially the Gen Z population.
4. To evaluate the hold of the regulating bodies connected to banking as well as other connected industries like insurance and stock markets (Reserve Bank of India, Securities and Exchange board of India, Insurance Regulatory and Development Authority).
5. To deliberate on the technological advancement in the traditional banking and the need analysis for neo banking.
6. To identify the research gap through the existing literature on Neo Banking.



3. RESEARCH METHODOLOGY OF LITERATURE REVIEW

The methodology followed for the literature review is to review the latest scholarly publications. To find relevant research academic papers, theses, and conference proceedings, several databases, Google Scholar, Academia, and Cross Reference were searched. The literature review is further strengthened by the inclusion of books and online materials that discuss customer behavior in banking and neo-banking settings. To further advance reading in the direction of the unknown, the researcher has considered looking into areas that have not been studied, and finding the research gap is the goal of the entire process.

4. SCHOLARLY REVIEW OF RESEARCH LITERATURE

The literature review is an important aspect of any research, it predominantly sets a direction to identify the gaps for further research. Hence a substantial reading of the literature gives us an idea of where the current process of neo-banking is heading and how well it is accepted. What modifications are expected out of it and how should it be taken up for implementation of research findings? Trends in neo-banking have developed faster than expected due to smartphones [1]. It also indicates that financial technologies have moved on and advanced much more than expected [2]. The economic crisis that happened during the year 2008 is due to extra usage and high leverage of financial derivatives the subprime crisis was caused due to extreme leverage [3]. Re-regulations are the key to understanding from a common man's point of view, regulations will protect the savings of a common man [4]. This can avoid major banking crises and the downfall of a system [5]. Causes of economic crisis can lead to a banking crisis. This crisis can create catastrophic effects on the whole financial system [6]. Banks do reflect the accounting system of a nation and it also indicates both the health of the balance of payments and NPA [7]. Monetary aggregation and liquidity of cash is an essential process that banks need to keep an eye on; especially the central banking system [8]. Alternatively, banking makes a difference in terms of the accounting practices of a nation coupled with the laws of the land [9]. Hence when a crisis hit a system and when austerity measures are implemented; it indicates the capacity of resilience [10] and many banks during this period do go for mergers and acquisitions [11]. There is a limit to liberalism and this can break the working patterns and working habits of people in general. Liberalism in creating greater liquidity may lead to higher inflation [12], therefore commercial banks play a critical role along with other banks in an economy. Commercial banks have accepted the belief that they are meant to be competitive and profit-oriented [13].

Education makes a difference in society; a good banking education can lead to better repayment and circulation of the entire economy [14]. A better-educated society can develop better research and advancement which may lead to better deregulation and ownership of business models and processes [15]. When we look at Africa and compare it with India, we see a similarity in patterns like exploitation and colonialism. Fin-tech companies do affect nations irrespective of boundaries [16]. Generation z makes a difference as they have tools for getting connected to fintech [17]. Fin-tech operates with AI, as banking transactions generate large quantities of data, they need to be correlated and coordinated to channel efforts to make Fin tech effective [18]. Banking laws should be stringent and data breaches should be taken care of by strict laws of any nation [19]. When a crisis hits a bank, it is the responsibility of the respective government to refurbish through recapitalization cash into the system [20]; which is possible only when there exists a synergy between commercial and central banks [21]; there could be a negative impact of neoliberalism and changes in the working system [22].

Banking in the present is modified after the financial crisis happened after 2008, it indicates the gaps were filled across nations [23]. Modified banks are possible with modified teams. A good HR can make a difference in the way things are accepted [24]. Retrenchment makes a difference to be a healthy bank. So HR practices and profitability should be the new aspect of Neo banking [25][26]. Banking unions too play a major role in HR interventions [27][28].

Macroeconomic risk can affect banking in general and this is felt when the crisis hits the balance of payment across nations, due to credit risk [29][30].

Neo banking is going to be the game changer as people want things to happen very quickly. People do not want to wait for a long period of time and want things to be instant [31]. The families and their occupations necessitate them to plan well ahead and adhere to saving that could make their future good and prosperous. Savings can lead to faster multiplication of growth and the chances of them moving out of poverty are the name of the game coming out of poverty [32]. Individuals need to save and collectively it creates a great pool of money and this can bring out the Concept of the Marxist approach of one for all and all for one [33]. Misallocation of funds or allocating to the wrong people can jeopardize the entire process and families need to make themselves well-prepared to repay loans taken for future growth. Women can play a major role in doing so [34]. The chances of getting further loan enhancement can make a difference in the operations of a bank, Neo fisher-ism and neo-Keynesian theories make a point that capitalism and commercial banks bring in synergy with central banks [35]. Corporate debt investments that are nonproductive and speculative can lead to bigger damages to individuals and families by not lending to people who really need the most [36]. In order to grow there has to be sustainable lending which would



create further lending and cause a multiplier effect [37]. When people are approached with money from a bank the understanding has to be that needs to be replaced and better utilized for productive development [38]. Brazil as a nation has seen the crisis and is part of the BRICS group. Brazil is an example of overspending by the central banks and the shortage of internal economic propulsion has created lesser growth [39] and causes misallocation of resources and right investments in wrong areas [40]. China as a nation has pulled a maximum number out of poverty and has set the pace for other nations to embark on people's programs that can create higher economic and human development index [41]. IMF has contributed to a large extent in making growth feasible and faster. IMF has impacted nations by lending long-term loans at lesser interest rates for better prosperity and viability of repayment [42], development is a must and if not done it may lose a nation backward, neo developmentalism is must and should be part of all central programs in nations like Brazil and India [43]. World Bank lends loans based on the criteria set by per united nations and UNDP is centrally tied to all loans that are lent by the World bank [44]. Shadow states or shadow governments control in spite of not being elected control funds and allocate to the wrong people can damage long-term plans for human development hence demystifying democratization [45]. This creates a golden trap for both citizens and the elected governments [46]. Shadow banking or parallel banking created in India and China is one offshoot of shadow governments, which triggers inflation out of government control [47]. Fin-tech is the solution to shadow banking and neo banking which does not discriminate against people and can remove shadow banking of businesses a counterattack to shadow banking [48]. Banking apps can change the choice of customers a bank can accept or reject based on Behavioural Bio-metrics [49][50].

Innovation has created scaling of banking causing disruptions [51][52]. Fin-tech companies have the choice of modifying the software based on the requirements of the bank and it becomes the road map for further growth [53]. Money- go around means it needs to create value. Value creation is an essential component of any type of banking. The higher the value created higher the wealth generation [54]. Neoliberalism or a new market economy needs to be less governed and independency should create sustainable business organizations [55]. This should lead to liberal consolidations and less polarization. Individuals who take the market in their own stride again tend to create monopoly and inflation hence liberal consolidation is a must possible through neo-banking [56].

When we see Fin-Tech companies in the Russian economy we see large-scale oligarchs controlling business operations from oil to banks and the growth of individuals is less when compared to other eastern and western countries [57]. Banks do borrow and banks need to have a healthy financial status for making things better, challenges in countries whose currencies have different valuations have the challenge to borrow from international financial markets [58]. Neo-liberal economies can spiral growth in an open economy [59]. Currently, the UK has experienced challenges due to BREXIT and the aftermath of the pound getting affected due to changes in the interest rates of the US government on the dollar [60]. Negative impacts of neo-liberalism policies were felt in Bulgaria and it contradicts the principles of positive growth this is seen in Bulgaria because of less acceptance of the guidance as people were not ready to change [61]. The central banks and macroeconomic policies should go in line to match sustainable growth [62]. This is possible at a faster pace when internet banking, M-banking has been accepted by India to a large extent [63][64]. Customers in India have accepted and adopted digital India [65]. Green banking has been pushed by the central banks to create better environmentally friendly project investments; which in turn stimulates sustainability [66]. Green banking considers what is good for the environment and good for the sustainability of Industry at large [67], hence banking reforms are a must to ensure all new systems are implemented [68].

Urban cooperative banks have good customer relationship management practices and most of the CRM practices are system based [69,70,71], cooperative banks are critical as the Primary agricultural cooperative societies have solved the rural banking requirements for both artisans and farmers. The district cooperative banks and state-level urban cooperative banks have their obligations to serve [72]. Awareness and utilization of credit facilities that are offered by cooperative banks can bring in social efficiency and sustainability [73,74]. Multinational banks in India play a role to transfer funds from other nations where Indian expatriates live and work. Most of the multinational banks do lending in large quantities to government bodies and have different businesses altogether, hence their perception of their business is less known to the general public in India [75]. They gained legitimacy due to the pressure from various monetary authorities to allow them to operate in India [76]. Though the environment is hostile and highly competitive they scale advantage due to technology and better practices as they do not operate in the priority activity of banking [77]. The multinational banks have been operating back doors and are active in the process of Hostile takeovers and hostile mergers in entire sectors of the financial industry, banking mutual funds, and insurance [78]. Employees working in all banks in India experience a pressurized working environment, which makes many of them not take up promotions [79]. The work-life balance for men and women is a challenge in conventional banking [80]. Work-life balance and job satisfaction are interrelated and hence the better work-life balance the better job satisfaction [80][81]. Working women face challenges before and after pregnancy and hence the work-life balance is critical for people to make things happen both at home and office [82]. Work-life balance and employee participation in their jobs make a difference [83] customers are the key and the relationship as well as the expectation create higher disturbances in the minds of the employees [84]. Staff needs to see promotions and promotions are a must to keep people engaged and occupied with positive thoughts. Promotions are possible



when expansion happens; hence expansion is a must [85]. Customer satisfaction is the key to profits they need to be served well [86]. Relationship marketing both in the public sector and private sectors is a comparative study done by many scholars [87]. This brings out the service quality gaps and once all these are listed it is easy to solve one by one [88]. Based on the gaps marketing needs to be done and communication with the customer is a must [89]. The green brand equity of a bank has to be measured and published as green brand equity creates a benchmark of initiatives [90]. Marketing mutual funds through retail banks is a unique product in itself and customers have a choice to buy systematic investment plans accordingly [91], micro-financing can eliminate household poverty provided they are approached on a daily basis, like pigmy collection agents [92]. Agri-business covers, fishing, farms, flowers, fruits, and honey beekeeping, these businesses are fluctuating and do not have a common constant income; hence banks play a major role in the financial stability of agribusiness [93]. The role of bank credit is the key role and a determinant of the economic progression of any nation [94]. The bank's performance is measured by various models like the CAMEL model, Altman's Z score, and many more [95][96]. Financial determinants using Altman's z score can be used for analyzing the scope of the industry to which the banks are lending [97]. Bankruptcy predictions are essential for growth [98]. Various new banking models are essential for the growth of the banking industry [99]. Neo banking needs neo regulations and banking regulations will take the industry a long way [100].

5. RESEARCH GAP

Banking processes are changing due to technology. Technology is the game changer and individuals or organizations bringing in the best technology can change the whole process. The following gaps have been identified for the sake of research

1. The perception and preference of neo-banking in youth and their expectations; there exists huge gaps.
2. Error-free or fraud-free systems that people expect, to know how many people have been affected due to various viruses and frauds; can this gap be nullified.
3. Banks are not well equipped in their technical upgradation a vast service gap exists in the process.
4. Age and gender adaptability and acceptance to handle neo banking, how can the gap be reduced.
5. Banking system is undergoing change and how many banks would be capable of transforming themselves is also a gap to be studied.
6. What can people do to know more about banking, their knowledge, and ignorance a gap to be filled only by analyzing.
7. Government's role in educating people to be aware of OTP, CVV, and passwords is a huge gap and RBI has to get involved to a greater extent in this regard. Large-scale NPAs and assets that have become toxic are a gap to be understood.

6. CONCLUSIONS

Neo banking has a tremendous scope for a better growth and scope for development hence new generation needs new concepts to live and grow in life. The concept of banking without banks and banks without branches is growing more and more popular as the world becomes more technologically aware and moves closer to full digitization. Neo banks are the best approach to do that as of recent years. Neo banks, which are virtually existent, operate on the internet, collaborate with banks, and offer the majority of financial services at extremely low costs. Customers are able to get banking services right from their location as they become more knowledgeable about computers and technology. Thus, Neo banking is also a means of extending banking services through technology, thus paving a way for inclusive growth.

REFERENCES

1. Rajitha, R., & Sivakumar, B. (2019). A Study on Neo Banking Trends in India. *Shanlax International Journal of Commerce*, 7(S1), 203-206. [Google scholar](#) [Cross ref](#)
2. Komarov, A. V., & Martyukova, V. M. (2020). Neo banking as a direction of development of modern financial technologies. *Vestnik universiteta*, (3), 134-142. [Google Scholar](#) [Cross ref](#)
3. Hanan, J. S., Ghosh, I., & Brooks, K. W. (2014). Banking on the present: The ontological rhetoric of neo-classical economics and its relation to the 2008 financial crisis. *Quarterly Journal of Speech*, 100(2), 139-162. [Google Scholar](#) [Cross ref](#)
4. Larsson, B. (2003). Neo-liberalism and polycontextuality: Banking crisis and re-regulation in Sweden. *Economy and society*, 32(3), 428-448. [Google Scholar](#) [Cross Ref](#)
5. Berry, M. (2013). The Today programme and the banking crisis. *Journalism*, 14(2), 253-270. [Google Scholar](#) [Cross Ref](#)
6. Harisalo, R. (2009). Looking for the Causes and Consequences of the Global Financial and Banking Crisis: Neo-Liberalism in the Dock. *In Reforming Europe* 13(20), 105-117. [Google Scholar](#) [Cross Ref](#)
7. Rymes, T. K. (1986). Further thoughts on the banking imputation in the national accounts. *Review of Income and Wealth*, 32(4), 425-441. [Google Scholar](#) [Cross Ref](#)
8. Canzoneri, M., Cumby, R., Diba, B., & López-Salido, D. (2008). Monetary aggregates and liquidity in a Neo-Wicksellian framework. *Journal of Money, Credit and Banking*, 40(8), 1667-1698. [Google Scholar](#) [Cross Ref](#)



9. Butzbach, O., & von Mettenheim, K. E. (2015). *Alternative banking and theory*. *Accounting, Economics, and Law: A Convivium*, 5(2), 105-171. [Google Scholar](#) [Cross Ref](#)
10. Gregory, L. (2014). *Resilience or resistance? Time banking in the age of austerity*. *Journal of Contemporary European Studies*, 22(2), 171-183. [Google Scholar](#) [Cross Ref](#)
11. Al-Sharkas, A. A., Hassan, M. K., & Lawrence, S. (2008). *The impact of mergers and acquisitions on the efficiency of the US banking industry: further evidence*. *Journal of Business Finance & Accounting*, 35(1-2), 50-70. [Google Scholar](#) [Cross Ref](#)
12. Grahl, J., & Teague, P. (1989). *The cost of neo-liberal Europe*. *New Left Review*, 174(1), 33-50. [Google Scholar](#) [Cross Ref](#)
13. Heise, A. (1992). *Commercial banks in macroeconomic theory*. *Journal of Post Keynesian Economics*, 14(3), 285-296. [Google Scholar](#) [Cross Ref](#)
14. Lauglo, J. (1996). *Banking on education and the uses of research. A Critique of: World Bank priorities and strategies for education*. *International Journal of Educational development*, 16(3), 221-233. [Google Scholar](#) [Cross Ref](#)
15. Kumbhakar, S. C., & Sarkar, S. (2003). *Deregulation, ownership, and productivity growth in the banking industry: Evidence from India*. *Journal of Money, Credit and banking*, 16(2) 403-424. [Google Scholar](#) [Cross Ref](#)
16. Langley, P., & Leyshon, A. (2022). *Neo-colonial Credit: FinTech platforms in Africa*. *Journal of Cultural Economy*, 1(1) 1-15. [Google Scholar](#) [Cross Ref](#)
17. Karmakar, A. (2021). *Generation-Z Banking Trends-A Study Based on Kolkata*. *IBMRD's Journal of Management & Research*, 10(2), 52-61. [Google Scholar](#) [Cross Ref](#)
18. Hameed, S., & Nigam, A. (2022). *Exploring India's Generation Z perspective on AI enabled internet banking services*. *Foresight*, 15(2), 332-341. [Google Scholar](#) [Cross Ref](#)
19. Neo, D. (2021). *Banking law*. *Singapore Academy of Law Annual Review of Singapore Cases*, 2(4) 135-160. [Google Scholar](#) [Cross Ref](#)
20. Cheung, M. T., & Liao, Z. (2005). *Recapitalization of Thailand's banks after the 1997 crisis: Interpretation and critique from a neo-institutional perspective*. *Asia Pacific Business Review*, 11(3), 411-427. [Google Scholar](#) [Cross Ref](#)
21. Wray, L. R. (1992). *Commercial banks, the central bank, and endogenous money*. *Journal of Post Keynesian Economics*, 14(3), 297-310. [Google Scholar](#) [Cross Ref](#)
22. Rangelova, R., & Sariiski, G. (2015). *Negative impacts of the neo-liberal policies on the banking sector in Bulgaria*. *Contemporary Economics*, 9(1), 61-76. [Google Scholar](#) [Cross Ref](#)
23. Hanan, J. S., Ghosh, I., & Brooks, K. W. (2014). *Banking on the present: The ontological rhetoric of neo-classical economics and its relation to the 2008 financial crisis*. *Quarterly Journal of Speech*, 100(2), 139-162. [Google Scholar](#) [Cross Ref](#)
24. Okafor, E. E. (2013). *Reforms in the Nigerian banking sector and strategies for managing human resource challenges*. *European Journal of Business and Management*, 5(18), 127-137. [Google Scholar](#) [Cross Ref](#)
25. Hindmoor, A. (2010). *The Banking crisis: Grid, group and the state of the debate*. *Australian Journal of Public Administration*, 69(4), 442-456. [Google Scholar](#) [Cross Ref](#)
26. Williams, W. O., Etuk, G. R., & Inyang, E. B. (2014). *Assessment of Survivors' Perceptions of Crises and Retrenchments in the Nigeria Banking Sector*. *Assessment*, 4(23), 448-461. [Google Scholar](#) [Cross Ref](#)
27. Butzbach, O., & von Mettenheim, K. E. (2015). *Alternative banking and theory*. *Accounting, Economics, and Law: A Convivium*, 5(2), 105-171. [Google Scholar](#) [Cross Ref](#)
28. Epstein, R. A., & Rhodes, M. (2019). *The Political dynamics behind Europe's new banking union*. In *The Politics of Supranational Banking Supervision in Europe* 4(1), 1-23. [Google Scholar](#) [Cross Ref](#)
29. Otašević, D. (2015). *The influence of macroeconomic risks on credit risk in the Serbian banks' loan portfolio*. In *Neo-Transitional Economics*. Emerald Group Publishing Limited. 1(1), 64-82 [Google Scholar](#) [Cross Ref](#)
30. Ansari, S. (2017). *The Neo-liberal incentive structure and the absence of the developmental state in post-apartheid South Africa*. *African Affairs*, 116(463), 206-232. [Google Scholar](#) [Cross Ref](#)
31. Bennell, P., & Segerstrom, J. (1998). *Vocational education and training in developing countries: Has the World Bank got it right?* *International Journal of Educational Development*, 18(4), 271-287. [Google Scholar](#) [Cross Ref](#)
32. Wray, L. R. (2000). *The Neo-Chartalist Approach to Money*. Retrieved from <https://ssrn.com/abstract=1010334> on 11/11/2022. [Google Scholar](#) [Cross Ref](#)
33. Cummings, S., & Taebel, D. (1978). *The Economic Socialization of children: A Neo-Marxist Analysis*. *Social problems*, 26(2), 198-210. [Google Scholar](#) [Cross Ref](#)
34. McDowell, L. (2017). *Youth, children and families in austere times: change, politics and a new gender contract*. *Area*, 49(3), 311-316. [Google Scholar](#) [Cross Ref](#)
35. Williamson, S. D. (2016). *Neo-Fisherism*. *The Regional Economist*, 1(1) 5-9. [Google Scholar](#) [Cross Ref](#)
36. Wray, L. R. (1992). *Commercial banks, the Central Bank, and Endogenous Money*. *Journal of Post Keynesian Economics*, 14(3), 297-310. [Google Scholar](#) [Cross Ref](#)
37. Leon-Ledesma, M. A. (2016). *Potential growth, misallocation, and institutional obstacles: Firm-level evidence*. *Asian Development Bank Economics Working Paper Series*, 4(8), 23-45 [Google Scholar](#) [Cross Ref](#)



38. Gebauer, S., Setzer, R., & Westphal, A. (2018). Corporate debt and investment: A Firm-level Analysis for stressed Euro Area countries. *Journal of International Money and Finance*, 86(10) 112-130. [Google Scholar](#) [Cross Ref](#)
39. Bonomo, M., Brito, R. D., & Martins, B. (2015). The after-crisis government-driven credit expansion in Brazil: A firm level analysis. *Journal of International Money and Finance*, 55(10) 111-134. [Google Scholar](#) [Cross Ref](#)
40. Fossati, R., Rachinger, H., & Stivali, M. (2021). Extent and potential determinants of resource misallocation: A cross-sectional study for developing countries. *The World Economy*, 44(5), 1338-1379. [Google Scholar](#) [Cross Ref](#)
41. Liew, L. (2005). China's engagement with neo-liberalism: Path dependency, geography and party self-reinvention. *The Journal of Development Studies*, 41(2), 331-352. [Google Scholar](#) [Cross Ref](#)
42. Emeagwali, G. (2011). The neo-liberal agenda and the IMF/World Bank structural adjustment programs with reference to Africa. In *Critical perspectives on neoliberal globalization, development and education in Africa and Asia* 1(1), 1-13. [Google Scholar](#) [Cross Ref](#)
43. Ban, C. (2013). Brazil's liberal Neo-developmentalism: New paradigm or edited orthodoxy?. *Review of International Political Economy*, 20(2), 298-331. [Google Scholar](#) [Cross Ref](#)
44. Mitchell, K. (2001). Transnationalism, neo-liberalism, and the rise of the shadow state. *Economy and Society*, 30(2), 165-189. [Google Scholar](#) [Cross Ref](#)
45. Ayers, A. J. (2006). Demystifying Democratisation: The Global Constitution of (neo) liberal politics in Africa. *Third World Quarterly*, 27(2), 321-338. [Google Scholar](#) [Cross Ref](#)
46. Jaffer, N. M., & Amalanathan, P. (2018). A Neo-liberal Golden Trap in India—Some Insights. 2(1), 368-379. Retrieved from <https://www.semanticscholar.org/paper/A-Neo-liberal-Golden-Trap-in-India-%E2%80%93Some-Insights-Jaffer-Amalanathan/c0225693d7997d4a83b9fb54b363d397040ab376> on 15/11/2022. [Google Scholar](#) [Cross Ref](#)
47. Sherpa, D. (2013). Shadow banking in India and China: Causes and Consequences. *Economic and Political Weekly*, 1(1), 113-122. [Google Scholar](#) [Cross Ref](#)
48. Banerjee, A., Banerjee, A., & Mukherjee, D. N. (2022). Fintech Lenders: A Threat to Shadow Banks?. Retrieved from <file:///C:/Users/KBL/Downloads/SSRN-id4200499.pdf> on 17/11/2022. Available at SSRN 4200499. [Google Scholar](#) [Cross Ref](#)
49. Dieter, M., & Tkacz, N. (2020). The patterning of finance/security: A Designerly walkthrough of challenger banking apps. *Computational Culture*, 1(7), 89-110. [Google Scholar](#) [Cross Ref](#)
50. Sahdev, S. L., Singh, S., Kaur, N., & Siddiqui, L. (2021). Behavioral Biometrics for Adaptive Authentication in Digital Banking—Guard Against Flawless Privacy. In *2021 International Conference on Innovative Practices in Technology and Management (ICIPTM)* 2(13). 261-265. [Google Scholar](#) [Cross Ref](#)
51. Koibichuk, V. (2021). Innovation technology and cyber frauds risks of neobanks: gravity model analysis. 6(3) 80-133. [Google Scholar](#) [Cross Ref](#)
52. Wewege, L., Lee, J., & Thomsett, M. C. (2020). Disruptions and digital banking trends. *Journal of Applied Finance and Banking*, 10(6), 15-56. [Google Scholar](#) [Cross Ref](#)
53. Sudhamathi, R. K. (2022). Fintech as a road map to enhance business operations and delivery of financial services. *Asian Journal of Research in Business Economics and Management*, 12(3), 1-9. [Google Scholar](#) [Cross Ref](#)
54. James, D. (2012). Money-go-round: personal economies of wealth, aspiration and indebtedness. *Africa*, 82(1), 20-40. [Google Scholar](#) [Cross Ref](#)
55. Hewison, K. (2013). Neo-liberalism and domestic capital: The Political Outcomes of the Economic crisis in Thailand. In *East Asia and the Trials of Neo-liberalism* 1(2). 114-134. [Google Scholar](#) [Cross Ref](#)
56. Hadiz, V. R., & Robison, R. (2013). Neo-liberal reforms and illiberal consolidations: The Indonesian paradox. In *East Asia and the Trials of Neo-liberalism* 2(4), 24-45. [Google Scholar](#) [Cross Ref](#)
57. Soloviev, V. (2018). Fintech ecosystem in Russia. In *2018 Eleventh International Conference " Management of large-scale system development" (MLSD)* (pp. 1-5). IEEE. [Google Scholar](#) [Cross Ref](#)
58. Atanasova, C. V., & Wilson, N. (2003). Bank borrowing constraints and the demand for trade credit: evidence from panel data. *Managerial and decision economics*, 24(6-7), 503-514. [Google Scholar](#) [Cross Ref](#)
59. Lavoie, M. (2012). Financialization, neo-liberalism, and securitization. *Journal of Post Keynesian Economics*, 35(2), 215-233. [Google Scholar](#) [Cross Ref](#)
60. Atanasova, C. V., & Wilson, N. (2004). Disequilibrium in the UK corporate loan market. *Journal of Banking & Finance*, 28(3), 595-614. [Google Scholar](#) [Cross Ref](#)
61. Rangelova, R., & Sariiski, G. (2015). Negative impacts of the neo-liberal policies on the banking sector in Bulgaria. *Contemporary Economics*, 9(1), 61-76. [Google Scholar](#) [Cross Ref](#)
62. Heise, A. (1992). Commercial banks in macroeconomic theory. *Journal of Post Keynesian Economics*, 14(3), 285-296. [Google Scholar](#) [Cross Ref](#)
63. Gupta, P. K. (2008). Internet banking in India—Consumer concerns and bank strategies. *Global journal of business research*, 2(1), 43-51. [Google Scholar](#) [Cross Ref](#)



64. Goyal, V., Pandey, U. S., & Batra, S. (2012). Mobile banking in India: Practices, challenges and security issues. *International Journal of Advanced Trends in Computer Science and Engineering*, 1(2). Google Scholar Cross Ref
65. Deb, M., & Lomo-David, E. (2014). An empirical examination of customers' adoption of m-banking in India. *Marketing Intelligence & Planning*. Google Scholar Cross Ref
66. Sahoo, P., & Nayak, B. P. (2007). Green banking in India. *The Indian Economic Journal*, 55(3), 82-98. Google Scholar Cross Ref
67. Bihari, S. C. (2010). Green banking-towards socially responsible banking in India. *International Journal of Business Insights & Transformation*, 4(1). Google Scholar Cross Ref
68. Banerjee, A., Cole, S., & Duflo, E. (2004, June). Banking reform in India. In *India policy forum* (Vol. 1, No. 1, pp. 277-332). National Council of Applied Economic Research; Brookings Institution Washington, DC. Google Scholar Cross Ref
69. Ramu, N. (2006). *Chronological Profile of Urban Cooperative Banking in India*. *Tamil Nadu Journal of Co-operation*, 6(10), 27-29. Google Scholar Cross Ref
70. Ramu, N. (2007). Performance and Challenges of Urban Co-operative Banks in India: An Appraisal. *The Journal of Indian Institute of Banking*, Apr-June (63-70).
71. Tandon, M. S., Sharma, N. N., & Bhulal, V. K. (2017). The impact of customer relationship management and its significant relationship to customers' satisfaction in cooperative banking (a case study of Kangra central co-operative bank). *Global Journal of Enterprise Information System*, 9(2), 59-66. Google Scholar Cross Ref
72. Kalmi, P. (2012). Cooperative banking. In *Handbook of critical issues in finance* (pp. 56-65). Edward Elgar Publishing. Google Scholar Cross Ref
73. Niyaz Panakaje, D., & Siddiq, A. (2021). Awareness and Utilization on Cooperative Banking Services and Schemes in Rural Area. *International Journal of Management, Technology, an Social Sciences*. Google Scholar Cross Ref
74. San-Jose, L., Retolaza, J. L., & Lamarque, E. (2018). The social efficiency for sustainability: European cooperative banking analysis. *Sustainability*, 10(9), 3271. Google Scholar Cross Ref
75. Khare, A. (2011). Customers' perception and attitude towards service quality in multinational banks in India. *International Journal of Services and Operations Management*, 10(2), 199-215. Google Scholar Cross Ref
76. Caussat, P., Prime, N., & Wilken, R. (2019). How multinational banks in India gain legitimacy: Organisational practices and resources required for implementation. *Management International Review*, 59(4), 561-591. Google Scholar Cross Ref
77. Caussat, P. (2021). Competitive Advantages in a Hostile, Regulated Environment: Four Multinational Banks in India. *Management International Review*, 61(6), 831-879. Google Scholar Cross Ref
78. Baradwaj, B. G., Fraser, D. R., & Furtado, E. P. (1990). Hostile bank takeover offers: analysis and implications. *Journal of Banking & Finance*, 14(6), 1229-1242. Google Scholar Cross Ref
79. Kabir, I., Gunu, U., & Gwadabe, Z. L. (2022). Decent Work Environment and Work-Life Balance: Empirical Analysis of Banking Sector of Hostile Environments. *Journal of Family and Economic Issues*, 1-16. Google Scholar Cross Ref
80. Ganapathi, R. (2016). A study on work life balance and job satisfaction of women employees working in new private sector banks. *Work*, 1(2.91), 24-10. Google Scholar Cross Ref
81. Yadav, R. K., & Dabhade, N. (2013). Work life balance amongst the working women in public sector banks-A case study of State Bank of India. *International Letters of Social and Humanistic Sciences*, 7, 1-22. Google Scholar Cross Ref
82. Dinakar, R. (2021). Effectiveness of Work Life Balance (WLB) on Job Satisfaction of Employees working in Banks. *International Journal of Management and Humanities* 5(7):22-26. DOI:10.35940/ijmh.G1256.035721. Google Scholar Cross Ref
83. Gyawali, A. (2017). Impact of employee participation on job satisfaction, employee fairness perception and organizational commitment: A case of Nepalese commercial banks. *Saptagandaki Journal*, 8, 1-13. Google Scholar Cross Ref
84. Sharanya, E., & Kumari, K. V. (2019). Structural Relationship between Dimensions of Psychological Empowerment, Customer Oriented Behaviour and Job Satisfaction of Employees in Public Sector Banks. *Indian Journal of Public Health Research & Development*, 10(11). Google Scholar Cross Ref
85. Edirisinghe, E. M. N. (2007). *The Impact of Staff Promotions and Remuneration Package on Staff Turnover: Evidence from the Small Scale Local Licensed Commercial Banks in Sri Lanka University of Sri Jayewardenepura, Nugegoda, Sri Lanka*. Retrieved from <http://dr.lib.sjp.ac.lk/bitstream/handle/123456789/4554/The%20impact%20of%20staff%20promotions%20and%20remuneration%20package%20on%20staff%20turnoverEvidence%20from%20the%20small%20scale%20local%20licensed%20commercial%20banks%20in%20Sri%20Lanka-001-015.pdf?sequence=5> on 19/12/2022. Google Scholar Cross Ref
86. Ali, A., & Bisht, L. S. (2018). Customers' satisfaction in public and private sector banks in India: A comparative study. *J Fin Mark* 2018 Volume 2 Issue 3, 27-33. Google Scholar Cross Ref
87. Dash, M. I., & Rajshkhar, V. (2013). A comparison of relationship marketing in public and private sector banks in India. *International journal of marketing, financial services & management research*, 2(7), 46-49. Google Scholar Cross Ref
88. Akhilesh, P. S., & Vinay, C. V. (2015). Service quality gap analysis: Comparative analysis of public and private sector banks in India. *Journal of Accounting and Marketing*, 4, 128. Google Scholar Cross Ref
89. Upadhyay, A., & Sivakumar, N. (2015). Impact of Marketing Orientation on Financial Performance of Banks in India. *International Journal of Banking, Risk and Insurance*, 3(1), 36. Google Scholar Cross Ref



90. Trott, S. (2020). *The impact of green banking initiatives on green brand equity of banks in India*. *International Journal of Business Forecasting and Marketing Intelligence*, 6(2), 79-98. [Google Scholar](#) [Cross Ref](#)
91. Popli, G. S., & Rao, D. N. (2009). *Marketing of Mutual Fund Products Through Retail Banks in India: An Empirical Study of Customers' Perception*. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1472156 on 01/12/2022 Available at SSRN 1472156. [Google Scholar](#) [Cross Ref](#)
92. Imai, K. S., Arun, T., & Annim, S. K. (2010). *Microfinance and Household Poverty Reduction: New evidence from India*. *World development*, 38(12), 1760-1774. [Google Scholar](#) [Cross Ref](#)
93. Chen, K. Z., Joshi, P. K., Cheng, E., & Birthal, P. S. (2015). *Innovations in financing of Agri-Food value chains in China and India: Lessons and policies for inclusive financing*. *China Agricultural Economic Review*. [Google Scholar](#) [Cross Ref](#)
94. Jotwani, D. (2014). *The Role of Bank Credit as a Determinant of Economic Growth in India*. *Adarsh Journal of Management Research*, 7(1). [Google Scholar](#) [Cross Ref](#)
95. Sangmi, M. U. D., & Nazir, T. (2010). *Analyzing financial performance of commercial banks in India: Application of CAMEL model*. *Pakistan Journal of Commerce and Social Sciences (PJCSS)*, 4(1), 40-55. [Google Scholar](#) [Cross Ref](#)
96. Thippeswami, H. (2022). *Performance of Canara Bank and Syndicate Bank before the Merger: A CAMEL Model Analysis*. *Research Bulletin*, 47(3-4), 113-126. [Google Scholar](#) [Cross Ref](#)
97. Altman, E. I., Iwanicz-Drozdowska, M., Laitinen, E. K., & Suvas, A. (2017). *Financial distress prediction in an international context: A review and empirical analysis of Altman's Z-score model*. *Journal of International Financial Management & Accounting*, 28(2), 131-171. [Google Scholar](#) [Cross Ref](#)
98. Altman, E. I., Iwanicz-Drozdowska, M., Laitinen, E. K., & Suvas, A. (2014). *Distressed firm and bankruptcy prediction in an international context: A review and empirical analysis of Altman's Z-score model*. Available at SSRN 2536340. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2536340 on 03/12/2022 [Google Scholar](#) [Cross Ref](#)
99. Alexandre, C., Mas, I., & Radcliffe, D. (2011). *Regulating new banking models to bring financial services to all*. *Challenge*, 54(3), 116-134. [Google Scholar](#) [Cross Ref](#)
100. Calomiris, C. W., & Gorton, G. (1991). *The origins of banking panics: models, facts, and bank regulation*. In *Financial markets and financial crises* (pp. 109-174). University of Chicago Press. [Google Scholar](#) [Cross Ref](#)
101. Aithal, P. S. (2017). *ABCD Analysis as Research Methodology in Company Case Studies*. *International Journal of Management, Technology, and Social Sciences (IJMTS)*, 2(2), 40-54. [Google Scholar](#) [Cross Ref](#)



UDC 574

MAIN LIMNOLOGICAL CHARACTERISTICS OF RESERVOIRS

**Tureeva Kuralay Zhumabaevna¹, Bazarbaeva Dilbar Ongarbaevna²,
Allaniyazova Muazzam Khaitbaevna³**

¹*Doctor of Philosophy in Biological Sciences (PhD), Department of Ecology and Soil Science,
Karakalpak State University named after Berdakha*

²*Doctor of Philosophy in Biological Sciences (PhD), Nukus State Pedagogical Institute named after Ajiniyaza,*

³*Department of General Biology and Physiology, Karakalpak State University named after Berdakha*

ANNOTATION

The article examines the limnological characteristics of the reservoirs of the Southern Aral Sea region. During the research, the chemical composition and mineralization of water in lakes Sudoche, Mezhdurechye, Davutkul.

KEY WORDS: *Protection, mineralization, reservoir, reservoirs, Amu Darya, birds, dynamics.*

At the global level, great attention is being paid to solving the problem of progressive anthropogenic impact on water resources and preservation of biological diversity in aquatic ecosystems. Especially due to the sharp increase in anthropogenic pressure on water ecosystems, the quality of the water environment is becoming increasingly worse, and it is playing an important role in solving the issues of threats to the ecological, food and national security of our country. In this direction, the study of anthropogenic degradation of water bodies is becoming more relevant in the field of ecology, in addition to the creation of laws of rational use of natural water bodies and their protection.

Due to the extraordinary dynamics of the hydrological regime of the Amudarya basin, there is a strong need for up-to-date information in the development of prospective measures of water management, which also applies to information on the composition of biogenic elements. is the result of anthropogenic impact on water ecosystems of this region.

The flow of Amudarya is an important source of fresh water, and it is one of the main routes of pollutant migration in the Amudarya basin. The average content of dissolved phosphorus in Amudarya water and drainage channels varied from 0.004 mg/l to 0.36 mg/l during the considered period. The average annual minimum content of phosphates in collector waste water (KS-1) near the bridge in the area of Shortanbay collective farm of Nukus district and in the area of Kokshiel collective farm of Bozatau district (0.19 mg/l), the maximum in the collector KS-4 of Takhtakopir district and at the "Asha" point (Akpetkey archipelago) (0.32 mg/l). The content of ammonium nitrogen in the Amudarya water near the Takhiatash bridge is around 0.01-0.20 mg/l, Porlytau pos., Muynaq district. Around 0.01-0.32 mg/l.

Lake Sudoche. Lake Sudoche, located in the north-western part of Karakalpakstan, consists of a system of several lakes (big and small Sudoche, karateren, Begdulla aydyn, Omar salym, Qarajar, Qarysjag'ys, Akushpa).

The lake borders the Urga hill (580 30' - 430 35') to the east (580 38' - 430 35') with the Ustyurt chinki, the eastern border is the Karajar system from the eastern shore of Sudoche lake (580 38' - 430 22'), the western border is Akushpa. hill and passes along Ustyurt plateau (580 22' - 430 32') from Tayly to Urge hill. The total area is 50,000 ha.

The lake is a breeding ground for many hydrophilic bird species and a stopover for migratory birds on the west-Asian migration route, including rare and endangered birds.

Currently, Sudoche consists of a large number of small water bodies and four large water bodies (Aqushpa, Qarateren, Begdulla-Aydynd and Big Sudoche), as well as the areas adjacent to it. The maximum length of Akushpa is 20 km, width is 6.5 km, depth is not more than 1.5-1.7 m. The area of the lake is 11,600 ha.



The southern and western shores of the lake, adjacent to the Ustyurt plateau, have a low coastline; the northern and eastern coasts are very high and swampy. The lake is surrounded on all sides by reed groves, the height and density of which decrease towards the southern edge. The shallowest southern end of the lake is rich in open plains and large bays. The clear surface of the lake constitutes 60% of its total area, and the rest of the lake is covered with reed groves.

It should be noted that the water level in the lake has decreased by 50-55 cm compared to 2016. The bird fauna of this area includes 230 species of birds, 117 of which build nests. There are many rare species here, which is why in 2007 Sudoche was included in the list of the most important ornithological area of Uzbekistan (Uz 002) according to criteria A1, A3, A4i, A4i.

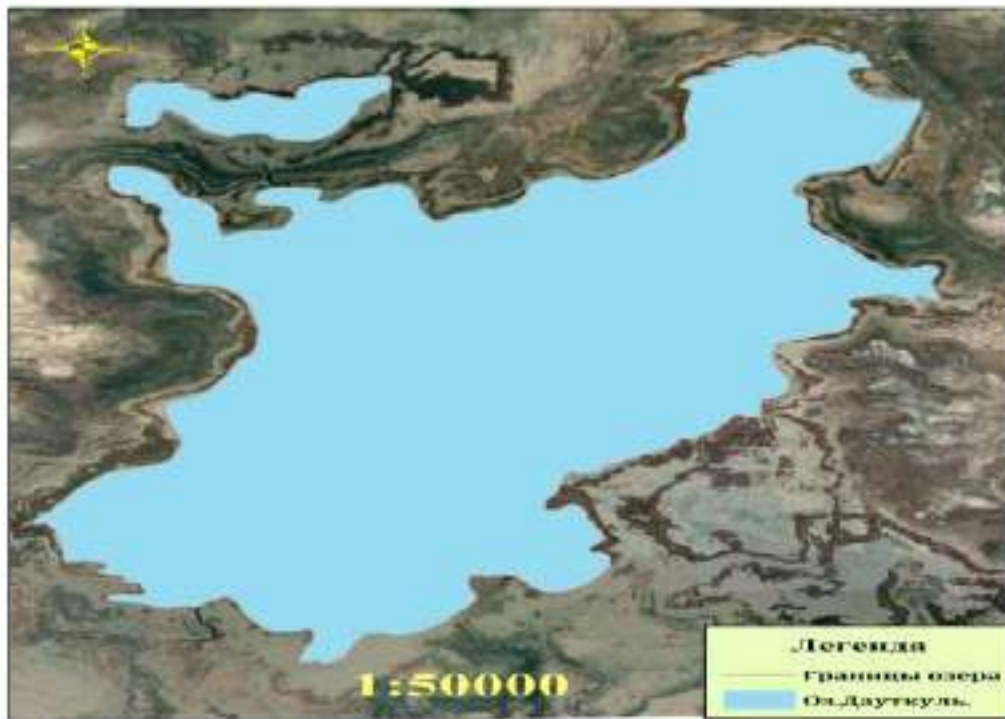
Different conditions of water supply and water exchange, as well as the chemistry of the feeding waters, create a polyhaline hydrochemical regime in different areas and lakes of the wetland. For example, this situation occurred in 2005-2010, 2015 and 2017, when the inflow through the collectors decreased or stopped. It was noticed that the lakes are drying up and becoming salty: the mineralization of water increases in all places, especially in stagnant places. Mineralization in the zones of the freshest watercourses corresponds to the mineralization of the feeding stream - 3-4 g/l. 2014 and 2018 this system was also very popular. The area of Lake Tayla has greatly decreased. Water enters the KKS collector in small quantities; the water consumption here is very small. According to our data, its mineralization is about 6 g/l, and the last area near Lake Western Karateren is 14.01 g/l, with the smell of hydrogen sulfide.

Davutkol. The Davutkol lake system, located at the beginning of the "former" delta of the Amudarya, is the largest and oldest limnic ecosystem in the Amudarya basin. It is marked on the map as Dautkol reservoir. The study of this system is of great importance, because, on the one hand, it helps to establish relationships within the basins in lakes located in extreme arid conditions, secondly, it helps to observe the transformation of ecosystems exposed to anthropogenic influence, and thirdly, it is reasonable to distinguish freshwater limnic ecosystems from freshwater limnic ecosystems in the conditions of acute shortage of freshwater in the Amudarya basin. provides an opportunity to develop a strategy of use.

The Davutkol lake system is located along the river, 4 km north of the city of Nukus. formed. At this time, water entered the lakes through the Davutkol system and fed the lakes located below it, namely up to the Kuskhanatau hill. The water level is not constant and is characterized by significant fluctuations, often depending on the filling of the river with water. The boundaries of the system were constantly changing, its area varied from 1770 to 2250 hectares. The greatest depth in the system was 5-7 meters in the Kuksu distribution, and unlike other distributions, its boundaries were clearly defined. In the lake, some holes are separated from each other by reeds 0.7-1.5 m high. The lakes are rich in aquatic plants.

According to experts, the main dominant of this ecosystem is reed (*Phragmites australis*), along the coast there are many examples of narrow-leaved sedge (*Typha angustifolia L.*) and sea pig grass (*Bolbochoenus maritimus*), in the muddy bottoms of shallow lagoons, underwater plant communities urut (*Myriophyllum verticillatum L.*), also forms dense thickets with rdest (*Potamogeton pectinatus L.*) and (*Potamogeton crispus L.*) species. Reeds (*Phragmites australis*) make up 85% of the ecosystem of the watershed and in some places are in clumps. The height of reeds in such bundles reaches 200-400 cm. Among reeds, the growth of 90-100 cm tall narrow-leaved sedges (*Typha angustifolia L.*) and reeds (*Schoenoplectus litoralis (Schr.) Palla*) was recorded. On the banks of the reservoir, specimens of hogweed (*Bolbochoenus maritimus*) are rare. Underwater macrophytes consist of rdest (*Potamogeton pectinatus L.*) and (*Potamogeton crispus L.*), urut (*Myriophyllum verticillatum L.*) and spiky urut (*Myriophyllum spicatum*). When the aquatic and coastal vegetation of the lake was studied, it was noted that it was covered with plants and had a high level of growth.

The lake is shallow and consists of numerous clumps of reeds (*Phragmites australis*). The bottom of the lake is muddy and sandy. Thick reed beds grow along the shore and form isolated clumps of dense reed beds in the lake's water area. The bottom is thickly covered with *Myriophyllum spicatum* species. Above the bottom of the lake and on the surface of the water spiral spirogyra (*Sphaerocysti*) formed a light green layer. The vegetation cover of the coastal part of the lake was dominated by plants such as sedge (*Kareliniacaspica*) and heather (*Tamarix hispida*) [69, 47-51 p.; 70, www.aknuk.uz.]. The dominant of this ecosystem is reed (*Phragmites australis*). It formed dense thickets and isolated islands. Underwater plants are represented by spiky urut (*Myriophyllum spicatum*). The species composition of the ecosystem is represented by only 2 types of aquatic plants. It is covered with reeds and its growth is high, and the coastal zone is also thickly covered with urut. Dominants of the coastal area are halophytes - plants such as sedge and rush.



Geographical location of Davutkol (www.uzeconet)

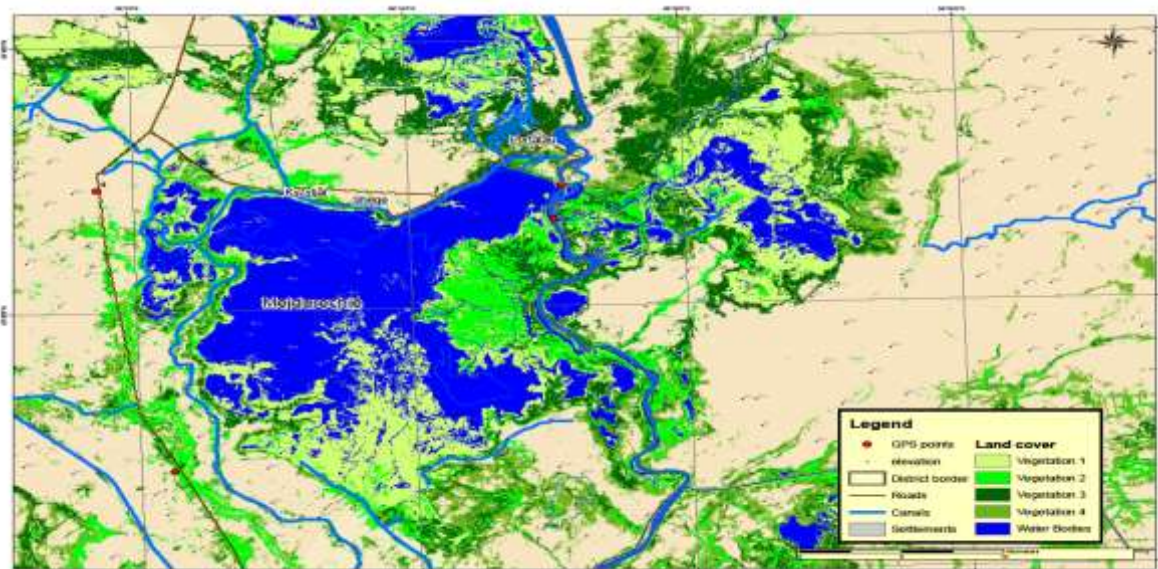
A change in the hydrological situation in the region, a sharp decrease in the total water flow of the Amudarya in the delta, as a result of the transition to another source of water supply led to the transformation of the lake system into a basin formed in the deepest water areas with a single water surface. Irrigation is carried out by pumping water from the Erkindarya canal and tributaries of the Sapaqkol-Birkulok lake system. The water supply of the water basin is very irregular, as a result of which, even in a short period of time, there are sharp changes in the water level and significant changes in the area. vegetation was observed only in the open expanses of the plains.

Not too high clarity is characteristic for Davutkol water. Sometimes it reached 3-4 m and more, water clarity decreased due to contamination with various debris on the shores of the lake and when approaching the dam, as well as a strong bloom of algae.

In the case of Dautkol (1995-2000) (Fig. 3.2), it was found in the study of the seasonal dynamics of mixed substances that the content of seston in the water of the circular canal flowing into Dautkol was 0.662 mg/l in the spring. In Dautkol water, the content of seston in the upper layer of water is 0.634 mg/l, in the lower layer of water at the bottom of the water is 0.603 mg/l. In winter, the concentration of seston decreases significantly, which is probably caused by the process of destruction and sedimentation. The content of seston in the upper layer of Dautkol water is 0.88-0.95 mg/l, in the lower layer it is 0.45-0.47 mg/l. The analysis of the amount of seston concentration shows that the concentration of mixed dissolved substances in the lake can vary significantly from year to year.

Lake Mejdureche. Mejdureche is located in the northwestern part of the reservoir, between Kipchakdarya and Okdarya. The water source is Amudarya. The total area of the water basin is 3000 ha, its length is 9-10 km, and its width is 2-3 km. The maximum depth is 3.5 m, the deepest place is 1.3-1.8 m.

The waters of Amudarya flowing into the lake are characterized by high mineralization and general pollution, which increases along the entire river due to collector-drainage and industrial water discharge. The clarity of the water in Shegekol varies depending on the season and is 0.50-0.80 m. Water mineralization in Shegekol undergoes drastic changes, minimum as well as maximum indicators were recorded during all periods of observations in the warm time of the year. In summer it is 1274-2124 mg/l, and in autumn it is 1240-1270 mg/l.



Geographical location of Lake Mejdureche

The concentration of dissolved substances in the water area of the lake is different and changes depending on the season. The content of dissolved substances in the summer season was 0.012-0.556 mg/l, in autumn - 0.310 mg/l (1998), in spring (1999) 0.104-0.671 mg/l, in summer from 0.0093 mg/l to 0.568 mg/l. It should be noted that the maximum amount of seston was recorded in the hypolimnion part of the water layer of the lake.

2013-2019 The analysis of the amount of seston concentration during the period shows that the distribution of dissolved mixed substances is not uniform and its variability probably depends on the internal regime of the water basin and the introduction of seston by the river flow.

Water environmental factors that lead to the degradation of water ecosystems are formed depending on the intensity and amount of biogenic elements entering water bodies and create certain conditions at the level of a specific biological regime and production and destruction processes that lead to their accumulation in ash.

LITERATURE

1. Mirziyoyev Sh.M. *Actions strategy 2017-2021*. - Tashkent: Adolat, - 2017. - 193 p.
2. Alekseenko V.A., Alekseenko L.P. *Biosphere and life activity: Textbook*. - M.: Logos, 2002. - 212 s.
3. Bykov B.A. *Ecological Dictionary*. - Alma-Ata: Science, 1983. - 216 p.
4. Iberla K. *Factor analysis*. - M. Statistics. - 1980. - 398 p.
5. Draper N., Smith G. *Applied regression analysis*. M. Statistics, 1973. - 392 p.
6. Dubrov A. M. *Processing statistical data using the principal component method*. M. - Statistics. - 1978. - 135 p.
7. Lakin G.F. *Biometrics*. - M. Higher School, 1990. - 352 p.
8. Nikanorov A.M. *Handbook of hydrochemistry*. - L. Gidrometeoizdat, 1989. - 390 p.
9. Stroganov N.S., Buzinova N.S. *Practical guide to hydrochemistry*. - M. Ed. Moscow Univ., 1980. - 196 p.
10. *Unified methods of water analysis* //Edited by Lurie Yu.Yu. - M. - Chemistry. - 1971. - 375 p.



MODERN STATE OF PHYSICS IN THE RESEARCH OF MICROPLASMA BREAKDOWN IN SILICON P-N JUNCTIONS AND DIODES AND SCHOTTKY

Tagaev Marat¹, Abdreymov Ali²

¹Doctor of Technical Sciences, Professor

²Assistant, Karakalpak State University named after Berdakh, The Republic of Uzbekistan

ANNOTATION

The reliability of semiconductor devices is primarily determined by the degree of perfection of the source material at the same time and very much depends on the technological processing methods used. Dislocations in the crystal structure are generated due to the occurrence of internal stresses, leading to plastic deformation of the material. Numerous studies have shown that one of the main causes of degradation and failure of semiconductor devices is the presence of internal mechanical stresses in them, the relaxation of which is accompanied by the appearance of structural defects.

KEY WORDS: *silicon, germanium, internal stresses, misfit dislocations.*

The reliability of semiconductor devices is primarily determined by the degree of perfection of the source material at the same time and very much depends on the technological processing methods used. Obtaining films on a single-crystalline substrate or epitaxial growth makes it possible to introduce a dopant with an arbitrary required concentration and obtain a p-n junction, avoiding the process of solid-phase diffusion. This is due to the fact that the degradation of almost all devices is based on the phenomena of diffusion, defect formation and decomposition of supersaturated solid solutions [1].

In devices containing p-n junctions with high impurity concentration gradients, degradation of parameters will be observed over time, associated, for example, with the spreading of concentration profiles due to diffusion. [2]. Taking into account all the factors that appear during the operation of devices, knowing the diffusion coefficients of impurities, it is possible to determine the amount of deformation of the concentration profile and predict the degree of degradation of electrical characteristics associated with changes in the profile. [3]. Analyzing these processes, the process of avalanche breakdown of real large-area p-n junctions, which has a microplasma character, remains poorly studied. Indeed, already in the very first studies of avalanche breakdown of pn junctions and Schottky diodes, it was shown that the breakdown in them is highly localized. [4]

The local breakdown region has small geometric dimensions and a significantly lower breakdown voltage compared to homogeneous regions. The region of such localized breakdown was called microplasma. However, [5-6] it was shown that dislocations do not always cause the appearance of microplasmas. In addition, in [7] it was theoretically proven that the phenomenon of microplasma breakdown can be interpreted as a special type of instability that occurs even in the case of an ideal p-n junction. In addition, analysis of experimental data shows that it is most likely not single dislocations that contribute to a local decrease in breakdown voltage, but their clusters.

Taking into account the above, it can be argued that the role of dislocations in the occurrence of microplasma breakdown is not fully understood. Most likely, the influence of dislocations manifests itself in conjunction with other factors. Let us consider separately the reasons leading to the appearance of dislocations. Dislocations in the crystal structure are generated due to the occurrence of internal stresses, leading to plastic deformation of the material

In epitaxial heterostructures, there are a number of reasons that cause internal stress. The main ones are thermal stresses; voltage mismatch; structural defects. Numerous studies have shown that one of the main causes of degradation and failure of semiconductor devices is the presence of internal mechanical stresses in them, the relaxation of which is accompanied by the appearance of structural defects [8-11].

Initial structural defects can contribute to the annihilation of radiation defects, both during and after irradiation. In particular, dislocations can be sinks of simple radiation defects (vacancies and interstitial atoms) - the main structural defects that arise during the relaxation of internal stresses, the density of which is especially high at the interface - the transition layer between two phases



or the contact surface of two grains in polycrystalline materials. Atoms and molecules at interfaces exhibit different properties than atoms and molecules in the bulk of a phase or material, since they are in a different environment. In this regard, the study of the properties of matter at interfaces and the phenomena that arise there constitutes a special field of physics and chemistry. Surface effects become important in nano-sized materials, where the surface fraction is very large and can begin to determine the properties of the material as a whole.

The increased defectiveness of the GR in devices with heterojunctions and a Schottky barrier allows us to hope that the parameters of such devices will change little when irradiated up to very high doses. In addition, the interaction of radiation defects with the original structural defects (both in the volume and in the GR region) in a certain range of irradiation doses can lead to a decrease in the generation-recombination component of the current and change the characteristics in the pre-breakdown region in a favorable direction. [12-13].

For an interface of arbitrary orientation (hkl), an expression has been obtained for the first time that establishes the relationship between the misfit parameter f of the epitaxial heterosystem, the number of dislocation families involved in the process of misfit stress relief, the linear densities of misfit dislocations of each family, as well as the values of the projections of the edge components of the Burgers vectors of misfit dislocations on interface boundaries. To obtain the expression, long-range fields of normal and shear stresses arising in the near-surface layer of the epitaxial film are considered. Criteria for the optimal and non-optimal course of the relaxation process of relieving tensions of inconsistency have been formulated [14]. Relaxation of internal mechanical stresses in heterogeneous device structures can lead to their degradation [15]. The main reasons for the occurrence of internal stresses in heterogeneous device structures are thermal expansion of contacting materials $\Delta\alpha$, which leads, when the system temperature (ΔT) changes, to the appearance of thermal stresses (TS) mismatch of crystalline film and substrate lattices Δa , as a result of which misfit stresses (MS) arise, each of which is associated with microdeformations, and therefore local stresses. At a high concentration of defects, the microstrain fields of individual defects overlap, resulting in inhomogeneous or homogeneous macrostrain. Let two materials, characterized by thermal expansion coefficients $\alpha_1(T)$ and $\alpha_2(T)$, be brought into contact at T_0 . This can be done in various ways: thermal compression, fusion, deposition of a film of material 2 on a substrate of material 1.

After cooling the resulting geostructure to room temperature T_k , both materials will be in a stressed state. If the structure of the geostructure is a layered structure, then the elastic deformation in the substrate and film is described by the diagonal tensors $\varepsilon(1)$ and $\varepsilon(2)$ with components

$$\varepsilon_{xx}(1) = \varepsilon_{yy}(2) \quad \varepsilon_{zz}(1) = -2\nu_i \varepsilon_{zz}(1)/(1 - \nu_i)$$

Here the z axis coincides with the direction of the normal to the phase boundary, ν_i - Poisson's ratios of mating materials ($i = 1, 2$) The stress tensors $\sigma^{\wedge(1)}$ and $\sigma^{\wedge(2)}$ can be obtained from $\varepsilon_{xx}(1) = \varepsilon_{yy}(2) \quad \varepsilon_{zz}(1) = -2\nu_i \varepsilon_{zz}(1)/(1 - \nu_i)$, using the equilibrium conditions of the system, Hooke's law.

Here the z axis coincides with the direction of the normal to the phase boundary, ν_i - Poisson's ratios of mating materials ($i = 1, 2$) The stress tensors $\sigma^{\wedge(1)}$ and $\sigma^{\wedge(2)}$ can be obtained from $\varepsilon_{xx}(1) = \varepsilon_{yy}(2) \quad \varepsilon_{zz}(1) = -2\nu_i \varepsilon_{zz}(1)/(1 - \nu_i)$, using the equilibrium conditions of the system, Hooke's law.

$$\sigma_{xx}^{(t)} = \sigma_{yy}^{(t)} = E_1^* \varepsilon_{xx}^{(t)}, \quad \sigma_{zz}^{(t)} = 0 \quad \text{with attitude } |\varepsilon_{xx}^{(t)}|_{z=0} - \varepsilon_{xx}^{(l)}|_{z=0}| = |\gamma_{lt}|,$$

$$\text{где } \gamma_{lt} = \int_{T_k}^{T_0} (\alpha_2 - \alpha_1) dT$$

$E_1 = E_1 / (1 - \nu_i)$, E_1 - Young modules, $i = j = 1, 2$. The deformation of both parts of the heterostructure is inhomogeneous in z . If the thickness of the substrate in d_1 is much greater than the thickness of the film d_2 , then the inhomogeneity of deformations in the film can be neglected and considered $\varepsilon_{xx}^{\wedge(2)} \approx \varepsilon_{xx}^{\wedge(2)}|_{z=0} = \text{const}$

Under the influence of moments of force applied to the film and substrate, the heterostructure bends. For the radius of curvature of the system for $d_1 \ll d_2$

$$\text{we get the expression } R = \frac{E_1^* d_1^2}{6E_2^* d_2 \nu_{12}}$$

The sign of the curvature of the system in the presence of only thermal stresses is determined by the sign of the value ν_{12} . Thermal stresses were experimentally discovered in various semiconductor heterostructures, as well as in semiconductor-insulator and



semiconductor-metal systems [16]. They are practically present in any device structures, since the latter are necessarily formed when elevated temperatures $T \neq T_k$. Thermal stresses can arise in heterosystems not only during the cooling process, but also during the manufacture of the system due to the presence of temperature gradients.

In contrast to thermal stresses that arise in any heterosystems regardless of the crystal structure of the mating materials, mismatch stresses arise only during the epitaxial growth of one material onto another.

If the materials are dissimilar (hetero-epitaxy), then each of them is characterized by its own crystal lattice parameter, a (i). On the surface of the substrate there is a potential relief with a period a , due to the periodic arrangement of atoms at lattice sites. During epitaxial deposition of a film, it is energetically more favorable for the atoms of the deposited substance to be located in potential wells, i.e. complete the substrate grid. In this case, the interatomic distances in the film in planes parallel to the interface turn out to be equal to the lattice parameter of the substrate.

Since in the general case $a_1 \neq a_2$, the film turns out to be deformed (tetragonal distortion). An idea of the magnitude of the mismatch stresses arising in this case can be obtained by comparing them with the theoretical ultimate strength of the crystal, which, according to various estimates, lies between $G/2\pi$ and $G/30$, where G is the shear modulus. Because the

$$\sigma_{\Pi} = \frac{2 \cdot (1 + \nu) \cdot G \cdot \varepsilon}{1 - \nu}$$

then in the case when the lattice mismatch $f = 2 \frac{a_2 - a_1}{a_2 + a_1}$

on the order of one percent, mismatch stresses can exceed the tensile strength of the crystal.

In autoepitaxy, also $a_1 \neq a_2$ due to different doping of the film and substrate. Therefore, auto-epitaxial systems in the sense of the occurrence of internal mechanical stresses are completely similar to geosystems. In this case, the mismatch stresses are called concentration stresses, since the difference in the lattice parameters of the film and the substrate is determined by the composition and concentration of dopant impurities.

Concentration stresses also arise in systems with a composition gradient or a concentration gradient of impurities (p-n junctions).

The nature and sign of deformations associated with DS depend on the nature of the defects. Thus, the sign of the deformation caused by point defects is determined by the difference between the radii of the defect and the matrix atom. Regions of tension and compression are associated with edge dislocations (the latter on the side of the extra half-plane in the crystal).

Depending on the nature of the defects (point, linear, three-dimensional), the corresponding stress fields attenuate with distance from the defect at different rates. Deformations caused by point defects decrease in proportion to the cube of the distance.

Assuming a uniform distribution of point defects (vacancies, between site impurity atoms), the average relative strain associated with their presence

$$E = \sum_k \beta_k N_k$$

where N_k are the defect concentrations and β_k are the corresponding deformation constants.

In the case of dislocation according to the hyperbolic law. The presence of a dislocation wall (disclination) leads to the appearance of a field of alternating stresses, and accumulations of dislocations of the same sign lead to the appearance of long-range tensile stresses on one side of the accumulation and compression stresses on the other side. Three-dimensional defects (clusters, micropores, inclusions) lead to extended strain fields.

Another reason for the occurrence of deformations associated with internal stresses is surface tension (ST), which plays a noticeable role in very thin continuous or island layers. Depending on the sign of the surface energy of the tensile force. Such stresses are inversely proportional to the thickness of the film and become negligible at $d \sim 100 \text{ \AA}$.

When creating integrated circuits, internal stresses caused by shrinkage of polycrystalline or amorphous films associated with aging processes, in particular oxygen diffusion, become of great importance.

Significant stresses can be associated with surface topography, scratches, and the edges of a non-continuous film.

In the general case, internal stresses of various origins are simultaneously present in heterosystems. However, essentially their occurrence is due to the same reason: the presence of intrinsic deformations at the phase boundaries associated with the difference in the equilibrium distances between atoms in the contacting layers.

The presence of internal stresses increases the energy of the system, and at certain stresses increases the energy of the system, and under certain conditions the system relaxes and transitions to a state with lower energy. In semiconductor heterosystems, internal stresses are usually relaxed through plastic deformation, but other methods of relaxation are also possible (elastic bending, continuity, swelling, peeling, cracking, destruction). Classification of relaxation mechanisms, with the exception of elastic bending, are phase transitions.

Plastic deformation, as well as twinning and cracking, are dislocation mechanisms: they are associated with the generation and movement of dislocations. We will not dwell on twinning here, since this type of relaxation is plastic deformation of the system associated with the generation of specific dislocations, called misfit dislocations. [32]

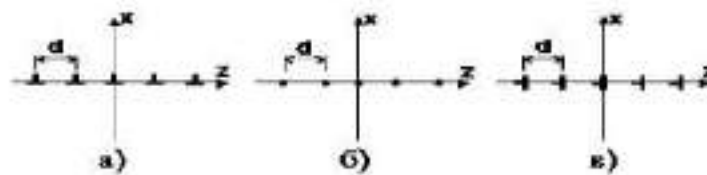


Fig. 1. Representation of a family of misfit dislocations in the form of three dislocation systems: edge misfit dislocations (a); screw misfit dislocations (b); edge dislocations creating a low-angle boundary(c).[17]

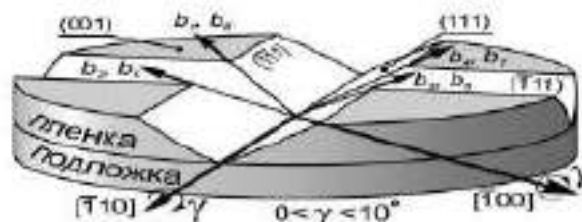


Fig. 2. Schematic representation of the Burgers slip vectors b_1 - b_2 in the case of a vicinal interface (001) deviating by an angle γ as a result of rotation around the [-110] or [-100] axis.

The numbers of the Burgers vectors and the Miller indices of the slip planes and Burgers vectors are given in accordance with the data in Table 1.1. The table shows the structural characteristics of 600-misfit dislocations located in the singular interface (001) of the semiconductor heterosystem [28]. The crystal lattice parameter of the film exceeds the substrate parameter.

Family number	Sliding plane	Burgers vector direction, b	Direction of dislocation lines, E	Type of helical dislocation component
1	(-1-11)	[101]	[-110]	левая
2	(-1-11)	[011]	[-110]	правая
3	(111)	[-101]	[1-10]	левая
4	(111)	[0-11]	[1-10]	правая
5	(1-11)	[011]	[-1-10]	левая
6	(1-11)	[-101]	[-1-10]	правая
7	(-111)	[0-11]	[110]	левая
8	(-111)	[101]	[110]	правая

The technology strives to perform epitaxial growth at lower growth temperatures since this allows the creation of sharp heterointerfaces between layers and reduces the number of structural defects. Therefore, the main mechanism for the formation of misfit dislocations is sliding - it occurs at lower temperatures compared to dislocation creep [18.22.23.24.].

Let us consider a separate misfit dislocation, which consists of the following parts [21.25.26].

- firstly, this is a straight dislocation section located at the interface or near it, and is directly the misfit dislocation itself. This part of the dislocation removes the misfit between the two mating materials and reduces the energy of the heterosystem;

-secondly, these are one or two dislocation sites that connect the ends of the misfit dislocation with the surface of the film feathers. These regions pass through the entire thickness of the film feathers; in the literature they are called threading [20,27,28] or threading [21] dislocations. The term “penetrating dislocations” is also used [29].

In foreign literature, starting from the first works of Matthews, these dislocations are called “threading dislocations”. The most accurate translation to the English version is “piercing dislocations.”

The operation of Heigen-Schrank sources and modified Frank-Reed sources leads to the accumulation of misfits with the same Burgers vector at the interface of 600-dislocations. From [19.29] it follows that the accumulation of identical misfit dislocations having a screw component can lead to the appearance of long-range shear stresses in the epitaxial film. An example of the experimental observation of L-shaped misfit dislocations is shown in (Fig. 1.7). This figure shows an image of an electronic microscopy (Fig. 1.7.a)

The operation of Heigen-Schrank sources and modified Frank-Reed sources leads to the accumulation of misfit dislocations with the same Burgers vector in the ganinite section. From [19.29] it follows that the accumulation of identical misfit dislocations having a screw component can lead to the occurrence of long-range shear stresses in an epitaxial film. An example of the experimental observation of L-shaped misfit dislocations is shown in (Fig. 3). This figure shows an electron microscopy image (Fig. 3.a) of L-shaped misfit dislocations in the (001) boundary Irengen topogram (Fig. 3.b) misfit dislocation data, recorded images of accumulations of a significant number of L-shaped dislocations with the same b, the distance between which is significantly less than the thickness of the film. The latter means that long-range shear stresses arise in the film.[17]

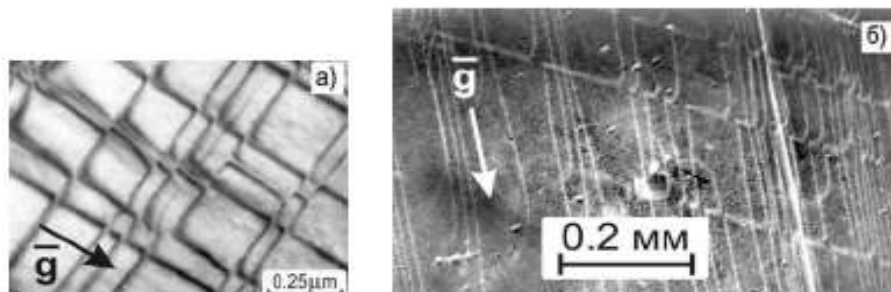


Fig3 Experimental images of Γ -base misfit dislocations [28].

Electron microscopic image (a) in the heterosystem (001). X-ray topogram (b), which shows two families of L-shaped dislocations rotated by 120° in the neutral plane of the stressed crystal (111).

Nagai was the first to observe the rotation between the crystal lattices of the film and the substrate in the InGa/GaAs heterosystem with a vicinal (001) orientation of the interface [30.31]. He proposed a model in which the reversal is a consequence of the presence of steps on the surface of the substrate and the mismatch between the cells of the film and the substrate.[17]



Fig. 4. RHEED pattern from a 25 nm Ga/Si(001)60 film around <001>, nucleation of the first monolayer by deposition. The surface cell (2*4) is oriented parallel to the edges of the terraces.[17]



Fig. 5. RHEED pattern from a 25 nm Ga/Si(001)60 film around <011>, nucleation of the first monolayer by mixing. The surface cell (2*4) is oriented perpendicular to the edges of the terraces.[17].

The commonality of the reasons for the occurrence of internal stresses in heterosystems allows us to develop a general approach to considering the mechanisms of their relaxation. Most clearly, one can study the mechanisms of relaxation in single-crystal epitaxial systems. Relaxation processes proceed similarly in systems with diffusion layers that play (substrates) with the lattice parameter. Therefore, let us consider the relaxation of internal stresses, for example, in epitaxial systems.

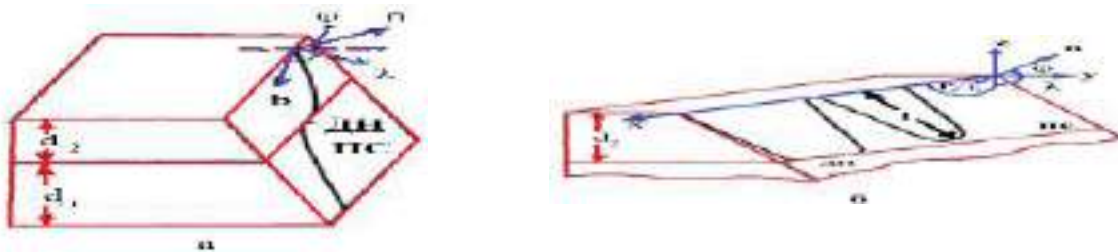


Figure 6. Various mechanisms of DN occurrence:

a-due to the bending of growth dislocations; *b*- by generating and expanding dislocation half-loops. [32]

During plastic deformation, the total length of dislocation lines per unit volume of the deformed material increases due to:

- 1) increasing the length of dislocations existing in the material
- 2) regenerative propagation of existing dislocations
- 3) the nucleation of new dislocations in the form of dislocation loops or half-loops.

All theoretical works that consider the relaxation of internal stresses in heterosystems are based on the concept of DN, introduced in [33-38], the authors of which proceed from the idea that the electron beam can be in one of two equilibrium states with a uniform elastic deformation and with a mesh straight edge dislocations at the interface. This network can be rectangular or hexagonal depending on the crystallographic orientation of the interface.

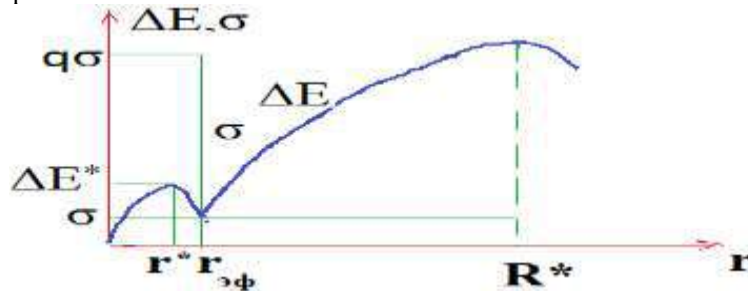


Fig-7. Dependences of stress σ on the distance to the concentrator and changes in the thermodynamic potential on the radius of the dislocation loop.

In the case of heterogeneous nucleation of dislocations, the dependence $\Delta E(r)$ takes on the form shown in Fig. 2. The additional left maximum corresponds to the region of action of stress concentrators. Its height ΔE^* is significantly lower than that of the main one, and at real temperatures only loops of radius r^* corresponding to this maximum are generated.

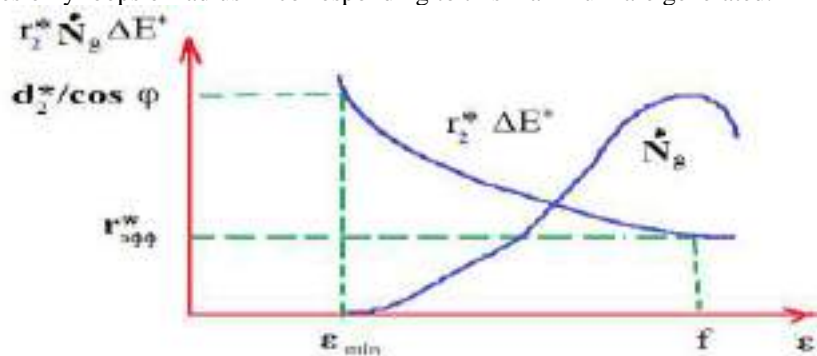


Fig.8. Dependence of the critical radius of nucleation and the generation rate of dislocation loops, as well as the change in the thermodynamic potential of the system when a half-loop occurs on elastic deformation of the film.

[32]



Fig.8. Dependence of the critical radius of nucleation and the generation rate of dislocation loops, as well as the change in the thermodynamic potential of the system when a half-loop occurs on elastic deformation of the film.

[32]

$$\varepsilon = -b \cdot \cos \lambda \cdot \int_{t'}^{\frac{t-t_0}{\varepsilon+t'}} v(t, t_1) N_D(t_1) dt_1 = \frac{2(1+\nu)Gb^3 \cos^3 \lambda \cos^3 \varphi}{1-\nu} \cdot \frac{D}{k \cdot T} \cdot \int_{t'}^{\frac{t-t_0}{\varepsilon+t'}} \left(\varepsilon - \frac{t_0}{t-t_0-t'} \right) N_D(t_1) dt_1$$

$t_0 \equiv \frac{W_0(1-\nu)}{2Gb\nu(1+\nu)\cos\lambda\cos\varphi}$ ε decreases, ΔE^* and r^* according to [5] increase and, accordingly, R^* increases so that later formed dipoles remain unexpanded. The straight sections of the MD lying at the interface are short, and in the volume of the film there is a larger number of dislocation dipoles and reaction products between them.

If the deposition rate is high, then the change in film thickness from $d_2 = R^* \cos \varphi$ to $d_2 = R^* \cos \varphi$ occurs in a short time. Then we can assume that almost all semi-loops nucleated on the surface, the density of which is relatively low, expand, as a result of which $\Delta E(r^*)$ increases and N_d sharply decreases. Thus, relaxation mainly occurs due to the expansion of a small number of half-loops, creating straight sections of DN at the interface.

The theory of relaxation of misfit stresses through the heterogeneous nucleation of dislocation half-loops on the surface of a growing film [35-38] is semi-quantitative in nature, which is due to ignorance of the nature of stress concentrators. It does not take into account the direct interaction of dislocations, the presence of many slip planes and the non-conservative movement of dislocations.

Dislocations in an unrelaxed heterosystem are in the stress field of the heterointerface. Depending on the direction of the Burgers vector, these stresses tend to either bring the dislocations closer to the interface or move them away from it. As a result, stress-induced selective absorption of point defects by dislocations occurs, namely: those from dislocation movement which requires the completion of the extraplane, will absorb interstitial atoms and emit vacancies, the same creep of which requires its shortening, will be sources of interstitial atoms and sinks of vacancies. As a result, under the influence of irradiation, dislocation mismatches that are ineffective for accommodation are dissolved and due to this, extraplanes associated with the MD are completed. [32]

Thus, from one mechanism of plastic deformation associated with dislocation sliding. In fact, this corresponds to a mechanical dislocation model without thermal fluctuations ($T=0$), where temperature is taken into account only by coefficients in the relations between ε and N_d . In fact, at a sufficiently high temperature, the role of the latter is also manifested in diffusion processes associated with the non-conservative movement of dislocations.

LITERATURES

1. M. B. Tagaev. Study of the heterogeneity of avalanche breakdown processes in silicon p-n junctions. Doctoral dissertation
2. V. F. Sinkevich, V. N. Solovov. Physical mechanisms of degradation of semiconductor devices. -Abroad.electron. Techn. 1984, issue. 2, p. 3-46.
3. A. M. Stoneham. Non-radiative transitions in semiconductors. -Rep.progr.phys.-1981, Vol. 44, N12, pp. 1251-1295.
4. R. J. McIntyre Theory of microplasma instability in silicon. - J. Appl. phys., 1961, V. 32, N6, P. 31-43.
5. Cottrell A. Theory of dislocations. -M.; Mir, 1969, 96 p.
6. Kikuchi, K. Tachikama Visible light emission and microplasma phenomena in silicon p-n junctions. - J. Phys. Soc. Jap. 1960, pt.1.v.15, p.835-848, classification of weak spots in diffused p-n junctions.-J.Phys.soc. Jap. 1960, v.15, pt.2, p.1822-1830.
7. Gribnikov Z.S. On one mechanism of instability of homogeneous avalanche breakdown of Schottky layers.-FTP, 1977, v. 11, no. 11, pp. 2111-2118.
8. Thorik Yu.A., Khazan L.S. Plastic deformation and misfit dislocations in heteroepitaxial systems. -Kyiv.; "Naukova Dumka", 1983. - 304 p.
9. Wenger E.F., Grendel M., Danishka, V., Konakova R.V. and others. Structural relaxation in semiconductor crystals and device structures. -Kyiv.; "Phoenix", 1994.
10. Milvidsky M.G., Osoensky V.B. Regularities of defect formation in heteroepitaxial III-V structural compounds for optoelectronics. - Crystallography, 1977, v. 22, V 2, p. 431-446.
11. Konakova R.V., Kordosh P., Thorik Yu.A. and others. "Forecasting the reliability of semiconductor avalanche diodes." -Monograph, - Kiev.; "Naukova Duma" -1986.
12. Askarov M. A., Ismailov K. A., Turmanova R. M. Degradation processes in semiconductor device structures. 2018 KSU. Art. 19-21.
13. Ismailov K.A., Kamalov A.B., Bizhanov E.K. Radiation changes in the electrical properties of semiconductor heterostructures. Kara-Kalpak State University named after. Berdaha. Tashkent, November 24 - 25, 2010
14. E. M. Trukhanov, A. V. Kolesnikov, I. D. Loshkarev. Long-range stresses in an epitaxial film created by misfit dislocations. 2003 Institute of Semiconductor Physics named after. A. V. Rzhanova SB RAS, Novosibirsk, Russia



15. 15.R. V. Konakova, P. Kordosh, Yu. A. Thorik, V.I. Fainberg, F. Shtofa-nik. *Forecasting the reliability of semiconductor avalanche diodes*. Kiev NAUKOVA DUMKA. 1986
16. Thorik Yu. A., Khazan L. S. *Plastic deformation and misfit dislocation in heteroepitaxial systems*. -Kiev: Nauk. Dumka, 1983. -304 s.
17. 17.I. D. Loshkarev. *Stress state and dislocation structure of GaAs, GaP and GeSi films on silicon*. Dissertation for the degree of candidate of physical and mathematical sciences. Novosibirsk 2013
18. 18. Hirt J., Lote I. *Theory of dislocations*. - M.: Atomizdat, 1972. - 599 p.
19. 19. Trukhanov E.M. *Influence of the type of misfit dislocations on the energy and structure of thick epitaxial films // Surface*. - 1995. - No. 2. - P.13-21.
20. 20. Kolesnikov A.V. *The role of screw dislocations. component in the plastic relaxation of semiconductor heterosystems (process analysis and modeling) // PhD thesis, Novosibirsk*. - 2003. - 163 p.
21. 21. Thorik A., Khazan L. S. *Plastic deformations and misfit dislocations in heteroepitaxial systems*. - Kyiv, 1983. - 304 p.
22. 22. Friedel J. *Dislocations*. - M.: Mir, 1967. - 643 p.
23. 23. Legoues F.K., Powell A., Iyer S.S. *Relaxation of SiGe thin-films grown on Si/SiO₂ substrates // J. Appl. Phys.* - 1994. - Vol.75, No. 11. - P.7240-7246.
24. 24. Read W.T. *Dislocations in crystals*. - New-York-London-Toronto, McGraw-Hill Publ. Company LTD, 1953. - 256p.
25. 25. Milvidsky G., Osvensky G. B. *Structural defects in epitaxial layers of semiconductors*. - M.: Metallurgy, 1985. - 159 p.
26. 26. Fitzgerald E.A. *Dislocations in Strained-Layer Epitaxy: Theory, Experiment, and Applications // Materials Sci. Reports*. - 1991. - Vol.7, N3. - P.87-142.
27. 27. Trukhanov E.M. *Dislocation structure of strained semiconductor film-substrate heterosystems // Doctoral dissertation, Novo-Sibirsk*. - 2002. - 333 p.
28. 28. Trukhanov E.M., Ilyin A.S., Krasotin A.Yu., Vasilenko A.P., Deryabin A.S., Kachanova M.M., Gutakovskiy A.K., Kolesnikov A.V. *The role of the screw component in the formation of a dislocation structure in heterosystems prepared on the basis of Ge and Si // Surface*. - 2007. - No. 5. - P.28-36.
29. 29. LeGoues F.K. *Self-Aligned Sources for Dislocation Nucleation: The Key to Low Threading Dislocation Densities in Compositionally Graded Thin Films Grown at Low Temperature // Phys. Review Lett.* - 1994. - Vol.72, N.6. - P.876-879.
30. 30. Nagai H. *Anisotropic bending during epitaxial growth of mixed crystals on GaAs substrate // J. Appl. Phys.* - 1972. - Vol.43. - P.4254-4256.
31. 31. Nagai H. *Structure of vapor-deposited GaInAs // J. Appl. Phys.* - 1974. - Vol.45. - P.3789-3794.
32. 32.R.V. Konakova, P. Kordosh, Yu.A. Thorik, V.I. Fainberg, F. Shtofanik. *Forecasting the reliability of semiconductor diodes*. Kiev Nauka Dumka 1986.
33. 33. Frank F. C., vander Merwe J. H. *One-Dimensional dislocations*, - Proc. Roy. Soc. A, 1949, 198, N 1052, p. 205-225.
34. 34. Akulova G.V., Kaluev L.A., Kolyasnikov V.A. *Influence of thermodiffusion phosphorus regimes* - ET.Ser.3, 1977, issue 3, pp.84-87.
35. 35. Hirt J., Lote I. *Theory of dislocations*. -M.: Atomizdat, 1972. -599 pp.
36. 36. Thorik Yu. A., Khazan L. S. *On the relaxation of internal stresses in heteroepitaxial systems* - Dokl. Academy of Sciences of the Ukrainian SSR. Ser A.1979. No. 8. With. 662-664.
37. 37. *The influence of structural defects on the development of avalanche breakdown in Ge-GaAs heterodiodes and Cr-GaAs Schottky barrier diodes/ P.B. Konakova G. D. Melshikov, Yu. A. Thorik, Yu. M. Schwartz*. -PTM.1978. Issue 28. P.67-69.
38. 38. Bardsley W. *The influence of dislocations on the electrical properties of semiconductors*. -UFN.1961.73. No. 1. Pp.121-167.



FLORA AND FAUNA OF THE REPUBLIC OF KARAKALPAKSTAN

Nagashybaeva Aigerim¹, Bekpanov Atamurat², Abipov Rustem³,

¹Assistant

²Assistant, Department of Ecology and Soil Science

³Assistant, Department of General Biology and Physiology

Karakalpak State University named after. Berdakha, The Republic of Uzbekistan

ANNOTATION

The article discusses the features of the flora and fauna of the Republic of Karakalpakstan. The territory of Karakalpakstan can be divided into 4 botanical-geographical regions: Ustyurt, Kyzylkum, the lower reaches of the Amu Darya and the dried-up part of the Aral Sea, which currently grow about 1000 species of higher plants and are home to 498 species of vertebrate animals, 1392 species of insects.

KEY WORDS: Kyzylkum, Lower Amu Darya, Ustyurt, IUCN, Red Book, region, protection.

The Republic of Karakalpakstan, located in the desert zone of the Central Asian region, is defined by a sharply continental desert climate with extremely low precipitation and high evaporation. Most of the territory is occupied by the deserts of the Ustyurt and Kyzylkum plateaus. Between them are the drying Aral Sea and the delta of the Amu Darya River, which, in turn, are separated by another desert (new) Aralkum.

The territory of Karakalpakstan can be divided into 4 botanical-geographical regions: Ustyurt, Kyzylkum, the lower reaches of the Amu Darya and the dry part of the Aral Sea, where about 1000 species of higher plants currently grow. Many of these plants have beneficial properties, for example, they have been widely used in medicine from ancient times to the present day.

The vegetation cover of deserts changes sharply depending on the substrate: psammophytic vegetation dominates on sands, gypsum-phytic vegetation dominates on rocky substrates, halophytic vegetation dominates on salt marshes, and wormwood, wormwood-salt and ephemeral vegetation dominates on loamy soils.

Forage plants are widespread in Ustyurt, which allows livestock to graze here all year round. Among them are biyurgunniks, wormwoods, saxauls, kereushniks, ephemerals and ephemerooids.

In the sands of the Kyzylkum desert, grow white saxaul, dzhuzgunniki, wormwood, chokeberry, biyurgunnik, cereals, silts, ephemerals and ephemerooids: ephedra, wormwood, selin, etc. Many of these plants are feed for cattle, and are also used in medicine (ferula, ephedra, wormwood).

The lower reaches of the Amu Darya are a monotonous plain with a slight slope towards the Aral Sea. It is characterized by a large concentration of tugai forest stands growing in the area of the modern and ancient Amu Darya delta, and is considered the main area of distribution of tugai trees in Central Asia. Other vegetation of the Lower Amu Darya is represented by reed, fodder, medicinal, dyeing and essential oil plants.

The vegetation of the dry bottom of the Aral Sea or the desert, which Aral-Kum has recently begun to reclaim again, is sparse. It is mainly represented by halophytes: species of comb grass, juzgun, saltwort, seline, etc. One of the most important tree-like plants are species of saxaul - black and white.

In the animal world of deserts, their adaptation to rather unfavorable environmental conditions is revealed. Animals in the desert also adapt to excessive heat and lack of moisture in different ways.

Some of them switch to a nocturnal lifestyle, and from the heat of the day they hide in holes or bury themselves in the sand or sit out on the branches of bushes. The lack of water in the desert has led to the fact that some desert animals do not drink water at all



and do not even know how to drink (yellow gopher). They get the necessary moisture from plants, while predators get it from the blood of their victims. Animals of ephemeral deserts, leading an active lifestyle in the spring, go into hibernation in the hot summer.

On the territory of the Republic of Karakalpakstan, 498 species of vertebrate animals have been registered, including mammals - 68, birds - 307 (of which nesting - 141, wintering - 20, migrating - 146), reptiles - 33, amphibians - 2, fish - 49 species. There are approximately 7 times more invertebrate animals, but they are very poorly studied. The greatest diversity is found in insects - 1392 species belonging to 23 orders.

The most fully studied invertebrates are parasites of fish, birds, crustaceans and mollusks. Thus, 436 species of parasites are known in fish, and 133 species of helminths are known in birds. 45 species of fleas and 16 species of ticks were found on rodents.

420 species of invertebrates have been registered in the tugai biocenosis, 264 in the gypsum desert, and 180 in the sandy desert.

The species composition of vertebrates in Karakalpakstan has undergone noticeable changes over the past decades. A significant portion of terrestrial species have greatly decreased in number and are classified as vulnerable, rare or endangered.

The Red Book of Uzbekistan (2006) lists 10 species of mammals, 37 birds, 12 fish, 4 reptiles. The International Union for Conservation of Nature (IUCN) Red List of mammals of Karakalpakstan includes 2 extinct species (Asian cheetah and Turanian tiger) and 4 critically endangered species (Indian honey badger, Turkmen caracal, Turkmen kulan, Ustyurt sheep); of birds - 5 endangered and on the verge of extinction species (marbled teal, white-headed duck, Siberian crane, bustard, slender-billed curlew), of fish - 5 species (Aral thorn, large and small Amu Darya silverback, Aral spined loach and Aral brown trout). Of the former objects of hunting and fishing - 24 species of mammals, 60 species of birds and 14 species of fish of Karakalpakstan, many have disappeared or decreased in number and have lost their commercial significance.

At the same time, as a result of acclimatization measures and through self-dispersal, 14 species of fish appeared in the water bodies of Karakalpakstan. However, only 4 of them are of commercial importance and even occupy leading positions in the fishery.

In 1976, 12 deer were brought to the Badatugai Nature Reserve, which is located on the territory of the Republic of Karakalpakstan, and were housed in specially built mesh enclosures. The Bukhara deer, as an animal of great importance for global biodiversity, which is in a catastrophic state and under a real threat of extinction, is included in the lists of priority taxa of ungulates of the International Union for Conservation of Nature, listed in the IUCN Red Book (2006), as well as in the Red Book lists Republic of Uzbekistan (2006). Currently, on the territory of the Amudarya State Biosphere Reserve (formerly Badatugai Reserve), the number of Bukhara deer has reached more than 1,200 individuals.

The fauna of Karakalpakstan has its own characteristics. Thus, desert inhabitants are considered the best runners. For example, hedgehogs, which are relatively slow-moving animals, are represented here by long-eared and long-spined species, with limbs noticeably longer than those of the European hedgehog.

Among mammals, the most common are the ton-footed ground squirrel, jerboa, wolf, wild boar, fox and hare; among birds - saksaul jay, desert sparrow, magpie; among reptiles - lizards, sand boa, among fish - grass carp, Amu Darya trout, carp, pike perch, snakehead, common silver carp, etc. Among invertebrate species, phalanges, scorpions, sand tarantula, and beetles are common.

Thus, the flora and fauna of the Republic of Karakalpakstan is diverse, but in the last decade the species composition of many animals has undergone changes and, due to a decrease in numbers, are included in the Red Book of the IUCN and the Republic of Uzbekistan.

LITERATURE

1. Berdambetova B.P., Bakhieva L.A. Fauna of the Republic of Kara-Kalpakstan // "Economy and Society" No. 4(71) 2020.- www.iupr.ru .- P.184-186.
2. Berdambetova B.P. Protected animal species of the Republic of Karakal-Pakistan // "World Science" No. 6(51) 2021. - Science-j.com. - pp. 113-115.
3. Museum of Ecology on the shores of the Aral Sea // <https://agroturizm.uz/>
4. Flora and fauna of Karakalpakstan, the originality of the nature of
5. Karakalpakstan // <https://fayllar.org/>
6. Republic of Karakalpakstan // <https://invest.gov.uz/>
7. Fauna // karakalpakstan.travel/f
8. Flora // <https://karakalpakstan.travel/f>



UDC 595.7

PECULIARITIES OF ARTHROPOD DISTRIBUTION IN VEGETABLE AND MELON CROPS UNDER CONDITIONS OF KARAKALPAKSTAN

Koshanova Rosa Erezhepovna

*Candidate of Biological Sciences, Associate Professor, Karakalpak State University named after Berdakh
The Republic of Uzbekistan*

ABSTRACT

In this paper the defeat of vegetable and melon crops by winter moth, exclamation moths and spider mite was noted, which led to a decrease in yield. And to reduce the number of pests it is advisable to carry out the developed protective measures for the region.

KEYWORDS: *Arthropods, nature, environment, soil, desert, insects, mite, pests, entomophagous, protection, plants, climate.*

INTRODUCTION

Representatives of the Arthropoda type are incomparably richer than all other animal species, which are the most numerous in terms of species and number. They are adapted to survive in the most diverse conditions, they can be found everywhere: on plants, in soil, water bodies, in the zone of eternal snow, in sultry deserts, and each biotope is characterized by specific species. Among arthropods, the dominant species are insects and spiders.

The role of insects in nature and in human life is undoubtedly diverse and occupies a special place, contributing to the process of environmental evolution. Some insects pollinate plants, contributing to their reproduction, propagation and a large group of insects are involved in soil formation. Among them, there are also pests of fields and crops that destroy crop yields every year. Numerous species of predators and parasites, called entomophages, are involved in the extermination of pests, many of which are used in biological plant protection.

The first attempts to inventory the entomofauna of Karakalpakstan were carried out by N.A. Vorontsovsky in 1934; he registered 476 species of insects.

The study of harmful and useful insects of Central Asia was expanded by the works of V. V. Yakhontov in 1960; he conducted a study on the locust fauna of the Amu Darya delta.

In 1972, A.G. Davletshina studied harmful locusts of the Amu Darya delta, which damage cotton and other agricultural crops in Uzbekistan.

In 1989, E.Sh. Torenliyazov studied the method of control against cutworms damaging melon crops in Karakalpakstan.

In 1999, N.G. Shamuratova conducted research on integrated system of alfalfa protection in conditions of Karakalpakstan.

In 2005, Z.O. Bekbergenova, as a result of her research, obtained data on the species composition of phytophages and entomophages of cotton agrobiocenosis of the Republic of Karakalpakstan.

The development of entomological research in Karakalpakstan on the study and development of new approaches harmless to humans, the environment and means of pest control continue to this day.



MATERIALS AND METHODS

The development of arthropods is conditioned by the trophic link between animal and plant life, which actively affects their relationships. The study of their relationships in each ecosystem is a particularly important problem. This work was carried out in the farm "Ornek" on vegetable and melon crops in Nukus district of the Republic of Karakalpakstan.

The Republic of Karakalpakstan is located in extreme natural and climatic conditions. The climate is desert and sharply continental.

The region remains a zone of risky farming, but despite this the cultivation of cotton, alfalfa, corn and various types of vegetable and melon crops is practiced in the republic.

RESULTS AND DISCUSSION

According to the results of the study, it can be seen that during the growing season, for the accumulation of a complex of species composition of arthropods, the most favorable crops were vegetable crops, where insects and mites were recorded, of which 25-30 species are serious pests and 12 are active entomophages. Due to the harmfulness of these pests, annual crop losses are observed, which averages 30-40% with a sharp deterioration in product quality.

In the Republic of Karakalpakstan, melon, watermelon and pumpkin are characteristic features of crop cultivation. The fields of these crops are close to each other and most of the pests are common to them. From the beginning of seedlings germination and till the formation of leaves, several species of cutworms are serious pests of melon and watermelon. Among them, winter moth (51.2% of the total number) was dominant, where each caterpillar could destroy on average 3.0-5.1 seedlings. The second species was the exclamation moth (38.0%), its caterpillar destroyed 6.6-5.4 plant specimens, respectively.

From the second half of vegetation, spider mites appeared on melon and pumpkin crops in mid-June and early July. In 20-25 days the number of mites on these crops sharply increased and reached 50-64%, and as a result the yield decreased by 25-30 centners per hectare.

The use of entomophages, especially trichogramma at the rate of 200-300 specimens per 1 hectare of area increased the protection of seedlings from pest moths, and in late May, treatment with microbiological and chemical preparations at field borders prevented the migration of spider mites in melon crops.

CONCLUSION

According to the results of the work it was noted that infestation of vegetable and melon crops by winter and exclamation moths and spider mites leads to poor growth and yield reduction. The fields of vegetable and melon crops appear to be the most favorable sites compared to other agricultural crops for the development of pests and mites.

Therefore, to reduce the number of pests of vegetable and melon crops it is advisable to carry out the developed protective measures against pests, application of biological method in the fields of agricultural crops of Nukus district of the Republic of Karakalpakstan.

REFERENCES

1. Davletshina A.G. *Entomofagi glavneyshikh vreditel'ey Uzbekistana [Entomophages of the main pests of Uzbekistan]*. Tashkent, 1972. p. 3-110.
2. Minoransky V. A. *Zashchita oroshaemikh polevikh kultur ot vreditel'ey [Protection of irrigated field crops from pests]*. Moscow, 1989. p. 208.
3. Pirnazarov B. *Osobennosti razvitiya i vreditel'nosti sovok i puti ikh istrebleniya [Peculiarities of development and harmfulness of noctuid moths and ways of their extermination]* – *Herald of the Karakalpak Branch of the Academy of Sciences of the Republic of Uzbekistan*. №5. 1997. p. 57-58.
4. Toreniyazov E.Sh. *Optimalnie sroki primeneniya insektitsidov protiv vreditel'ey bakhchevikh kultur [Optimal terms of application of insecticides against pests of melon crops]* - *Herald of the Karakalpak Branch of the Academy of Sciences of the Republic of Uzbekistan*, No.6. 1999. p.59-60.



PLANT WORLD OF THE KYZYL KUM DESERT

Kaipov Kydyrbay Pakhretdinovich

*Doctor of Philosophy in Biological Sciences (PhD), Department of General Biology and Physiology
Karakalpak State University named after Berdakha The Republic of Uzbekistan*

ANNOTATION

The article is devoted to the peculiarities of the flora of the Kyzylkum desert. The flora of the Kyzylkum desert is diverse. Here you can find trees, shrubs, semi-shrubs, geophytes, perennial and annual grasses, among which herbaceous plants occupy more than half of the total vegetation.

KEY WORDS: *Aralkum, desert, climate, vegetation, xerophytes, psammophytes.*

The Kyzylkum Desert (from Turkic - red sands) is one of the greatest deserts in Asia, located in the interfluvium of the Amu Darya and Syr Darya rivers, on the territory of Uzbekistan, Kazakhstan and partly Turkmenistan. Occupying an area of about 300 thousand km, the desert is limited in the northeast by the Syrdarya River, in the southwest by the Amu Darya River, in the east by the spurs of the Tien Shan and Pamir-Alai (Nurata Range), in the northwest by the Aral Sea and the resulting drying up of the Aral Sea, Aralkum desert.

The Kyzylkum Desert in the northwestern part merged with the new Aralkum Desert, which includes the entire territory of the island chain from the Muynak Upland (Tokmak-ata Island) in the south to the Kulandy Peninsula in the north; these are the former islands of Lazarev, Konstantin, Vozrozhdeniya, Komsomolsky and the "banks" of Bellingshausen, Komsomolskaya and Beninga. Previously, the ridge divided the Greater Aral into two basins: Western and Eastern. The united territory is now conventionally called the Renaissance Peninsula. Together with the drained part of the seabed within the territory of Uzbekistan - an area, according to various sources, of over 3 million hectares represents the Aralkum desert.

The Kyzylkum Desert is a plain with a general slope to the northwest (height from 300 m in the southeast to 53 m in the northwest); has a number of extensive closed depressions and isolated strongly dissected remnant mountains - Bukantau (764 m), Kuldzhuktau (up to 785 m high), Tamdytau (up to 972 m high), etc. Most of the desert is occupied by sand massifs formed by sands semi-fixed by vegetation, but there are also massifs of pure sand dunes. The most common are sandy ridges with a meridional orientation. The relative height of the ridges is from 3 to 30 m, the maximum is up to 75 m. There are many takyrs and salt marshes in the northwest of the desert.

The climate in Kyzylkum is sharply continental. Summer is hot, the average temperature in July is from 26 to 29 °C, (maximum - 51 °C), in January from 0 to -9 °C. Precipitation 100-200 mm per year; fall mainly in winter and spring. There is not a single surface watercourse throughout the entire territory (except for the drying up Zhanadarya River), but there are rich reserves of fresh pressurized groundwater.

The flora of the Kyzylkum desert is diverse. Here you can find trees, shrubs, subshrubs, geophytes (bulbous and tuberous plants), perennial and annual herbs.

The sparse vegetation cover of sandy deserts is formed by psammophyte grasses (i.e., adapted to life in shifting sands). Among them are the seline grass (*Aristida*), shrub zhuzgun (*Calligonum*), tree and shrub saxaul (white and black), semi-shrub wormwood (white, Turanian, etc.). There are also loose sands devoid of vegetation, but there are relatively few of them. Desert plants are well adapted to prolonged drought, overheating, mobile or saline and always poor soils. Adaptations such as leaflessness, which reduces evaporation (saxaul, zhuzgun, etc.), rapid rooting, and hibernation during heat (bulbous and tuberous plants), are widespread. Their fauna was formed in full accordance with the ecological characteristics of deserts.

The vegetation of the dried bottom of the Aral Sea is characterized by a small number of species. Only a small part of the drained part of the bottom of the Aral Sea is occupied by sparse desert vegetation. The basis of the vegetation is made up of biyurgun-keireuk complexes.



Black saxaul, kuyandyk, kandym, and feather grass are found in the Kyzylkum sands. However, a significant part of the Aralkum is represented by wet salt marshes on the site of former bays, as well as sandy-clayey salt marshes. This area is devoid of vegetation and animals. The surface is armored with powerful salt crusts up to 5 cm thick.

In Kyzylkum, about 700 species grow from the wild flora of Karakalpakstan (a little over a thousand species). They are represented by typical desert life forms. More than half of them are herbaceous plants (representatives of the families Chenopodiaceae, Buckwheat and Compositae), slightly less than a quarter of the species are shrubs, and the rest are subshrubs and subshrubs.

The predominance of sandy areas in the Kyzylkum desert determines the noticeable development of psammophytes and xerophytes in the flora. Moreover, the vegetation of sandy deserts is the richest compared to other types of deserts and is very adapted for existence on a loose, moving substrate. Thus, psammophytes have the ability to enhance shoot formation and rapid growth when covered with sand. And the protection of some of the roots exposed when sand is blown out is provided by cork tissue developing on the roots, or by caps made of grains of sand stuck together around the root.

Plant seeds are also adapted to desert conditions. The spherical kandym fruits have dense bristles. These spherical fruits are rolled by the wind, causing the seeds to spread. The fruits of saxaul, boyalych, and cherkez have outgrowths and wings. Thanks to them, the wind carries flying seeds far. A special group of desert plants; ephemerals are annual herbaceous plants that complete their development in a very short wet period of spring, and ephemeroïds are perennial herbs that bloom in the spring, and in the summer the above-ground part dies off, leaving only underground rhizomes, bulbs and tubers.

A special type of adaptation occurs in plants of saline deserts - halophytes: fleshy organs and a slow type of development.

Thus, the flora of the Kyzylkum desert is represented by typical desert life forms and more than half of them are herbaceous plants, less than a quarter of the species are shrubs, the rest are subshrubs and subshrubs.

LITERATURE

1. *Museum of Ecology on the shores of the Aral Sea* // <https://agroturizm.uz/>
2. *Kyzylkum Desert* // <https://www.apta.eduris.uz/>
3. *Flora of Uzbekistan* // <http://www.orient-tracking.com/>
4. *Republic of Karakalpakstan* // <https://invest.gov.uz/>
5. *Flora and fauna of Karakalpakstan, the originality of the nature of Karakalpakstan* // <https://fayllar.org/>
6. *Flora* // <https://karakalpakstan.travel/f>
7. *Shomurodov Kh.F., Khasanov F.O. Forage plants of the Kyzylkum Desert // Arid ecosystems, 2014, volume 20, no. 3 (60), p. 94-101*



UDC 591.5

BEHAVIORAL FEATURES OF BUKHARA DEER (*Cervus Elaphus Bactrianus*) DURING THE RUT

Dosnazarova Umit¹, Kidirbaeva Arzygul Yuldashevna²

¹Basic Doctoral Student (PhD), Department of General Biology and Physiology

²Doctor of Philosophy in Biological Sciences (PhD), Associate Professor,

Department of Ecology and Soil Science,

Karakalpak State University named after. Berdakha, The Republic of Uzbekistan

ANNOTATION

The article discusses the behavioral characteristics of the Bukhara deer during the rut. Bukhara deer is one of the subspecies of red deer, adapted to living in desert conditions. It belongs to the deer family, artiodactyl order. Bukhara deer are characterized by an order of alternation between the rutting and molting periods that is not typical for other subspecies, the formation of true currents, specific characteristics of acoustic signals, etc.

KEY WORDS: signal, roar, subspecies, squad, harem, cry, mating season, mating group.

Bukhara or tugai deer (*Cervus elaphus bactrianus*) is a subspecies of red deer that lives in Central Asia. Bukhara deer is one of the subspecies of red deer, adapted to living in desert conditions. It belongs to the deer family, artiodactyl order.

The body height of the Bukhara deer is 120 cm at the withers. Branched antlers adorn male deer only until spring (March-April). The length of the horns reaches 110 cm, with 5 branches. Females are hornless. The body weight of deer is about 200 kg. The body color is light ash with a brownish-yellow-gray tint; brighter in summer than in winter. The legs are much lighter than the main color. The spot under the tail, called the "Mirror", is reddish in its upper part and white below. Newborn fawns are light in color, with scattered small round spots on their sides. The height of babies is up to 60 cm at the withers. The body weight of newborns is about 9 kg [2].

The main habitats of the Bukhara deer are reed thickets and tugai forests located in the floodplains of desert rivers. Sometimes deer enter the saxaul thickets along the outskirts of the Kyzylkum desert. A prerequisite for the habitat of tugai deer is the presence of watering places. It turned out in the course of many years of research that Bukhara deer are characterized not only by specific morphology, but also by behavior, communication, certain physiological characteristics, in particular, the order of alternation of the rutting and molting periods, which is not typical for other subspecies, the formation of real currents, not typical for other subspecies, specific characteristics of acoustic signals, etc. This specificity of the Bukhara deer makes its preservation and restoration in its natural habitat especially important [5].

In Bukhara deer, sexual maturity occurs at the age of 1.5-2.5 years. In ungulates, the rut begins in the fall and lasts from August to mid-October. During the mating season, male Bukhara deer emit loud calls that can be heard at a distance of several kilometers. These screams are usually called roars. It is believed that mating calls stimulate the development of estrus in females and make it easier for them to find males. There is also an opinion that the roar reduces the number of fights between males, replacing them with a demonstration of the strength of rivals through acoustic rituals. The sound activity of deer during the mating season confirms that this form of behavior is under hormonal control. Males roar at dawn, which is how they announce the beginning of the mating season. The roar lasts about a month, but the massive roar usually lasts 5-10 days [4].

The roar of deer occurs in September, when the male collects harems of 2-3, less often 4-5 females. At this time, males demonstrate their strength by butting bushes and trees with their horns, rolling around in mud "baths," "picking" the ground with their horns and hooves, fighting with other males, and courting females. And most importantly, the dominant male roars loudly. The roar of deer is a series of abrupt and hoarse sounds, turning into a low and drawn-out moo. The early or late periods of roaring of the Bukhara deer depend on the weather and food conditions, as well as the fatness of the males [1].



During the rut, adult males (4-5 years old) lose caution, begin to intensively pursue females and often roar. During the rutting period, fights between males are possible, thanks to which the animals establish primacy. The first stage - male rivals roar at each other, the males who roar longer and deeper are the strongest. These roaring duels can last for several hours, an indication of how strong the opponent is. There is no point in the male continuing to fight if it is obvious that he is weaker than the dominant animal. If after the first stage the winner is not determined, then the males will fight with their horns. The rivals clash their horns, trying to knock each other down. Weaker males quickly leave the battlefield. Fights extremely rarely end tragically, although there have been cases when males broke their horns, or were so intertwined with them that they could not disentangle themselves and simply died of hunger. Among the males there are hornless individuals - they do not participate in fights, but try to quietly get into someone else's harem [3].

As a rule, the herd of Bukhara deer is headed by an old, experienced female. At the same time, the herd contains offspring of different ages, and their number is at least 6 individuals. With the onset of autumn, the mating season of ungulates begins and the herd breaks up. At the beginning of the mating season, females stay in groups separately from males. During the rutting season, males invade groups of females, thus forming harems. Under normal conditions, at least ten deer of different sexes and ages are involved in the mating season, implementing mating behavior over an area of 10-15 km². In this territory, there is a center of social activity - a lek, where mating groups are formed. Here you can record traces of deer activity, for example, scratches in trees, areas of dislodged earth [4].

In Bukhara deer, during the rutting period, a territorial distribution is clearly established among males, subordinate to the hierarchical structure of the herd. The establishment of such hierarchical structures sometimes leads to the cessation of fighting. They can be replaced by ritual movements of ungulates, where it is possible to save strength in the dominant and subordinate deer.

Thus, the behavioral characteristics of Bukhara deer during the rut are characterized by mating calls, the formation of a lek, the formation of mating groups and harems, as well as the establishment of territorial distributions subordinate to the hierarchical structure of the herd.

LITERATURE

1. Amirov Z.G. State of the population of Bukhara deer (*Cervus elaphus bactrianus lydekker*, 1900) in Tajikistan // Reports of the Academy of Sciences of the Republic of Tajikistan 2012, volume 55, No. 10 P.827-832
2. Berdambetova B.P. Bioecological features of the Bukhara deer (*Cervus elaphus bactrianus*) in the conditions of the Southern Arlie region // Theory and practice of modern science" No. 6(72) 2021 P.62-64.
3. Red deer // <https://ru.wikipedia.org/>
4. Nikolsky A.A. Sound signals of mammals in the evolutionary process. - M.: Nauka, 1984
5. Seitvelieva S.S., Daminov A.S. Parasitological aspects influencing the increase in the Bukhara deer population // Problems of biology and medicine 2023, No. 3.1 (145). - P. 358-362



UDC 591.5

STUDYING THE POPULATION DYNAMICS OF BACKGROUND SPECIES OF SMALL MAMMALS IN TECHNOGENIC POLLUTION ZONES OF THE SOUTH ARAL REGION

Bekmuratova Dilaram¹, Mambetullaeva Svetlana Mirzamuratovna²

¹*Basic Doctoral Student (PhD), Karakalpak State University named after Berdakh*

²*Doctor of Biological Sciences, Professor, Karakalpak Research Institute
Natural Sciences of the Academy of Sciences of the Republic of Uzbekistan*

ABSTRACT

The article provides the results of research on the assessment of environmental parameters of small mammals in the conditions of technogenic influences in the territory of the Prearalye. In the conditions of the technogenic landscape of the sanitary protection zone of the Kungrad soda plant, the community of small mammals are characterized by a decrease in the abundance of species by an average of 18%.

KEYWORDS: *populations, small mammals, technogenic influences, environmental parameters, communities, diversity.*

One of the central problems of modern ecology is the discovery of the mechanisms of adaptation of animals to certain environmental conditions. The relevance, first of all, is determined by the need to further develop the issue of the mechanisms of the evolutionary process and the factors influencing them, as well as the development of the scientific basis of the modern approach to the problem of nature conservation and rational environmental management in the conditions of anthropogenic impacts on individual species and their communities. Study of the population of background species of small mammals in zones of technogenic pollution in the Southern Aral Sea region to identify changes in a set of population and morphophysiological parameters, as well as the possibility of using them for practical solutions to biomonitoring problems.

Of particular importance is the study of the structure and dynamics of animal communities under conditions of anthropogenic impacts on individual species and their communities. Of great interest is the study of the fauna of anthropogenic and technogenic contaminated areas. In connection with the increase in anthropogenic and technogenic pollution of the environment by emissions from industrial enterprises, there is a need to conduct environmental diagnostics of the state of natural systems located in a given territory and assess the impact of industrial emissions on these systems.

Studies of individual consequences of the influence of industrial emissions on the living conditions of mammals in a natural environment polluted by pollutants make it possible to determine the degree of significance of adaptive processes.

Traditionally, there is an opinion that technogenic impacts always have negative consequences for the functioning of ecosystems and their productivity. Examination of territories disturbed at different times by economic activities allows us to identify natural analogues of exogenous factors and shows the specificity of emerging ecosystems, characterized by high species diversity, features of successional cycles, productivity and a special landscape structure. The problem of anthropogenic transformation of the natural environment remains insufficiently studied and therefore relevant, especially in the example of the regional impacts of various types of disturbances.

The work is based on the results of studies conducted in 2018–2022. on the technogenic territory of the sanitary protection (impact) zone of the Kungrad Soda Plant (KSZ) and control (background) areas located in the Kungrad region of the Republic of Karakalpakstan.



The most significant indicator of technogenic impacts is the expansion of the area of moving sands and surfaces devoid of vegetation (the vicinity of the territory of the Kungrad soda plant). The Kungrad Soda Plant (KSZ) is the only large enterprise in Central Asia that produces soda ash (Fig. 1).

Relative counts of small mammals were carried out in several areas remote from the territory of the KSZ:

- at a distance of 1 and 2 km southeast of KSZ;
- at a distance of 2 and 4 km northwest of KSZ.



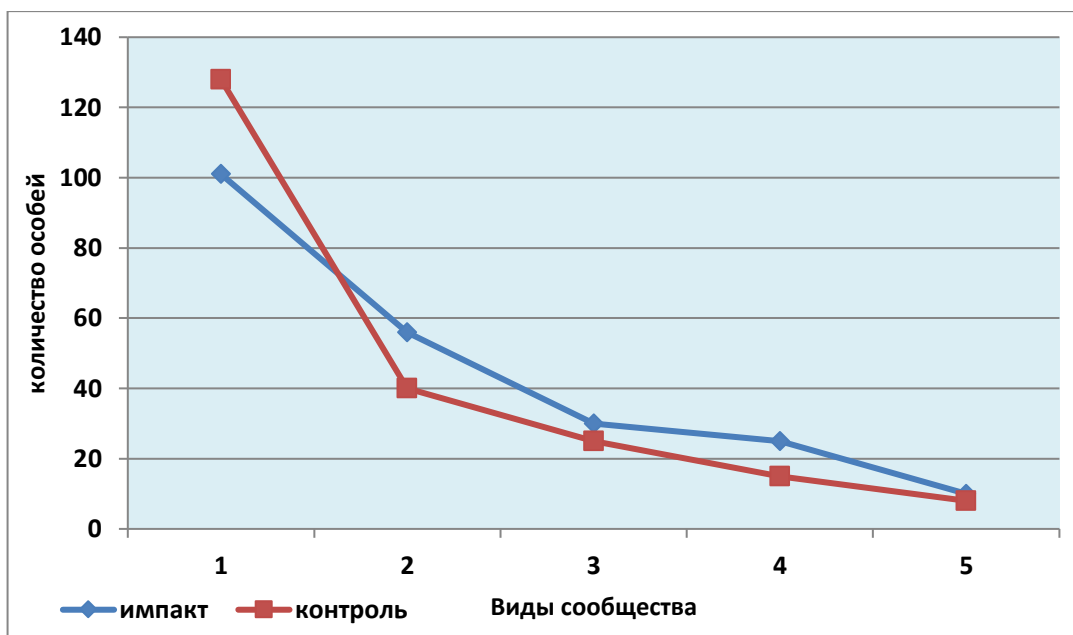
Rice. 1. Transformation of the ecosystem on the territory of the Kungrad soda plant (2022)

The Kungrad Soda Plant is the only large enterprise in Central Asia producing soda ash. According to the Decree of the President of the Republic, Uzbekistan “On measures to further reform and increase the investment attractiveness of the chemical industry” dated April 3, 2019, 51 percent of the authorized capital of Kungrad Soda Plant LLC was sold to a foreign investor. As a result, the production scale has expanded, the economic condition of the enterprise has improved, which contributes to a further improvement in product quality. The plant's unique production technology consists of several complex stages. The main raw material is lake salt, extracted from the Barsakelmes mine, located on the Ustyurt plateau. The limestone used in production is also of high quality.

Currently, the plant annually produces 200 thousand tons of soda. The product is used as the main chemical additive in the production of glass, detergents, non-ferrous metallurgy, light industry, and water treatment.

Recreational load leads to disruption of soil and living ground cover [4]. The transformations of phytocenoses occurring in ecosystems should certainly influence faunal complexes, and, in particular, micromammal communities. A number of authoritative authors [9, 11] recommends the use of small mammals as model objects in assessing the genetic and morphophysiological danger to the population of areas contaminated with mutagens.

Small mammals, due to their high numbers, species diversity and ecological lability, exhibit clear responses to natural and anthropogenic changes [1], so it is quite reasonable to use them in determining and assessing changes that occur naturally in natural communities. Analysis of communities of small mammals in technogenic and background territories shows that the species composition and number of individuals of individual species in the compared territories differ. The features of the community structure of the impact and background territories are very well demonstrated by the dynamics of dominance-diversity (Fig. 2).



Rice. 2. Dynamics of dominance – diversity of small mammals in technogenic and control territories

The curve of the importance of species in animal communities of technogenic zones reflects the superdominance of species such as *Mus musculus* and *Citellus fulvus*, as well as the low abundance of other species. Such a community is subdominant. The significance curve of species in the background area is more leveled, which shows the polydominance of natural communities. In this case, in addition to the dominance of *Mus musculus* and *Citellus fulvus*, *Rhombomys opimus* is also co-dominant. Consequently, the success of the existence of species in these communities is limited by a fewer number of factors compared to communities in impact areas. In the impact zone, a complex of technogenic limiting factors is added.

The sanitary protection zone of the KSP (Kungrad Soda Plant) is a heterogeneous environment, most of which is occupied by fallow fields and wastelands, and occasionally by agricultural crops. The spatial distribution of small mammals is characterized by extreme unevenness and an increased degree of aggregation [5]. The optimal habitats for most species of micromammals are intrazonal biotypes, floodplains and “green” belts, where they find the most favorable microclimatic conditions.

The distribution of species in the communities of micromammals within the village boundaries was radically different from those in the desert. Inside settlements, *Mus musculus* dominated in all areas, making up about 57% in the general community, and about 80% in the “green” zones. The second most abundant species in the demutating ecosystem was the population of *Rhombomys opimus*, (just over 18%), followed by *Citellus fulvus* (about 11%) [6].

To study the reaction of the organism of small mammals to changes in environmental factors, we used the method of morphophysiological indicators (Schwartz et al., 1968). This method is very widely used in practical ecology and bioindication to determine the possible effects of environmental conditions on the body.

The distribution of species in the communities of micromammals within the village boundaries was radically different from those in the desert. Inside settlements, *Mus musculus* dominated in all areas, making up about 57% in the general community, and about 80% in the “green” zones. The second most abundant species in the demutating ecosystem was the population of *Rhombomys opimus*, (just over 18%), followed by *Citellus fulvus* (about 11%) [6].

Dominance in desert and semi-desert ecosystems in terms of species composition and values occupied an intermediate position between desert and intra-village communities. On the first transects, closest to the development, *Mus musculus* dominated everywhere.

Thus, based on all of the above, we can conclude that despite the effect of increased anxiety present on the first lines of all sites [5, 7], this does not always entail the almost complete disappearance of desert species, a noticeable dominance of *Citellus fulvus* and, as a consequence, a decrease in the diversity of communities.



There is an opinion [7] that species diversity in communities exposed to stress decreases, however, as follows from our results, this does not always happen. In some cases, the increased diversity of communities in frontiers that are more susceptible to anthropogenic impact appears to be a result of their ecotonic nature. The penetration of hemi-synanthropes into the vicinity of the city led to an increase in the number of animal species living there [8].

The analysis made it possible to establish that the different nature of the response to the consequences of natural catastrophic impacts indicates a decrease in the population size of *Meriones erythrouros* and *Citellus fulvus* during the middle stages of restoration succession and, on the contrary, an increase in the abundance of *Mus musculus* and *Allactaga elator* populations. Because of the natural transformation of the microhabitat environment, conditions are created that meet the ecological requirements of species that were not numerous before natural catastrophic impacts.

The species spectrum and population density of rodents within demutating landscapes depend on the intensity of the impact of these factors and the level of environmental pollution (Reimov, 2000). During the indicated period, the house mouse and red-tailed gerbil were recorded in the demutating ecosystems. Among them, the house mouse occupies a dominant position (9.8% incidence). Of the elements of the anthropogenic microrelief, the most important ecological significance for rodents is the open collector-drainage network. These structures are the main habitats and reserves for 5 species of rodents: house mouse, lamellar rat, and occasionally, red-tailed gerbil.

Sewer embankments and dams that have loose soil are preferred burrowing sites for lamellar-toothed rats.

The residential landscape of the desert-plain zone is represented by settlements and livestock complexes. Settlements and livestock farms are inhabited by 3 types of rodents: the house mouse, the plate-toothed rat, and the gray hamster. They mainly inhabit household plots and stacks in fields, occasionally found in storerooms (2.2% of hits). High house mouse density in the period 2019-2022. was noted in residential buildings, cowsheds, outbuildings (66.4% of the total catch), and the maximum number of house mice and plate-toothed rats was in livestock complexes (up to 48% of the catch). Currently, in the dissolving ecosystems of the Southern Aral Sea region, xerophytization of the territory of settlements is observed due to the drainage of canals and other excessively moist places, and the desolation of the once developed system of ditches and canals. Concreting the beds of canals and irrigation ditches flowing through regional settlements violates the ecological integrity of the waterways of villages, farms in cities and district territories, which leads to isolation and degradation of its individual elements.

Thus, in the conditions of the technogenic landscape of the sanitary protection zone of the KSP, communities of small mammals are characterized by a decrease in the abundance of species by an average of 18%. Under the conditions of technogenic pressure, monodominant communities are formed with a predominance of a single species – *Mus musculus*, which has the greatest plasticity and resistance to technogenic factors. Despite the effect of increased anxiety present in the first lines of all sites, this does not always entail the almost complete disappearance of forest micromammal species, a noticeable dominance of *Mus musculus*, and, as a consequence, a decrease in the diversity of communities. The ecotone conditions of the “green” zone created additional conditions for greater species diversity of the lower layers of vegetation and, accordingly, communities of small mammals, which is consistent with the general provisions on ecotones.

LITERATURE

1. Bezel B.C. *Population ecotoxication of mammals*. M.: Nauka, 1987.
2. Bolshakov V.N., Vasiliev A.G., Sharova L.P. *Fauna and population ecology of shrews of the Urals (Mammalia Soricidae)*. Ekaterinburg: Publishing house "Ekaterinburg", 1996.
3. Dzuev R.I., Ezdekova N.Z. *House mouse (Mus musculus) as an indicator of environmental conditions*. // Abstract. conf. Current environmental issues and protection of ecosystems in the southern regions of Russia and adjacent territories. Krasnodar, 2007.
4. Ivanter E.V. *Population ecology of small mammals in the taiga north-west of the USSR*. - Leningrad. - Publishing house Nauka. - 1975. - 246 p.
5. Kataev L.D. *The influence of a changed environment on the state of small mammals of the Northern taiga // The influence of anthropogenic transformation of the landscape on the population of terrestrial vertebrates*. - Part 2. - M.: All-Union Theriological Society of the USSR Academy of Sciences. - 1987. - P. 89 - 90.
6. Lukyanova L.E., Lukyanov O.A. *Response of communities and populations of small mammals to technogenic impacts // Advances in modern biology*. - 1998. - T. 118. - Issue. 5.6. - pp. 613-622, 693-706.
7. *Resolution of the President of the Republic of Uzbekistan "On measures to further reform and increase the investment attractiveness of the chemical industry" dated April 3, 2019*
8. Reimov R.R. *Rodents of the Southern Aral Sea region*. - Tashkent. - FAN. - 1987. - 125 p.
9. Khulamkhanova M.M., Khaidukova O.B., Bittirova Zh.A. *Study of the structure and dynamics of the population of background species of small mammals in zones of technogenic pollution in the Central Caucasus // NovaInfo*, 2021. - No. 123. - P. 5-8.
10. Shwarts S.S. *Biology of shrews of the forest-steppe Trans-Urals*. // Zool. zhurn., 1995.



11. Shadrina E.G., Volpert Ya.L. Reaction of small mammal populations to stressors of natural and anthropogenic origin / *Science and Education*. - 2004. - No. 2. - P. 38-46.
12. Burton M.A. S. *Biological monitoring of environmental contaminants (Plant)*. London: MARC, 1989.
13. Corbet C.B. *An aberrant specimen of araneus from Cironde, France - Mammalia*, 2015
14. Holling C.S. *Resilience and stability of ecological systems // Ann. Rev. Ecol. Syst.*, 2000.



UDC 579

SCREENING AND STUDYING THE DESTRUCTIVE ACTIVITY OF PERSISTENT ORGANOCHLORINE PESTICIDES

Bazarbaeva Dina Erkinovna

Doctor of Philosophy in Biological Sciences (PhD), Nukus branch of Samarkand State University of Veterinary Medicine, Animal Husbandry and Biotechnology, The Republic of Uzbekistan

ANNOTATION

Screening of bacterial strains isolated from soils contaminated with organochlorine pesticides was carried out. Bacterial strains have been identified that are capable of growth on a mineral medium with organochlorine pesticides - the γ -isomer of hexachlorocyclohexane and dichlorodiphenyltrichloroethane as the only carbon source. The processes of hexachlorocyclohexane degradation by monocultures and associations of isolated bacterial strains were studied. A monoculture of bacterial strains and a consortium created on the basis of the four most active strains are capable of destroying hexachlorocyclohexane when contained in a nutrient medium at a concentration of 100 $\mu\text{g/ml}$. It was shown that monocultures of four bacterial strains almost completely degraded hexachlorocyclohexane within one month. The consortium of destructor strains contributed to a decrease in the initial concentration of the drug from 100 μg to 45.55 μg in 12 days. The species identity of the active strains of destructor bacteria was determined.

KEYWORDS: *pesticides, bacteria, hexachlorocyclohexane, lindane, dichlorodiphenyltrichloroethane, destruction.*

RELEVANCE

The world scientific literature has accumulated numerous data on the negative consequences of using pesticides [6, 8]. It should be noted that pesticides are used to protect plants and animals from pests and diseases, despite the fact that they are one of the leading chemical compounds in terms of their harmful effects. Scientists especially note the role of organochlorine pesticides in the biosphere [2, 11].

Based on the results of a study by a number of scientists, the general pattern of migration of pesticides from sources of pollution into the environment through water and the atmosphere has been clarified [3, 10]. By contaminating drinking water, crop and livestock products, they enter the human body, which is very dangerous for human health.

In world literature and practice, soil microbiological degradation of persistent compounds is recognized as one of the most promising [1,4,5,7]. Methods are being developed to clean natural objects from pesticides by microbiological means [9].

In the Republic of Uzbekistan, special attention is paid to the development and implementation of measures in the field of conservation and sustainable development of biodiversity, and in this regard, certain results are being achieved in the detection of soil degrading bacteria for cleaning soil contaminated with organochlorine pesticides. For this reason, determining the degree of degradation of organochlorine pesticides under the influence of degrading bacteria in soils and developing the effectiveness of biological soil restoration is of great practical importance. In particular, the isolation of active pesticide degrading microorganisms from the soil, the identification of degrading microorganisms that are resistant to extreme temperatures, salinity, high and low pH values, increasing the degree and rate of decomposition of pesticides by microorganisms, the creation of biological products that decompose pesticides based on various taxonomic groups of microorganisms are promising.

The purpose of this work is to search for and screen strains of soil bacteria that actively degrade the organochlorine pesticide hexachlorocyclohexane.

MATERIALS AND METHODS OF RESEARCH

A model site located in the village of Kyzyluy, Kegeyli district of the Republic of Karakalpakstan, was selected as the object of study. The model site includes a former pesticide storage site and nearby cultivated fields. The search for destructive bacteria was



carried out in saline soil, contaminated for a long time with organochlorine pesticides. When conducting the study, microbiological, chemical, chromatographic, radiological and statistical methods were used.

RESEARCH RESULTS AND DISCUSSION

According to the data obtained, the soils of the model area are saline and have a neutral or slightly alkaline reaction. The degree of soil salinity in cotton and rice fields was 0.8 and 1.2%, respectively. The soil of the contaminated area contained about 3% salt, while in the halophytic substrate the salt content reached a maximum value of 3-4%. Analysis of the chemical properties of the studied soils showed that the model site was characterized by a low humus content. The lowest amount of humus was observed in the halophytic area (0.1%), a relatively higher content of humus was observed in the rice field (1.4%). The data obtained indicate that long-term pollution with pesticides and soil salinity has led to a decrease in humus content.

Currently, a large amount of pesticides is still concentrated on the territory of former agricultural airfields, pesticide warehouses and poison burial grounds. Without a doubt, pesticides migrate from these areas with wind and groundwater, which leads to their contamination of nearby soil and water bodies. In this regard, the level of contamination of soils and bottom sediments of the model site with residual quantities of pesticides was determined.

The results obtained indicate a high concentration of organochlorine pesticides in the study area; their content accounted for 90% of the total volume of detected pesticides. Among them, persistent organochlorine insecticides predominated, namely dichlorodiphenyltrichloroethane (DDT) and hexachlorocyclohexane (HCH) and their derivatives.

Thus, the continued detection of organochlorine pesticide residues in the environment of the Republic of Karakalpakstan does not eliminate the problem of contamination of natural substrates with persistent organochlorine pesticides, such as DDT and HCH, despite the cessation of their use. The data obtained indicate the need for constant monitoring of the state of the environment.

In the environment of Karakalpakstan for decades, the most frequently detected pesticide was HCH. The toxicity of HCH is determined by the γ -isomer - lindane, which is effective in agriculture as an insecticide.

The search and isolation of HCH degrading bacteria were carried out in soil contaminated with pesticides for a long time. From HCH-contaminated soil areas, 10 indigenous cultures of microorganisms were isolated by direct seeding on meat-extract agar containing HCH at a concentration of 100 mg/l, which differed from each other in a set of cultural characteristics. The selected cultures were conventionally numbered from 1 to 10.

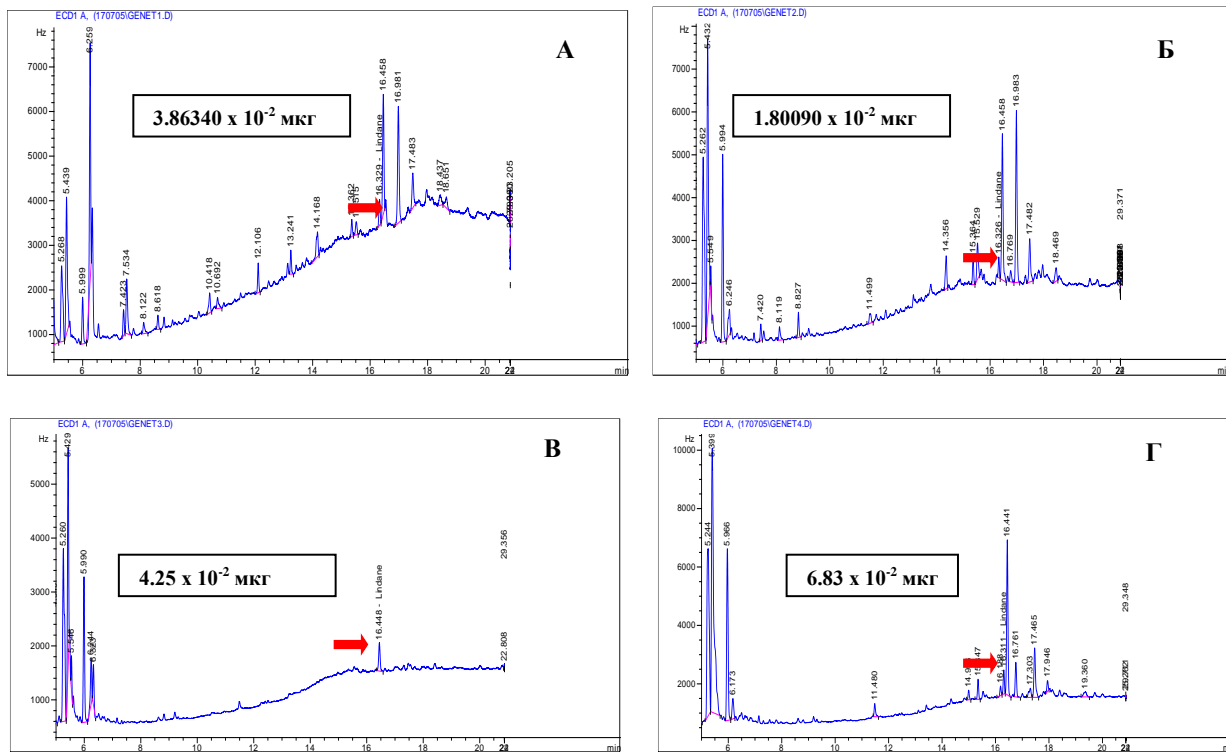
All isolated cultures of microorganisms were tested for the ability to use lindane as the sole carbon source by sown on synthetic M-9 medium with the addition of lindane at a concentration of 20 $\mu\text{g/ml}$. The research results showed that on the synthetic medium, on the 3rd day of the experiment, growth was observed in three cultures No. 2, 7 and 9. On the 5th day, growth was observed in the remaining cultures No. 3, 4, 5, 6, 8 and 10, except for culture No. 1, the growth of which was not recorded during the month.

It is known that microorganisms successfully degrade compounds that are closer in chemical structure. In this regard, it was advisable to study the effect of the organochlorine insecticide DDT on the growth of the test crops, since the most detected pesticide in the model area was DDT and its metabolites.

Experiments conducted to study the ability of crops to grow on a mineral medium with DDT at a concentration of 20 $\mu\text{g/ml}$ showed that 72 hours after sowing, growth of cultures No. 5, 6 and 7 was observed. On the 5th day, growth of cultures No. 3 and 4 was recorded on the 7th day of cultivation; the growth of cultures No. 2 and 10 was detected. During the experiment, the development of cultures No. 1, 8 and 9 on a synthetic medium with DDT was not observed.

Thus, the results obtained indicate that the growth of cultures numbered 2, 3, 4, 5, 6, 7 and 10 on a synthetic medium in the presence of both γ -HCH and DDT as the sole source of nutrition implies their ability to assimilate and transform these compounds without additional organic substrate. Apparently, the studied crops, isolated from a site heavily contaminated with pesticides, acquired resistance to chemical compounds, in this case hexachlorocyclohexane and DDT.

Microbiological destruction of HCH by pure bacterial cultures. At the next stage of research, the degradative activity of the isolated crops was studied. Chromatographic analysis of the study showed (Fig. 1) that out of ten cultures, only four caused active destruction of lindane in the nutrient medium. By the end of the first month, this pesticide was almost completely degraded by culture No. 4, 5, 7 and 10 at its initial concentration in the medium of 100 $\mu\text{g/mg}$. The destructive activity of the remaining crops (cultures No. 1, 2, 3, 6, 8 and 9) was low



Rice. 1. Chromatographic analysis of the destruction of lindane in the nutrient medium of cultures 4 (A), 5 (B), 7 (C) and 10 (D)

It is known that in nature microorganisms occur in associations and their combined activity can lead to complete mineralization of any organic compounds, while the population of one type of microorganism is not always capable of such destruction. We conducted a study to determine the ability of mixed bacterial cultures to actively degrade lindane in a nutrient medium. For this purpose, a method was used that made it possible to evaluate the distribution of the radioactive label between the culture liquid and bacterial cells.

As can be seen from Table 1, the association of the studied crops had high destructive activity towards lindane, as indicated by the percentage of remaining radioactivity.

**Table 1
Content of tritium-labeled lindane in bacterial cells and culture fluid**

	Bacteria	Culture medium	Total remaining radioactivity, count 100 µl, pulse/10 sec (% of injected radioactivity)
	count 100 µl, pulse/10 sec (% of remaining radioactivity)		
Control	-	17872	17872 (100%)
Association of Cultures	2180 (26,78%)	5960 (73,22%)	8140 (45,55%)

The data obtained showed that by the end of the 12th day of incubation there was a decrease in the initial concentration of tritium-labeled lindane from 100 µg to 45.55 µg. Of these, 26.78% of the radioactive label was found in bacterial cells, which indicates partial sorption by the surface structures of the cells of the studied cultures. The presence of most of the tritium label - 73.22% in the supernatant allowed us to conclude that the destruction of lindane mainly occurred through the extracellular route. At that time, in the control variant, no loss of radioactive label was observed, as evidenced by the 100% detection of radioactivity in the culture fluid.

Determination of the species of destructor bacteria. For further studies, cultures of destructor bacteria numbered 4, 5, 7 and 10 were selected. The identification of the studied bacteria was carried out on the basis of classical and modern studies. As a result, it was established that culture 4, 5 and 7 belong to the genus *Bacillus*, species *Bacillus subtilis*, culture 10 belongs to the genus *Micrococcus*, species *Micrococcus roseus*.



Lindane degradation in soil. The next stage of our research was to determine the destructive activity of selected monocultures of *B. subtilis* 4 and *M. roseus* 10 and their association in soil samples artificially contaminated with lindane under laboratory conditions. The initial amount of lindane in soil samples was 14.50 µg/g.

In soil samples with an inoculated culture of *B. subtilis* 4, after a month, a decrease in the concentration of lindane was noted from 14.50 to 8.37 µg/ml, which is 41.9% of the initial concentration of the drug. Monitoring the state of lindane in the soil with the addition of *M. roseus* 10 over the same period of time showed a decrease in the concentration of the drug to 5.67 µg/ml from the initial concentration, that is, 60.6% of the drug was destroyed.

Subsequently, we studied the degradation of lindane by a consortium of bacteria *B. subtilis* 4 and *M. roseus* 10. As a result, it was revealed that the destruction of lindane by an association of cultures is significantly higher than when using pure destructor cultures. These studies showed that the association of the test crops made it possible to reduce the lindane content in the soil from 14.50 µg/ml to 0.08 µg/ml in a month. Consequently, within thirty days, the percentage of lindane destruction in soil with a mixed crop - *B. subtilis* 4 and *M. roseus* 10 was almost 100%.

Analysis of the destructive activity of the tested cultures indicates that at the end of the test period, in samples with the inoculated culture of *B. subtilis* 4, the amount of lindane is 57.8%, and in the case of the culture of *M. roseus* 10 - 39.4%. The introduction of an association of cultures *B. subtilis* 4 and *M. roseus* 10 showed an increase in the degree of destruction of lindane, which amounted to 99.4%.

Thus, the study showed that lindane was effectively utilized by the cultures of *B. subtilis* 4 and *M. roseus* 10 in soils under laboratory conditions, and the use of their association would significantly increase the degree of destruction of the pesticide HCH in soil under field conditions.

Based on the conducted research, the following conclusions are presented:

1. Bacterial strains isolated from soil contaminated with organochlorine pesticides were screened for destructive activity towards hexachlorocyclohexane. Cultures No. 4, 5, 7, and 10 showed high destructive activity towards the γ -isomer of HCH in the nutrient medium, both as monocultures and in association.
2. To study taxonomic affiliation, 4 crops were selected based on the study of destructive activity. The results of the study of the phenotypic properties of culture No. 4, 5 and 7 were attributed to the species *Bacillus subtilis*, culture No. 10 to the species *Micrococcus roseus*.
3. Based on the synergy between the cultures of *B. subtilis* 4 and *M. roseus* 10, an association of these cultures was created for the destruction of organochlorine pesticides. Laboratory experiments have shown that this bacterial association has high HCH-destructive activity in saline soil. It was revealed that on the 30th day of the experiment, the destruction of lindane by the monoculture of *B. subtilis* 4 was 42%, by the monoculture of *M. roseus* 10 - 59%, while by the association of 2 degrading bacteria it was 92%.
4. Selected active destructor cultures *B. subtilis* 4 and *M. roseus* 10 are recommended to be used to create a new biological product for cleaning soils contaminated with hexachlorocyclohexane under salinity conditions.

LITERATURE

1. Berezin G.I., Kondakova L.V., Domracheva L.I., Dabakh E.V. Features of microbial groups of soils in the area of the Kilmez burial site for pesticides (Kirov region) // *Principles of Ecology*. - 2016. - No. 2. - P. 4-15.
2. Volgina T.N., Novikov V.T., Reguzova D.V. Paths of distribution of pesticides in environmental objects / *Regional problems*. 2010. - Volume 13, No. 1. - P. 76-81.
3. Galiulin R.V., Bashkin V.N., Galiulina R.A. Agrogeochemistry of persistent pesticides // *Bulletin of the Russian Academy of Sciences*, 2015. - T. 85, No. 2, - P. 152-154.
4. Demidenko G.A., Fomina N.V. Assessment of the influence of herbicides on soil microflora // *Bulletin of Kras State Agrarian University*. - 2013. - No. 8. - P.49-55.
5. Ivantsova E. A. The influence of pesticides on soil microflora and beneficial biota / *Bulletin of Volgograd State University. Ser. 11, Natural Sciences*. - 2013. - No. 1. - P. 35-40.
6. Ivantsova, Yu.V. Kaluzhenkova E.A. Environmental problems of pesticide use // *News of the Nizhnevolsky Agro-University Complex: science and higher professional education*. - 2008. - No. 1 (9). - pp. 41-46.
7. Ksenofontova O. Yu., Ivanova E. V. The influence of pesticides on soil microorganisms in the Saratov region / *News of Saratov University. Ser. Chemistry. Biology. Ecology*, 2012. - T. 12. Issue. 1. - P.75-81.
8. Rogozin, M. Yu. Environmental consequences of using pesticides in agriculture // *Young scientist*. - 2008. - No. 25. (211). - P.39-43.



9. Skorobogatova V.I., Shcherbakova L.F., Ermakova I.T. Rehabilitation of soils contaminated with decomposition products of organophosphorus toxic chemicals / *Biology - science of the XXI century: Collection. Abstract 14 Int. Pushchinskaya school Pushchino, 2010. - T. 2. - P. 261.*
10. Kholoptsev A.V., Ryabinin A.I., Klimenko N.P. Modeling and assessment of surface contamination of the Crimea with pesticides that arrive on it with precipitation in the 21st century / *Geography. Geology. - 2017. - Volume 3 (69). - No. 3. Part 2. - pp. 276–293.*
11. Yamborko N.A., Pindrus A.A. Toxic and mutagenic effect of hexachlorocyclohexane and its microbial destruction products on soil microbial cenosis // *Mikrobiol. Journal, 2011. - No. 6. - P.50-57.*



SEISMIC EVALUATION OF VERTICAL IRREGULARITY IN HIGH-RISE BUILDINGS WITH AND WITHOUT HANGING COLUMN

Avinash Yadav¹, Dr. Jyoti Yadav², Vivek Shukla³

¹M. Tech Scholar, Dept. of Civil Engineering, Sarvepalli Radhakrishnan University, Bhopal, M.P, India

²Assistant Professor, Head of Dept. of Civil Engineering, Sarvepalli Radhakrishnan University, Bhopal, M.P, India

³Assistant Professor, Dept. of Civil Engineering, Sarvepalli Radhakrishnan University, Bhopal, M.P, India

ABSTRACT

Various regions throughout the globe have had detrimental consequences in tall multi-story buildings as a result of earthquakes, mostly owing to the presence of various abnormalities and badly planned constructions. A structure is said to be vertically irregular when there is an uneven distribution of stiffness, strength, and mass across the height of the building. The presence of hanging columns in an uneven structure significantly increases its irregularity, resulting in a discontinuous load path and a higher likelihood of collapse during an earthquake. The presence of a hanging column, caused by a discontinuity in the load path, compromises the structural integrity of the structure, resulting in reduced performance. The current research examines and analyses high-rise buildings with a regular construction and irregularities, both with and without a hanging column. An analysis has been conducted to examine the crucial placement of a hanging column in various positions around the peripheral columns of both regular and irregular buildings in zone V. The research examines the behaviour of high-rise buildings, namely those with regular and irregular vertical structures, that are ten stories tall and include hanging columns. The buildings are tested under earthquake stresses to observe their reaction. The different reaction parameters, including base shear, storey drift, node displacement, shear pressures, and bending moments, are analysed in the different models. The findings are compared to assess the impact of the presence of a hanging column in a structure.

KEYWORDS: Multi-storey, Irregularity, Hanging column, High-rise buildings, seismic analysis

1. INTRODUCTION

Around the world, earthquakes have shown the dangerous effects and susceptibility of high-rise buildings. An earthquake's impacts are greatly magnified in irregularly planned buildings. Strong earthquakes provide a significant danger of high-rise building frames with hanging columns at one or more locations collapsing. Buildings now have to have fewer columns and more open space because of both practical and aesthetic requirements. The general geometry, size, and form of the structure, as well as the way the forces are transmitted to the ground, have a significant impact on its behaviour. The forces generated in a building at various floor levels during an earthquake must be sent to the ground using the quickest route possible. The load transfer route becomes discontinuous due to hanging columns, which impairs the structure's performance. Architects are increasingly interested in these structures because of the advantage of having more open space due to fewer columns without any obstacles. hanging columns are an inevitable feature of many multi-story buildings and may be disadvantageous if built in seismically prone areas. The hanging column is a vertical component that rests, at its lowest point, on a beam, a horizontal component. As a result, the beam shifts the weight to the column next to it or below it. Because the hanging column creates an uneven distribution of mass, stiffness, and strength over the building's height, the structure may exhibit vertical irregularities.

2. METHODOLOGY

2.1 Modelling And Analysis

The G+10 story frame has been modelled in this research. A total of sixteen models—two with and without hanging columns and two with standard and asymmetrical vertical frames—have been created and examined. Position on the hanging column at the base of the structure has been adjusted at the building's outside, middle and inner peripheries. By using Staad-Pro for equivalent static analysis, the model is examined for Zone V, which corresponds to medium soil Type II.

Model 1: The model-1 is a rectangular building model devoid of any hanging columns or vertical irregularities. Model 2: The model-2 is a rectangular building model with hanging columns around the perimeter and no vertical irregularities.

Model 3: The model-3 is a rectangular building model with a hanging column in the centre of its perimeter and no vertical irregularities.

Model 4: The model-4 is a rectangular building model with a hanging column on the inner perimeter and no vertical irregularities. type 5: There is no hanging column in this rectangular building type, which has Type-1 vertical irregularity.

Model 6: The model-6 is a rectangular structure with hanging columns around the perimeter and a Type-1 vertical irregularity.

Model 7: The Model-7 is a rectangular building model with a hanging column on the central perimeter and a Type-1 vertical



irregularity.

Model 8: The model-8 is a rectangular building with an inner periphery hanging column and a Type-1 vertical irregularity.

Model 9: There is no hanging column in this rectangular building model, which has Type-2 vertical irregularity. Model 10: The model-10 is a rectangular building model with a hanging column around the perimeter and a Type-2 vertical irregularity.

Model 11: The Model-11 is a rectangular building model with a hanging column on the central perimeter and a Type-2 vertical irregularity.

Model 12: The model-12 is a rectangular structure with an inner perimeter hanging column and a Type-2 vertical irregularity.

Model 13: The Model-13 is a rectangular building model that lacks a hanging column and has Type-3 vertical irregularity.

Model 14: The Model-14 is a rectangular building model with a hanging column around the perimeter and a Type-3 vertical irregularity.

Model 15: The Model-15 is a rectangular building model with a hanging column on the central perimeter and a Type-3 vertical irregularity.

Model 16: The model-16 is a rectangular structure with an inner perimeter hanging column and a Type-3 vertical irregularity.

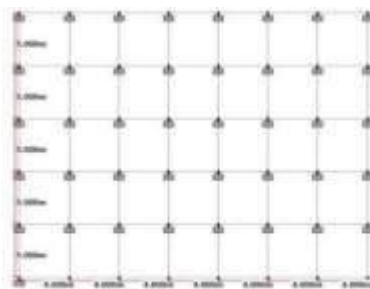
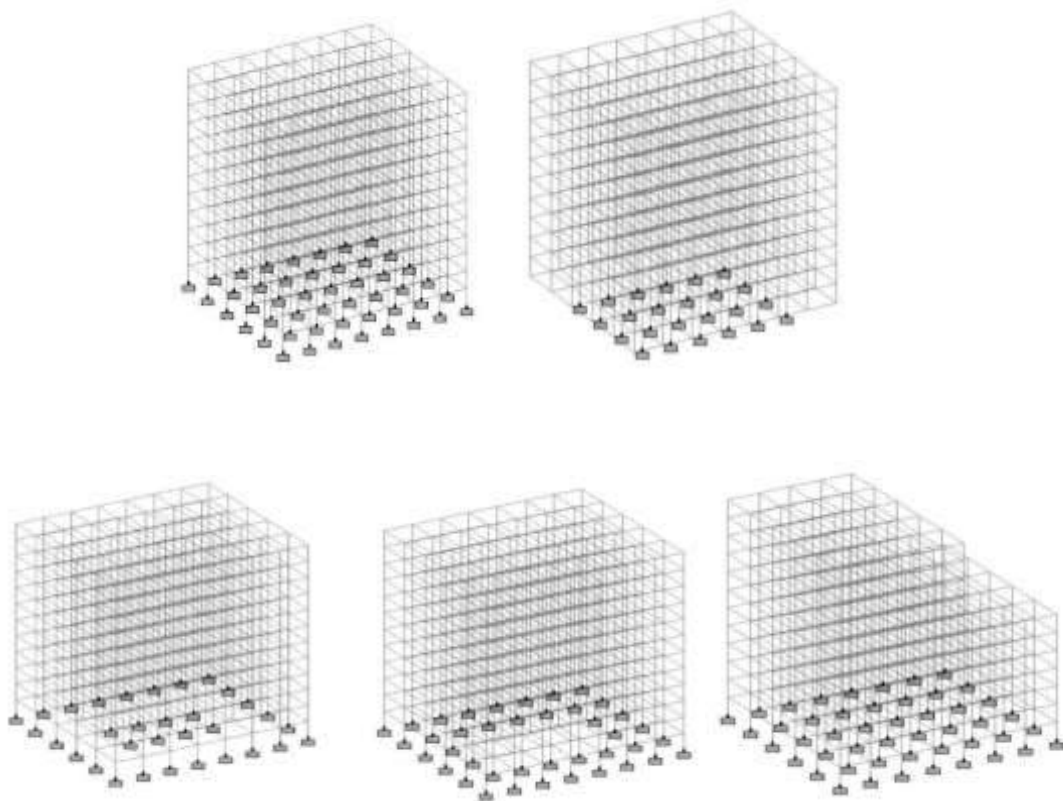
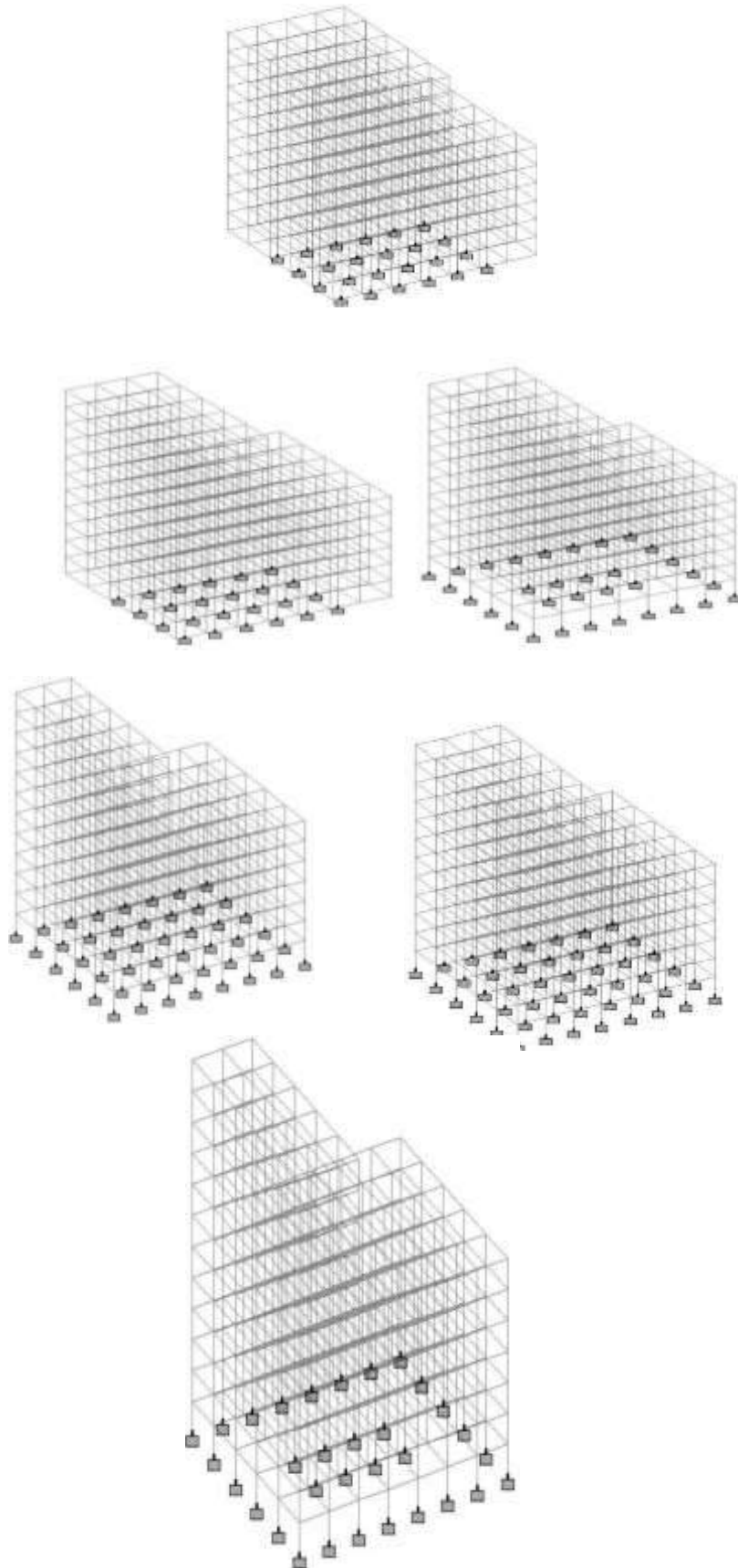


Fig.1. Plan Model







2.2 Load Analysis

In the present work, for the analysis of the structure, the loads such as the dead load (IS-875 PART 1), live load IS-875 (PART 2), and the seismic load are taken for analysis as per IS 1893 (Part 1):2002. The load combinations are also applied as per the IS code.

3. RESULT AND DISCUSSION

The research is conducted to assess seismic characteristics such as seismic weight, base shear, node displacement, storey drift, shear pressures, and bending moments. The findings for these parameters are shown in graphical form.

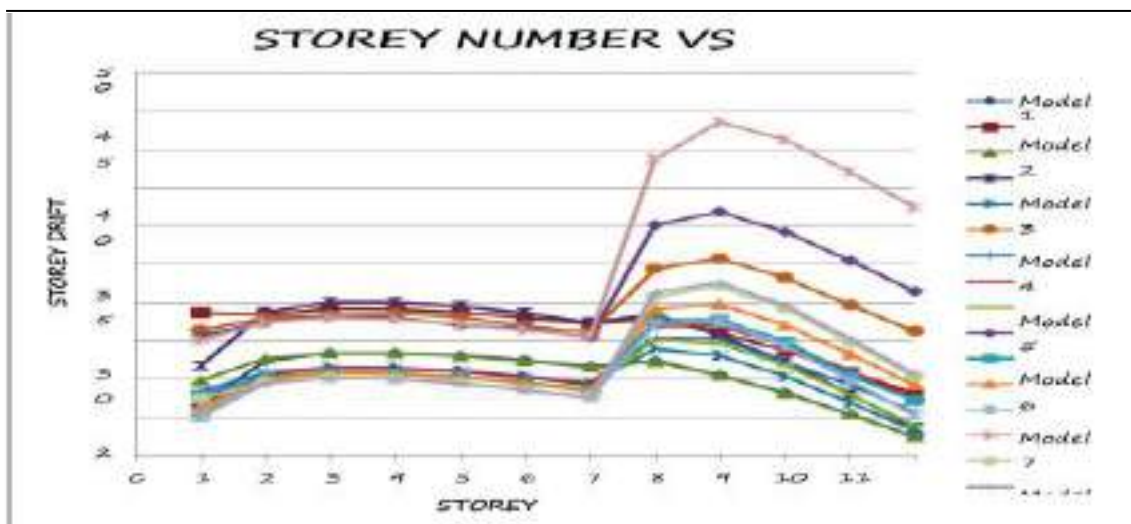
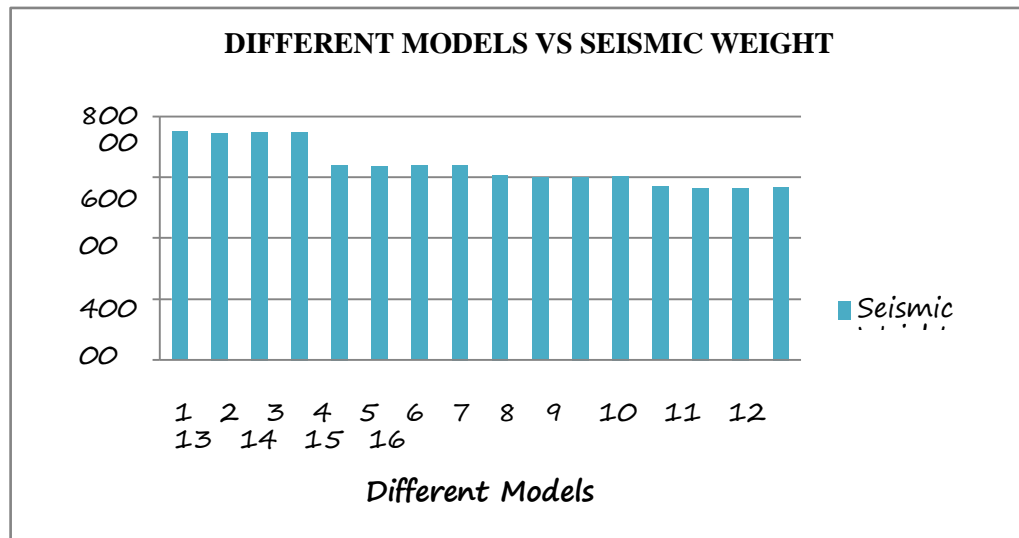


Fig.4. Graph For Storey Drift

4. CONCLUSION

- It has been noted that regular buildings have greater seismic weight and foundation shear compared to irregular ones.
- It is noted that the forces and moments in the beam members of the structure grow and are greater in models with a hanging column.
- It is clear that the drift is largest for the model with the greatest irregularity and when a hanging column is located at the outside edge of the structure (specifically, model 14). The drift is amplified in models that include a hanging column and a vertically uneven structure.
- The analysis of the storey drift response throughout the height of a building reveals that the middle storeys of the structure are more significantly impacted compared to the higher and lower stories.
- From the research, it is seen that placing a hanging column at various positions inside a building leads to variations in the reaction to earthquake forces. The most important scenario occurs when the hanging column is positioned at the outer perimeter



of the structure.

- The node displacement findings for buildings with hanging columns are quite high. It is inadvisable to include a hanging column in an area with a high risk of earthquakes, such as Zone V.
- Based on the analysis of different parameters and the observed results, it is evident that regular frame structures exhibit superior seismic performance compared to irregular frames in all scenarios. Therefore, it is recommended to construct regular frame structures in order to minimise the impact of earthquake forces.
- Furthermore, the displacement of the nodes, shear pressures, bending moments, and drift are much greater in structures with hanging columns. Therefore, it can be inferred that incorporating hanging columns in high-rise buildings located in high seismic zones is precarious and should be abstained from. Irregular buildings with hanging columns are much more prone to damage in areas with strong seismic activity. Therefore, it is advisable to prioritise and construct regular buildings without hanging columns.

REFERENCES

1. Almajhali, K. Y. M. (2023). "Review on passive energy dissipation devices and techniques of installation for high rise building structures." *Structures*, Elsevier BV, 51, 1019–1029.
2. Zhang, Y., Guo, Z., Liu, D., and Sun, W. (2023). "Seismic response analysis of super-high-rise building structures with three-layer isolation systems." *Scientific Reports*, Springer Science and Business Media LLC, 13(1).
3. Barod, S., Pahlwa, S., Safdari, M., and Parmar, S. (2021). "Seismic Response of a high rise building with and without hanging Column using STAAD Pro." *Journal of Structural Technology, MAT Journals (A unit of ARV Infomedia Pvt. Ltd.)*, 6(1), 50–57.
4. Yamini (2021). "ANALYSIS OF IRREGULAR MULTI- STORIED BUILDINGS WITH & WITHOUT OUTRIGGER STRUCTURAL SYSTEM, *International Research Journal of Engineering and Technology (IRJET)*, volume8, issue 7.
5. Archana swivedi and S.P Tyagi, *Seismic Analysis of Shear Walls and Buildings for RCC and Composite Column Buildings, International Journal of Engineering Research and Technology (IJERT)*, ISSN: 2248-1181, Vol. Issue 6 June 07, 2021.
6. *Seismic Analysis of Multi-Storey Irregular Building with Different Structural Systems" by Vishal N., Ramesh Kannan M., and Keerthika L. Specifically, Vishal N., Ramesh Kannan M., and Keerthika L. IJRTE, 2020, 8(6), 3146-3155.*
7. HoHossam El-Sokkary, Khaled Galal Structure released an article in 2020 titled "Material Quantities of Reinforced Masonry vs. Reinforced Concrete Shear Walls," with page numbers 5, 2020, 27, 767-779.
8. Jain, D. (2021). A literature review on seismic response of elevated hanging column building. *International Journal for Research in Applied Science and Engineering Technology*, 9(12), 68–72. <https://doi.org/10.22214/ijraset.2021.39181>
9. K. D. Nigam and Mayank Praasad, *Comparative analysis of shear walls using shear and shear parameters, Volume 3, February 02, 2017.*



DESIGN AND ANALYSIS OF A HIGH-RISE BUILDING WITH AND WITHOUT HANGING COLUMN BY ETAB SOFTWARE

Avinash Yadav¹, Dr. Jyoti Yadav², Vivek Shukla³

¹M. Tech Scholar, Dept. of Civil Engineering, Sarvepalli Radhakrishnan University, Bhopal, M.P, India

²Assistant Professor, Head of Dept. of Civil Engineering, Sarvepalli Radhakrishnan University, Bhopal, M.P, India

³Assistant Professor, Dept. of Civil Engineering, Sarvepalli Radhakrishnan University, Bhopal, M.P, India

ABSTRACT

Currently, the use of hanging columns is a common characteristic in contemporary high-rise structures in metropolitan India. hanging columns are often used in many projects, particularly above the bottom level. This allows for the use of transfer girders, resulting in a larger open area on the ground floor. Due to the lack of continuity in the load path, the hanging columns are more susceptible to seismic activity. Occasionally, it is necessary to fulfil certain criteria even when certain features are not deemed safe. Therefore, an attempt is made to analyse the behaviour of a G+15 multi-storey structure, with certain storeys designated for commercial use and the rest for residential use. This research examines and analyses the seismic behaviour of multistorey structures with and without hanging columns. This research presented the analysis and findings of many parameters in a high-rise structure, including storey drifts, storey displacement, and Base shear. The design and analysis were conducted utilising the Extended Three Dimensional Analysis of Building Systems (ETABS) software.

KEYWORDS: Multi-storey structure, hanging column, high-rise structure, ETABS software

1. INTRODUCTION

Nowadays, it is common for urban multi-story structures to have an open first level as a necessary characteristic. The main purpose of this adoption is to provide space for parking or reception lobbies on the ground floor. The seismic response of a structure is significantly influenced by its general configuration, dimensions, and structural arrangement, as well as the manner in which seismic forces are transmitted to the foundation. The seismic forces generated at various levels inside a structure must be efficiently transmitted downwards to the ground via the most direct route. Poor performance of the building occurs when there is any deviation or discontinuity in the load transmission route. Buildings that include vertical setbacks, such as hotel buildings with a few floors wider than the rest, have a significant increase in earthquake pressures at the point of discontinuity. Buildings with reduced column or wall density on a specific floor or with abnormally high floors are more prone to damage or collapse, which often originates in that particular floor. Several structures using columns suspended or supported by beams at an intermediate level, rather than extending all the way to the foundation, exhibit discontinuities in the direction of load transmission. This may be achieved by the use of transfer beams. The hanging column is supported by the transfer beam, which in turn transmits the forces to the columns underneath it. This is currently a prevalent characteristic in high-rise structures.

2. OBJECTIVE AND SCOPE OF THE STUDY

A G+15 high-rise structure with and without hanging columns is examined in this thesis, with part of its storeys designated for commercial use and the rest storeys for residential use. It should be able to endure any loading scenario and perform the intended function. It need to guarantee the affordable design of the construction as well. The construction must meet safety requirements in order to function as cheaply as possible. The comparison and seismic analysis is carried out by applying all the loads and combinations in order to determine whether the structure is safe or unsafe with hanging columns. The analysis and results are presented in this study. The superstructure's analysis and design were completed using ETABS, which is acknowledged as the industry standard for Building Analysis and Design Software.

3. METHODOLOGY

3.1 Building Parameters

Utility of Building- Commercial & Residential Building

Number of Stories- G+15



Geometry of Building- Symmetric

Type of Construction-RCC framed Type Of Walls ,Brick walls External walls 0.20m Internal walls 0.10m

Floor to floor height-3.0 m

Height of the plinth- 2.0 m above the ground Grade of Concrete M25

Grade of Steel-Fe 500

3.2 ETABS Analysis

The grid size are established as the first stage in ETABS. This involves determining the X and Y directions of the line count as well as the distance between grid lines. The number of storeys, typical storey height, and bottom storey are then specified as part of the definition of the storey data. The grid data also includes a reference of the slab type.

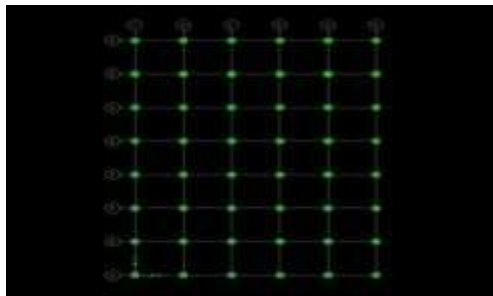


Figure 1: Plan and Elevation Model of Building

3.3 Types of Models Analysis by ETABS

The types of models used for this proposed study are as follows:

Case -1: 20% of Commercial space and 80% of Residential space of hanging columns over the height of building

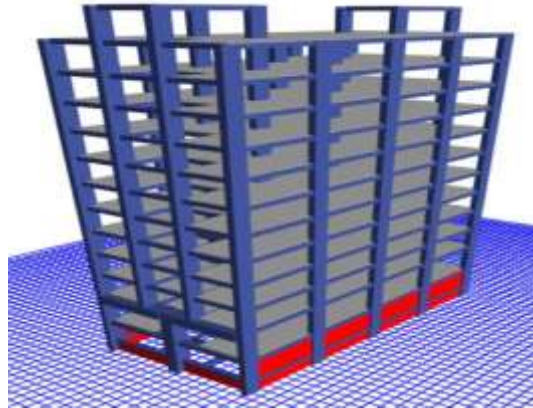


Figure 2: 3D model of Case-1

Case -2: 50% of Commercial space and 50% of Residential space of hanging columns over the height of building.

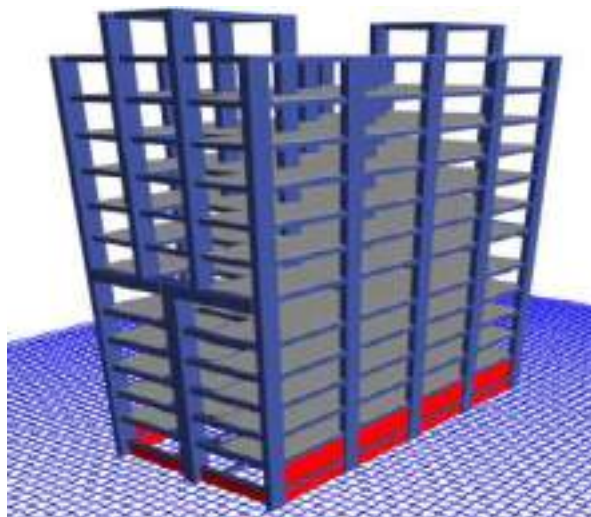


Figure 3: 3D model of Case-2

Case -3: 80% of Commercial space and 20% of Residential space of hanging columns over the height of building.

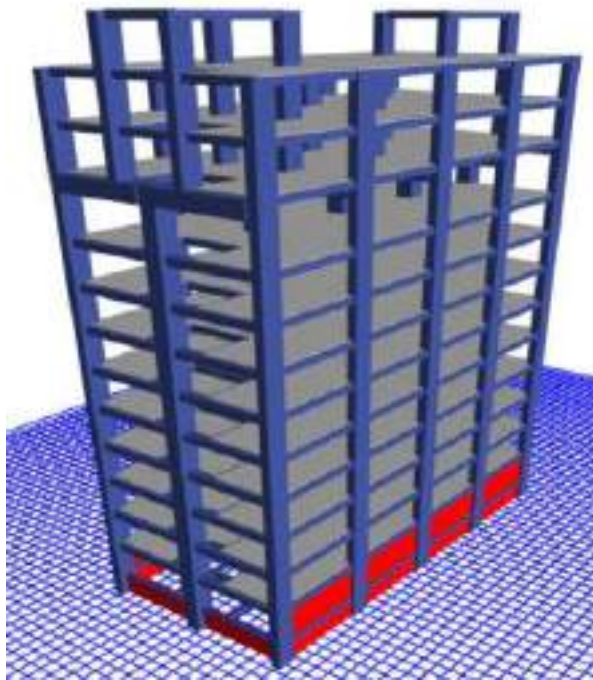


Figure 4: 3D model of Case-3

4. RESULTS AND DISCUSSIONS

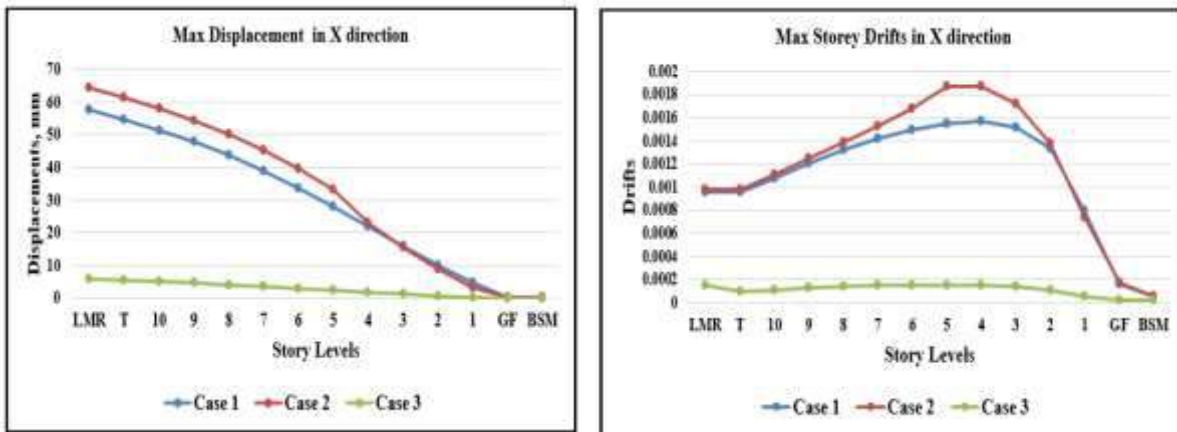


Figure 5: Displacement & Drift Graph in X directions

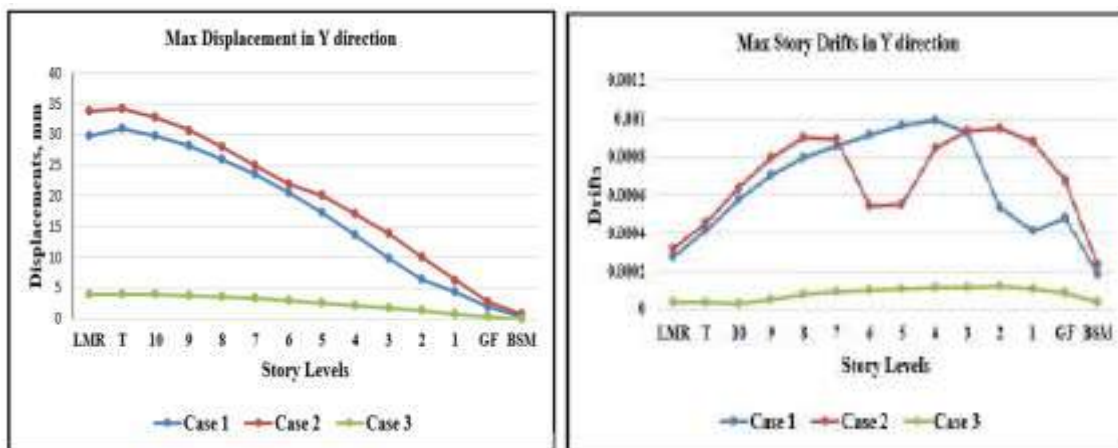


Figure 6: Displacement & Drift Graph in Y directions

5. CONCLUSIONS

The research that is discussed in the article contrasts a typical structure with one that is supported by hanging columns. The research led to the following findings.

1. The lateral displacements of hanging column buildings in X and Y directions are greater than those of a typical building due to the application of lateral loads in X and Y direction at each level.
2. In light of this, creating a hanging column building is riskier than erecting a conventional structure. It is found that hanging column buildings would experience more severe storey drift than regular buildings based on the computation of storey drift at each level for the structures. In all scenarios, the storey Drift reaches its maximum at the fifth and sixth story levels.
3. Compared to the regular structure, the hanging column building had higher story shear. This is because more materials were used than would be used in a typical structure. Therefore, compared to a regular structure, the hanging column construction is not cost-effective.
4. The ultimate conclusion is that hanging columns should not be built into structures unless they provide a valid purpose and meet functional requirements. If they are to be supplied, then careful consideration should be given to the structure's design.
5. The current study examines the seismic analysis of a multi-story structure with hanging columns at various storey levels, including the lower, middle, and higher storey levels over the building's height. An investigation of the response spectrum was carried out for each of the three construction scenarios.
6. The ETABS programme uses both the static and dynamic methods to analyse the seismic and wind behaviour of hanging columns.
7. Determining the best places for hanging columns in each of the three scenarios when the structure extends over the building's height. Here, the Case-3 holds firm, ensuring the safety of the structure.
8. The main and parapet walls are constructed of hollow, lightweight concrete blocks to reduce the structure's weight. In contrast, we may lessen the weight of the blocks on the framework by over 50%.
9. The parametric research of Time Period, Frequency, Displacement, Storey Drift, and Storey Shear reveals that the building's more hanging column floors (Case-1 & Case-2) would perform marginally worse when subjected to seismic excitation.
10. On the other hand, the Case-3 type works better during building. When all of the aforementioned factors are taken into account, Case-3 operates well and has a resistance of 86% to 92% when subjected to seismic excitation.
11. Having hanging columns in multi-story structures not only creates more open spaces but also offers a pleasing visual aspect.

REFERENCES

1. Mr. Kiran Kumar Reddy and Kandukuri Sunitha "Seismic Analysis of Multistory Building with hanging Column Using Tabs" Volume 4, Issue 8 of the International Journal of Engineering Technology Science and Research - IJETSR.
2. Pushkar Rathod and Rahul Chandrashekar "Seismic Analysis of Multistory Buildings Using Etabs 2015" Volume: 04 Issue: 10, October - 2017, International Research Journal of Engineering and Technology (IRJET)
3. Arpit Shrivastav and Aditi Patidar "Seismic Analysis of Multistory Buildings with hanging Columns" Volume 5 Issue 5 of the SSRG International Journal of Civil Engineering (SSRG - IJCE) - May 2018.
4. Gulchaman Khan and Prof. Mayur Singi, "Seismic Analysis of a Multistory Building with a hanging Column" IJESRT (International Journal of Engineering Sciences and Research Technology), January 2019.
5. Shivam Wankhade, Prof. M. Shahezad, and Dr. N.W. Ingole, "Seismic Analysis of a Multi-story Building with a hanging Column." Volume: 07, Issue: 01, January - 2020, International Research Journal of Engineering and Technology (IRJET).



6. J. C. Awkar and E. M. Lui, "Seismic analysis and response of multistory semirigid frames", *Journal of Engineering Structures*, Volume 21, Issue 5, Pages 425-442, 1997.
7. "Seismic behaviour of a full-scale RC frame repaired using CFRP laminates," Balsamo A, Colombo A, Manfredi G, Negro P, and Prota P (2005). 769-780 in *Engineering Structures*.
8. V.G. Bardakis and S.E. Dritsos, "Evaluating assumptions for seismic assessment of existing buildings," 2007. *Soil Dynamics and Earthquake Engineering*, 27(2007), pp. 223-233.
9. *Structural Developments in Tall Buildings: Current Trends and Future Prospects*, M. Ali and Kyoung Sun Moon University of Illinois at Urbana-Champaign, Structures Division, School of Architecture, Champaign, IL 61820, USA. 13 June 2007.
10. S.S. Patil, Miss. S.A. Ghadge, Prof. C.G. Konapure, Prof. Mrs. C.A. Ghadge, Prof. Mrs. C.A. Ghadge *Response Spectrum Method Seismic Analysis of a High-Rise Building International Journal Of Computational Engineering Research (Ijceronline.Com) Vol.3 Issue 3 272, Issn-2250-3005 (Online), March 2013.*
11. Sreadha A R and C. Pany, "Seismic Study of Multistory Building Using hanging Column," *International Journal of Emerging Science and Engineering (IJESE)*, Volume-6 Issue-9, April - 2020
12. Shilpa Valsakumar and Harsha P.V. "Seismic Analysis of a Multi-Storey Building With hanging Columns Using Etabs," *International Research Journal of Engineering and Technology (IRJET)*, Volume: 07, Issue: 07, July 2020.



A SYSTEMATIC LITERATURE REVIEW ON IMPACT OF HYBRID WORK CULTURE ON EMPLOYEE JOB ENGAGEMENT AND PRODUCTIVITY - A STUDY OF IT PROFESSIONALS IN KARNATAKA

N. Vanitha¹, Dr. Shailashri V. T²

¹Research Scholar, College of Management & Commerce, Srinivas University, Mangalore and Assistant professor, MWCMC, Mysore, OrcidID:0000-0001-6129-5947

²Research Professor, College of Management & Commerce, Srinivas University, Mangalore. OrcidID:0000-0002-1684-238X.

Article DOI: <https://doi.org/10.36713/epra15360>

DOI No: 10.36713/epra15360

ABSTRACT

Purpose: This study aims to comprehensively investigate the Impact of Hybrid Work Culture on Employee Job Engagement and Productivity, with a specific focus on IT professionals in Karnataka. As organizations increasingly adopt hybrid work models, understanding the nuanced effects on the workforce becomes imperative. The research seeks to assess the levels of job engagement among IT professionals within this hybrid framework, examining how the flexible arrangement influences their commitment, motivation, and overall involvement in work-related tasks. Additionally, the study aims to measure productivity metrics, investigating whether the combination of remote and in-office work enhances or impedes IT professionals' ability to deliver high-quality output. By delving into the intricate dynamics of the hybrid work model, the research also intends to identify challenges faced by IT professionals and propose practical solutions, contributing valuable insights to both academic literature and organizational strategies. Ultimately, the findings aspire to guide organizations and policymakers in shaping effective hybrid work policies that optimize employee engagement, productivity, and overall well-being in the unique context of Karnataka's IT sector.

Finding / Results: Organizations transitioning to hybrid work models aim to enhance employee engagement through factors like culture, recognition, and reinvented appraisal systems. The positive characteristics of remote work challenge traditional norms, posing a management struggle to define the new normal. Employee retention remains crucial for long-term success, and digital transformation plays a significant role in accelerating work-life balance. The hybrid model's impact on productivity is inconclusive, yet the appeal lies in offering flexibility, happiness, and efficiency. Challenges and opportunities arise, emphasizing the need for effective leadership, digital tools, and a focus on employee well-being in navigating the evolving landscape of work.

Originality/ Value: This research provides in-depth insights into hybrid work models, emphasizing digital tools, leadership, and employee well-being. It tackles job satisfaction, productivity paradox, and turnover intention, offering valuable perspectives for post-pandemic work strategies. The study contributes to informed decision-making on optimizing hybrid work structures, addressing challenges, and leveraging opportunities in the evolving workplace landscape.

Paper type : Systematic Review Paper

KEYWORDS: Hybrid Work Culture, Employee Job Engagement, Productivity, IT Professionals and Workforce Dynamics

1. INTRODUCTION

In the wake of unprecedented global changes, the traditional landscape of work has undergone a profound shift, with the emergence of hybrid work models becoming a focal point of discussion. This research paper delves into a multifaceted exploration of hybrid work cultures, examining their impact on employee engagement, productivity, and organizational effectiveness. Drawing insights from a diverse array of studies, our analysis encompasses factors such as digital collaboration tools, leadership strategies, and the well-being of employees in this evolving paradigm. By synthesizing findings on job satisfaction, turnover intention, and productivity paradox, this paper aims to contribute to a nuanced understanding of the challenges and opportunities presented by the hybrid work environment, providing a valuable guide for organizations shaping their future work strategies.

The contemporary professional landscape is undergoing a transformative shift, with the conventional notions of the workplace evolving into a dynamic hybrid model that fuses remote and on-site work structures. This research embarks on a comprehensive



examination of various facets surrounding hybrid work cultures, aiming to dissect their intricate influence on employee engagement, organizational effectiveness, and overall workplace dynamics. The multifaceted exploration encompasses critical elements such as leadership strategies, digital collaboration tools, and the profound impact on employee well-being in the emerging paradigm of work. As organizations grapple with defining the 'new normal,' understanding the nuanced relationship between work structures and employee outcomes becomes imperative.

The research unfolds through a meticulous analysis of diverse studies, each shedding light on distinct aspects of hybrid work arrangements. From the examination of productivity paradoxes to insights into the impact on job satisfaction, the findings provide a nuanced understanding of the challenges and opportunities embedded in this evolving professional landscape. Furthermore, the study delves into the adoption and impact of digital tools, such as cloud storage, online collaboration platforms, and remote communication channels, on the overall efficiency and cohesion within hybrid work settings.

Synthesizing findings on job satisfaction, turnover intention, and the broader implications of the hybrid model, this research aims to offer valuable insights for organizations navigating this transformative phase. As the workforce seeks a harmonious blend of flexibility and structure, understanding the intricate dynamics of hybrid work environments is pivotal for businesses aiming to foster a resilient and engaged workforce in the years to come.

2.OBJECTIVES OF THE STUDY

- To explore the concept of hybrid work culture.
- To review the articles regarding hybrid work culture, employee job engagement and employee productivity.
- To develop a conceptual framework for the study of hybrid work culture, employee productivity and employee job engagement.
- To identify a research gap that should be investigated further

3.RESEARCH METHODOLOGY

The research methodology employed in this study adopts a comprehensive approach to investigate the dynamics of hybrid work environments and their impact on employee engagement. Employing a mixed-methods design, the study combines quantitative and qualitative methods to capture both numerical trends and nuanced employee experiences. The population under consideration spans diverse industries, ensuring a representative sample through stratified sampling. Surveys will be utilized to quantitatively assess factors influencing engagement, while semi-structured interviews will provide qualitative depth to the analysis.

Digital collaboration tools play a pivotal role in hybrid work success; thus, an in-depth analysis of their usage and effectiveness will be conducted. The study will compare organizations embracing hybrid models with those maintaining traditional structures to identify trends in employee engagement, job satisfaction, and organizational effectiveness. Special attention will be given to the impact of leadership styles on employee outcomes, with interviews conducted to gain insights into leadership strategies.

Data analysis will involve both statistical techniques for quantitative results and thematic analysis for qualitative insights. The study will uphold ethical considerations, ensuring participant confidentiality, informed consent, and obtaining necessary permissions from involved organizations

4.LIMITATIONS OF THE STUDY

Limitations, such as potential biases and the evolving nature of hybrid work, will be acknowledged. The significance of the study lies in providing actionable insights for organizations navigating hybrid work transitions and contributing to the academic discourse on the changing landscape of work environments and their implications for employee engagement.



5. REVIEW OF LITERATURE

Table 1: Review of Literature

Sl. No	Research Topic	Focus Area	References
1	Examining the factors and Employee Engagement model for Hybrid Work Culture	The model is focusing 1) culture, 2) transparency, 3) employee recognition, 4) trained leadership, 5) employee connect, 6) reinventing the appraisal system, and 7) feeling of security. The aim of this model is to improve engagement; the derived possible outcomes of engagement are: 1) higher productivity, 2) defined engagement, 3) change in employee attitude, 4) satisfaction through experience	[1]
2.	Hybrid Work to turn Workplace Vibrant	Positive characteristics of RW, and the home working experience employees gained during the pandemic, pose a challenge to the traditional work definition and norms in a less regulated workplace. On other hand, management and HR are struggling to agree on what exactly the model of new normal should look like	[2]
3.	Effect of Hybrid Working on Employee Engagement and on Turnover Intention	Employee retention is critical to the organization's long-term viability and success. Understanding the variables that influence an employee's decision to leave a company is critical for addressing the economic and social consequences of a business	[3]
4.	Accelerating WLB to increase Employee Engagement in Hybrid Environment	The digital transformation has completely changed the labour market and the organisation functionality towards productivity, there is a change in the work process and method due to digital transformation and certain managerial solution are been implemented like agile system, mentoring and reverse mentoring.	[4]
5.	Defining Hybrid Organisational Environment	Organizational environment is dependent on the type of organization and its setup. The traditional environment in short defines the regular process of working, it complies with the aspects of each person with each desk and individual workstation. On the other hand, hybrid workplace environment setup is different.	[5]
6.	Hybrid Working Arrangements	Hybrid working arrangements, also known as hybrid work models or hybrid work arrangements, refer to a flexible work structure that combines remote work and on-site work in a blended approach. It allows employees to work from both a physical office or workplace and a remote location such as their home. This means that employees have flexibility to determine their own mix of remote and on-site work based on their individual circumstances and job responsibilities.	[6]
7.	Hybrid Work Model	Although studies of productivity gains are inconclusive, in part because there may be a difference between a well-prepared strategic decision to move to remote work and the need to work from home overnight because of a pandemic, studies show employers' willingness to continue with remote work practices even after the Covid19 pandemic	[7]
8.	Impact on Hybrid Work Model on Job Satisfaction	People want the future of workplace to be hybrid because they believe the employees fared better as the employees can benefit from the best of both the worlds together, which resulted in healthier mental-being, better work relationships and decreased burnouts who worked entirely remote basis.	[8]
9.	Opportunities and Challenges of Hybrid Work	Employees could have the flexibility to work whenever, saving time in commuting, and being able to work in a comfortable environment of their own choice which could increase happiness and focus. Thus, being able to perform better and increase efficiency level	[9]



10.	Impact of Hybrid Work on Team Creativity	social interactions mediated by digital tools and applications 27 can be just as crucial to the influence of team creativity as being physically present in an IOE. DKS transcends the typical information transfer process and should be viewed as a social factor in team creativity.	[10]
11.	Tools Hybrid Work Model for the future of Work	Digital collaboration tools are essential for smooth blending of physical and remote work. The main tools include cloud storage for documents and data, cloud software, online whiteboards for collaboration and digital wikis for knowledge building and exchange. This move from physical to digital collaboration has led newspapers to state that “data centres are the new offices”	[11]
12.	Impact of HWC on Organizational Effectiveness	The statistics show that employees who work remotely are more productive than those who work on-site, and that remote and hybrid work arrangements are positively related to employee engagement. Employee satisfaction with their current working circumstances was also high, with the majority of them reporting that it was very good. The poll also revealed that manager and supervisor support is crucial for a positive work environment and content employees.	[12]
13.	Hybrid Work- Consequences for Stress and Work Engagement	Six factors important for burnout and work engagement: Workload, Control, Reward, Community, Fairness, and Values. However, subsequent studies showed that the impact of Work-Life Areas on burnout and commitment turned out to be very complex.	[13]
14.	Trends in Hybrid Work	a. Employees want the best of both worlds. b. Leaders are out of touch with employees and need a wake-up call. c. Digital overload is real and climbing. d. Talent is everywhere in a hybrid working world.	[14]
15.	Predicting Employee Attrition-Impact of Hybrid Work	Employee attrition refers to the loss of workers for causes other than termination or other employer-initiated events. Attrition is an unavoidable component of running a company. An employee will eventually desire to quit an organization for reasons both personal and professional. This implies that a company has no direct influence over how many employees leave due to attrition. Employee attrition is increasing as a result of a number of causes, including the changing expectations of employees, work-life balance, and workplace environment.	[15]
16.	Hybrid Model- Impact on Job Performance	Organizations need to focus on building employees' positive performance through providing employees with a broad range of tools and skills to meet new realities and challenges. Employees' productivity can be enhanced through motivation and effective recognition, which will lead to the organization's performance.	[16]
17.	Productivity Paradox of Hybrid Work Model	The term "productivity paradox" was first used in the context of information technology, where organizations invested heavily in IT but saw little improvement in overall productivity. Hybrid work arrangements, despite their anticipated advantages of enhanced flexibility and improved work-life equilibrium, have not necessarily yielded heightened productivity.	[17]
18.	Validity Test of HWM on Employee Performance through WLB	The results showed that the Hybrid Working Model has a significant effect on Work-Life Balance based on the statistical calculation of the t value of 3.813, while the t table is 1.676 where t count > t table and p value = 0.000 < α = 0.05 value, this means that H12 is accepted and the direct effect given is 0.335 or 33.5% which is included in the category of influence quite strong so that the second hypothesis can be accepted.	[18]



19.	Definition of WLB	Life is a balancing act, and in American society, it is safe to say that almost everyone is seeking work/life balance. But what exactly is work/life balance? We have all heard the term, and many of us complain that we don't have enough of it in our lives. Among men and women alike, the frustrating search for work/life balance is a frequent topic of conversation, usually translated into not enough time and/or support to do, to handle, to manage ... our work commitments or personal responsibilities.	[19]
20.	Pandemic Induced Changes in Work Culture	The pandemic provided companies with an ample amount of time to reassess their corporate strategy. Once the threats of the pandemic became milder, we saw organizations switching over to the hybrid model of work. In a hybrid work model, the employees were asked to work both in-office and remotely based on their position and the task that needed to be performed.	[20]
21.	Impact of Hybrid Work Culture on Organizational Effectiveness	The objective of the research study is to identify impact of hybrid work culture on organizational effectiveness. There is a positive association between employee engagement and both remote and hybrid work arrangements, demonstrating that these flexible work models have a beneficial effect on engagement.	[21]
22.	Hybrid Working Environment and Employee Engagement	The concept of hybridization is relatively new with very few models that have been designed to understand the concept. The research will investigate a number of multinational organizations that have transitioned into this change and highlight the problems and issues that are of concern.	[22]
23.	Impact Of Nature of Work Setup on Employee Wellbeing, Engagement and Productivity	It explores the hybrid work set-up and the various factors like ability to adapt to the hybrid work set-up along with productivity of the employee, employee wellbeing and engagement of the employees working in the hybrid type of work set-up. The existence of inter-relatedness between various factors such as adjustment to hybrid work set-up, wellbeing, engagement and productivity.	[23]
24.	Hybrid Work Models and Employee Productivity	This study examined effects of hybrid work models effective communication, access to technology, study concludes that hybrid work models have significant effect on employee productivity in the organisation recommends that by improving access to technology infrastructure, enhancing communication channels, optimizing work environment, can enhance the productivity of their employees in hybrid work models.	[24]
25.	The Moderating Role of Workplace (Hybrid/ Remote) on Employee Engagement and Employee Turnover Intention	The elements of a workplace can impact how committed employees are and whether they plan to stay or leave. The study reveals that techniques for boosting employee engagement have better results in hybrid workplaces compared to remote workplaces.	[25]
26.	Impact of Remote Work Arrangements on Employee Engagement.	This study found that the intentional, planned, and consistent communication between the remote employee. The findings of this research study build upon existing theoretical concepts and further recommendations for future research are provided.	[26]
27.	The evolution of employee engagement	Research demonstrates that high Employee Engagement (EE) sustains job satisfaction and performance among staff. Main Findings are, the social and relational nature of EE, the fact that EE is dynamic, how EE could be a fundamental ingredient in shifting towards a human centred approach.	[27]



28.	Engagement and Burnout in Hybrid Work Arrangements	This study sheds light on the effects of hybrid work, finding that a greater frequency of virtual work is associated with lower employee engagement and unrelated to employee burnout. More importantly, this study found that when the managers' exhibition of positive leadership behaviours is taken into account, how often one works virtually no longer has a predictive effect on engagement.	[28]
29.	The Impact of Hybrid Work on Productivity	Organizations has become more hybrid enabling the workers to work partially from the office and partially from home. Limitations can be found in the study where the findings are restricted to the context of a single case study. Thus, further research can be conducted to enrich the findings with other settings and strategies.	[29]
30.	Well-being and Engagement in Hybrid Work Environments	This paper concludes with a recommendation on how to enhance coaching skills among leaders and to build their knowledge and literacy in the field of coaching, to result in positive effects on workplace well-being and engagement in contemporary work environments.	[30]
31.	Investigating Employee Engagement of Engineering Teams of Long-term Domestic Projects	This study aimed to investigate the effect of the hybrid working model, manager coaching and development plans under long-term assignment conditions on engagement. The study findings suggested that the relationship between job resources and engagement is negatively moderated by working on long-term assignments.	[31]
32.	The Impact of Digital Employee Engagement Practices on Organizational Performance	The inclusion of advanced technical infrastructure is not required for now. The significance of digitally engaging the employees to connect with the organizational management is getting high due to the increasing ratio of hybrid working to promote work-from-home concept.	[32]
33.	Hybrid Working Method	The results of the earlier research on hybrid working, telework and flexible work arrangements it was found that employees are highly recommending the organizations to encourage work from home policies and make adjustment in the working culture of the organization in order to survive in this competitive world by retaining their top talented work force.	[33]
34.	Impact of Leadership in a Remote Work Environment	The recommended solutions for the research findings are for Company to improve leadership and employee retention strategies. Every employee is different and should be seen as an individual to better comprehend their preferred ways of working and therefore, different approaches and strategies should be implemented to ensure maximum employee retention.	[34]
35.	Hr Challenges in The Era of Remote and Hybrid Workforces	This review research paper offers valuable insights into the future of work and the pivotal role of HR in navigating the challenges and harnessing the benefits of remote and hybrid workforces. It aims to guide both scholars and practitioners in shaping HR strategies that foster a harmonious and productive work environment.	[35]
36.	Work from home (WFH), employee productivity and wellbeing	Remote working has attracted a large volume of research from various disciplines, alongside the expansion of WFH practices, academic and industry reports. Managers can develop an awareness of potential signals and symptoms of poor health and mental well-being among employees.	[36]
37.	Hybrid Working: The Future of Organizations	The organizations were able to sustain its functioning by adopting work-from-home (WFH) policy. This study is an attempt at formulating the same by preparing a systematic review of significant and recent studies and figuring out the antecedents and relational outcomes of Workplace incivility.	[37]



38.	The Organisation of Work and Employee Engagement	The organisation of work is the relationship between workforce engagement, the organisation's structure, leadership and management. Engagement is more likely to occur in an aligned work environment with workplace structures with a clear line of sight between organisational goals, and individual job or role specifications and performance management systems that enhance the opportunity to achieve these goals.	[38]
39.	Remote Work and Hybrid Work Organizations	Research focus on the extent to which organizations, as social entities, are constrained by physical space and materiality or by the way they exercise power and control over their human resources. Another direction should focus on a better understanding of information and communication processes as well as alternations in leading and managing people in online environment.	[39]
40.	Blending the physical and virtual: A hybrid model for the future of work	It should aim to facilitate the implementation of flexible working conditions, ensuring minimum protection levels for on-site and hybrid workers equally, while fostering harmonisation within the single market and making it easier for workers to be geographically mobile.	[40]

6.FACTORS INFLUENCING PRODUCTIVITY IN HYBRID WORK CULTURE AND ITS EFFECTS

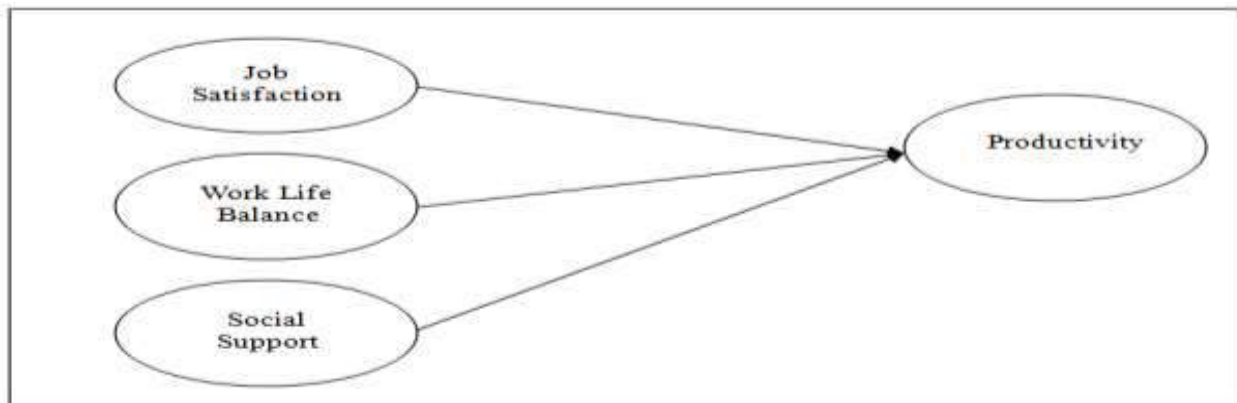


Figure -1 Conceptual framework of employee engagement in Productivity

Table 2: Factors influencing productivity in hybrid work culture and its effects

Job Satisfaction	Work life balance	Social Support	Productivity
1. Job autonomy 2. Monitoring mechanism 3. Longevity of WFH 4. Home work space suitability 5. Digital social support	1. Identify employees work values 2. focus on flexibility 3. foster connections 4. reinforce the organizational offer 5. Employee trust 6. Amplify recognition 7. safety	1. Establish consistent expectations 2. Make time to reduce bias in assessments 3. Pay and reward people in a fair and equitable way 4. Expand feedback types 5. Increase feedback sources and frequency 6. Prepare and guide feedback providers and receivers	1. Increase transparency and visibility 2. Equip team with the right technology and tools 3. Embrace different work modes spark to innovation 4. Create clear goals 5. Update goal progress regularly 6. Give individuals their performance data



The conceptual framework for this study revolves around the key variables of job satisfaction, work-life balance, and social support, examining their interconnectedness and influence on productivity within the context of hybrid work environments. Job satisfaction, a critical indicator of employee contentment, is hypothesized to be positively correlated with productivity. Work-life balance, reflecting the equilibrium between professional and personal life, is considered a mediating factor, affecting both job satisfaction and, consequently, productivity. Social support, encompassing interpersonal relationships and collaborative interactions, is postulated to enhance both work-life balance and job satisfaction, thus contributing positively to overall productivity. This framework aims to elucidate the intricate relationships among these variables, offering insights into how organizations can optimize job satisfaction, work-life balance, and social support to foster a more productive hybrid work environment.

7. RESEARCH GAP

While there is extensive discussion on the benefits of hybrid work, there is a gap in understanding the most effective strategies for implementing and managing hybrid work models across diverse industries.

- Current research lacks standardized metrics for measuring employee engagement in a hybrid work environment, hindering the ability to accurately assess the impact of hybrid models on workforce engagement.
- Limited research explores the specific leadership skills and training needed for effective management in a hybrid work setting, especially regarding maintaining team cohesion and productivity.
- The consequences of hybrid work models on team creativity remain understudied, requiring a deeper examination of how virtual collaboration tools influence creative processes and outcomes.
- There is a gap in understanding the long-term productivity trends associated with hybrid work, including potential fluctuations over time and the sustainability of initial productivity gains.
- Research gaps exist in comprehending the nuanced relationship between hybrid work arrangements and employee well-being, including factors such as stress, burnout, and mental health.
- While the importance of digital collaboration tools is acknowledged, research lacks insights into the most effective tools and strategies for optimizing collaboration and communication in a hybrid work setup.
- Limited research delves into how hybrid work models influence and shape organizational culture, including the emergence of new cultural norms and values within remote and on-site workspaces.
- Research gaps persist in understanding how gender disparities manifest in hybrid work environments, including potential differences in opportunities, challenges, and work-life balance.
- Despite the emphasis on work-life balance, there is a gap in identifying the most effective organizational practices that contribute to a healthy work-life balance for employees engaged in hybrid work arrangements.

8. CONCLUSION

The extensive exploration of hybrid work environments and their impact on employee engagement, productivity, and well-being reveals a complex landscape shaped by factors such as organizational culture, leadership, and the evolving nature of work itself. While the findings underscore the potential benefits of hybrid models, including increased flexibility and job satisfaction, challenges such as digital overload and the need for effective leadership in remote settings also surface. The identified research gaps emphasize the ongoing need for nuanced investigations into the dynamics of hybrid work, offering opportunities for future studies to delve deeper into areas such as the long-term effects on job satisfaction and the evolving role of leadership in a hybrid context. As organizations navigate the transition to hybrid work, these insights contribute valuable considerations for optimizing strategies and fostering a resilient and positive work environment.

REFERENCES

1. Nagesh, P., Kulenur, S., & Shetty, P. (2019). *The study on factors affecting employee engagement. International Journal of Engineering Research & Technology (IJERT)*, 8(6), 426-430. [Google Scholar](#)
2. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3735771
3. Delany, K. (2022). *What challenges will organisations face transitioning for the first time to the new normal of remote working? Human Resource Development International*, 1-9. [Google Scholar](#)
4. La Porta, R. (2021). *Hybrid jobs and redesigning of the workplace: literature and empirical review. Google Scholar*
5. Lina Vyas, Nantapong Butakhieo Pages 59-76 | Received 29 Aug 2020, Accepted 09 Dec 2020, Published online: 23 Dec 2020. [Google Scholar](#)
6. La Porta, R. (2021). *Hybrid jobs and redesigning of the workplace: literature and empirical review. Google Scholar*
7. Microsoft (2021), *The Next Great Disruption Is Hybrid Work – Are We Ready? Microsoft’s Work Trend Index*, available at: [Google Scholar](#) (accessed on January 10th, 2022)
8. Santillan, E. G., Santillan, E. T., Doringo, J. B., Pigao, K. J. F., & Von Francis, C. M. (2023). *Assessing the Impact of a Hybrid Work Model on Job Execution, Work-Life Balance, and Employee Satisfaction in a Technology Company. Journal of Business and Management Studies*, 5(6), 13-38. [Google Scholar](#)



9. Birkett, H., Forbes, S., & Jackson, G. (2021). *Hybrid Working Beyond COVID-19 Research findings and recommendations for implementing hybrid working*. Google Scholar
10. Simon Van Rossum. (2022-2023), *The impact of hybrid work on team creativity: understanding the conditions of the workplace*, UHASSELT, PPI-226 Google Scholar
11. Martin, W. S., & MacDonnell, R. (2021). *Remote work's future may lie in hybrid models, but are leaders ready?* Harvard Business Review. Retrieved from Google Scholar
12. Karasek Jr, R. A. (1979). *Job demands, job decision latitude, and mental strain: Implications for job redesign*. *Administrative science quarterly*, 285-308. Goggle Scholar
13. Karasek Jr, R. A. (1979). *Job demands, job decision latitude, and mental strain: Implications for job redesign*. *Administrative science quarterly*, 285-308. Google Scholar
14. D. Alao and A. B. Adeyemo, "Analysing employee attrition using decision tree algorithms," *Computing, Information Systems, Development Informatics and Allied Research Journal*, vol. 4, no. 1, pp. 17-28, 2013. Goggle Scholar
15. A. Adhikari, "Factors Affecting Employee Attrition: A Multiple Regression Approach," *IUP Journal of Management Research*, vol. 8, no. 5, pp. 38-43, May 2009.
16. N. Chellam, D Divya "A casual study on Hybrid Model and its impact on employee job performance", "Journal of Pharmaceutical Negative Results", pp 866-873, 2022
17. Krupp, S. *The work anywhere paradox: Love it or hate it, how leaders can optimize it*. Google Scholar
18. Brynjolfsson, Erik. "The productivity paradox of information technology." *Communications of the ACM* 36, no. 12 (1993): 66-77. Google Scholar
19. Kanter, R. M. (1989). *Work and family in the United States: A critical review and agenda for research and policy*. *Family Business Review*, 2(1), 77-114. Google Scholar
20. Hirsch, P. B. (2021). *Sustaining corporate culture in a world of hybrid work*. *Journal of Business Strategy*.
21. M. Evans A Monte Carlo study of the effects of correlated method variance in moderated multiple regression analysis *Organizational Behaviour and Human Decision Processes*(1985)
22. Tombari, N., & Spinks, N. (1999). *The work/family interface at Royal Bank Financial Group: successful solutions—a retrospective look at lessons learned*. *Women in Management Review*, 14(5), 186-194. Goggle Scholar
23. Greenhaus, J. H., Bedian, A. G., & Mossholder, K. W. (1987). *Work experiences, job performance, and feelings of personal and family wellbeing*. *Journal of Vocational Behavior*, 31, 200-215.
24. Bhatia K., Kulshrestha S. (2018). *Managing work life balance by working women – A case study in Jodhpur*. *International Journal of Research in Commerce and Management*, 9(10), 8-11. Google Scholar
25. Bhui K., Dinos S., Galant-Miecznikowska M., de Jongh B., Stansfeld S. (2016). *Perceptions of workstress causes and effective interventions in employees working in public, private and non-governmental organisations: A qualitative study*. *BJPsych Bulletin*, 40(6), 318-325. Google Scholar
26. Anandh, K. S., & Gunasekaran, K. (2016). *Constructing a model to examine the influence of quality of work-life on work-life balance- discernment of civil engineers from construction industry in Chennai*. *Indian Journal of Science and Technology*, 9(40), 1-12. Goggle Scholar
27. Noronha, S., & Aithal, P. S, (2016). *Glass Ceiling- A Silent Barrier for Women in Highly Advanced and Humanistic Society*. *International Journal of Management & Social Sciences* 5(3), PP 455-466. Goggle Scholar
28. Noronha, S., Aithal, P. S., & MD, P. (2017). *Study on the Policy Framework towards work life balance in India*. *International Journal of Multidisciplinary Research and Modern Education (IJMRME)*, 3(2). Goggle Scholar
29. Horgen, K. B., & Choo, J. Y. (2022). *Engagement and Burnout in Hybrid Work Arrangements: Effects of Leadership Behaviors and Frequency of Virtual Work* (Master's thesis, Handelshøyskolen BI). Goggle Scholar
30. Franzen-Waschke, U. (2021). *Well-being and Engagement in Hybrid Work Environments: Coaching as a Resource and Skill for Leaders to Develop*. *GiLE Journal of Skills Development*, 1(2), 82-98. Goggle Scholar
31. Noronha, S., & Aithal, P. (2017). *Organizational Strategic Approach towards Work Life Balance of in India*. *International Journal of Management, Technology, and Social Sciences (IJMTS)*, 2(1), 18-24. Google Scholar
32. Arief, N. R., Purwana, D., & Saptono, A. (2021). *Effect of quality work of life (QWL) and work-life balance on job satisfaction through employee engagement as intervening variables*. *The International Journal of Social Sciences World (TIJOSW)*, 3(1), 259-269. Google Scholar
33. BHATIA, K., & Kulshrestha, S. (2018). *MANAGING WORK LIFE BALANCE BY WORKING WOMEN-A CASE STUDY IN JODHPUR*. *CLEAR International Journal of Research in Commerce & Management*, 9(10). Google Scholar
34. Atkeson, A. 2020. *What will be the economic impact of COVID-19 in the US: Rough estimates of disease scenarios*. National Bureau of Economic Research, 26867.
35. Owan, V. J., Bassey, B. A., Friday Mbon, U., Okon, A. E., Ene, E. O., Ekaette, S. O., ... & Owan, M. V. (2020). *Validation of an instrument and measurement of employee work-life policies, psychological Empowerment, and job commitment of academic staff in universities*. *Mediterranean Journal of Social Sciences*, 11(2). Google Scholar
36. AFŞAR, Selda Taşdemir. "Impact of the quality of work-life on organizational commitment: a comparative study on academicians working for state and foundation." *ISGUC The Journal of Industrial Relations and Human Resources* 17, no. 2 (2015): 45-75. .Google Scholar
37. Khalid, K. (2020). *The Impact of Managerial Support on the Association between Pay Satisfaction, Continuance and Affective Commitment, and Employee Task Performance*. *SAGE Open*, 1-13.



38. Drew, E., & Murtagh, E. M. (2005). *Work life balance: senior management champions or laggards?* *Women in Management Review*, 20 (4), 262-278.
39. Shiffer, Dana, Maura Minonzio, Franca Dipaola, Mattia Bertola, Antonio Roberto Zamuner, Laura Adelaide Dalla Vecchia, Monica Solbiati, Giorgio Costantino, Raffaello Furlan, and Franca Barbic. "Effects of clockwise and counterclockwise job shift work rotation on sleep and work-life balance on hospital nurses." *International journal of environmental research and public health* 15, no. 9 (2018): 2038. Google Scholar
40. Kofodimos, J. *Interpreting Lessons Learned: A Comment on Paula Caproni's Journey into Balance.* *J. Appl. Behav. Sci.* 1997, 33, 57-63



QUALITY OF EARLY DIAGNOSIS OF BREAST CANCER

Urmanbaeva D.A., Makhmudzhonova S.Sh., Rasulova D.K., Isomitdinov Sh.A.

Department of Oncology, Andijan State Medical Institute, Andijan, Uzbekistan

SUMMARY

The article discusses the state of the quality of early diagnosis of breast cancer. Advances in clinical oncology show that early diagnosis of pre-tumor diseases and initial stages of cancer is possible only with an active search for patients among practically healthy people. The effectiveness of early diagnosis of malignant neoplasms is influenced by many factors, including the biological and clinical features of the tumor process, the sensitivity and specificity of screening methods, the degree of screening coverage of the female population, the frequency of screening and others.

KEYWORDS. *Breast cancer, screening, diagnosis.*

RELEVANCE

In oncology, as literature data show [1, 2, 3], one of the leading places belongs to breast cancer. Many authors [4, 5, 6] emphasize the special significance of this problem in the modern situation, when, due to the unfavorable demographic trends observed in our country, the issue of reproductive health of the female population is acute. According to literature sources [7, 8], of the four leading areas in the fight against cancer (prevention, early diagnosis, treatment, pain control), the global oncology community today places its greatest hopes on two of them - cancer prevention and early diagnosis. Advances in clinical oncology show that early diagnosis of pretumor diseases and initial stages of cancer is possible only with an active search for patients among practically healthy people [9, 10, 11]. However, despite the availability of the breast for examination in adult clinics, malignant tumors of this location are often detected with a significant delay [12, 13]. Thus, only 14–15% of breast cancer patients sent to specialized hospitals have the first stage of the tumor. In the remaining patients, more widespread tumors are detected, leading to the development of distant metastases in almost half of the cases [14]. The effectiveness of early diagnosis of malignant neoplasms is influenced by many factors, including the biological and clinical characteristics of the tumor process, the sensitivity and specificity of screening methods, the degree of screening coverage of the female population, the frequency of screening, and others. However, the most important factor in the success of early diagnosis of cancer pathology is the work of primary care physicians. Meanwhile, the qualitative level of doctors' preventive activities and their level of cancer alertness remains low, which, according to research, accounts for 35.0% of the causes of neglect [15]. The reason, in our opinion [16], lies in a number of circumstances: doctors do not receive compensation for carrying out preventive measures, are poorly informed about what preventive measures need to be carried out, and are too busy to pay attention to preventive procedures. However, no studies have been conducted to study the quality of early diagnosis of breast cancer in urban women by doctors at adult clinics in modern conditions.

PURPOSE OF THE STUDY

To study the quality of early diagnosis of breast cancer

MATERIALS AND METHODS

In accordance with the purpose of the study, the research base was identified as polyclinics No. 1, 2, 3, 4, 5, 6, 7, 8 of the city of Andijan. The study was carried out during the period 01.01–31.01.2023. The research program included the use of expert, sociological and mathematical statistical methods. Units of observation: a woman with a malignant neoplasm of the mammary gland living in an urban area; a case of identified and confirmed malignant neoplasm of the mammary gland. A retrospective analysis of 600 expert opinions of the regional commission of the Department of Health of the Ivanovo region on the analysis of advanced cases of malignant neoplasms was carried out. The information basis for the expert opinions was the following documents: "Protocol for the analysis of an advanced case of malignant neoplasm" (form 027/U), "Medical record of an outpatient" (form No. 025/U). Using a targeted selection method, a sample of women with advanced malignant neoplasms of the mammary gland was formed, among them a survey was conducted using



a specially designed questionnaire regarding their satisfaction with premorbid prevention in an adult clinic and the availability of early diagnosis of breast cancer over the past year (100 patients). The average age of the respondents was 57 ± 12.0 years. All patients participating in the study were informed about the purpose and procedure for its conduct. The obtained data were processed using applied computer programs (Statistica 10.0 program) with the calculation of relative values and the reliability of their difference according to the t criterion. The critical value of the level of statistical significance was taken equal to 5%.

RESEARCH RESULTS AND DISCUSSION

When analyzing expert data, it was found that the main reasons for late diagnosis of breast cancer in urban women are: untimely referral of the patient to a medical institution (50.7%), deviations from the standard of examination of women for oncological pathology (34.3%), errors in diagnosis (6.8%), features of the course of the disease (fulminant or latent forms) (5.2%), lack of continuity in patient management (3.0%).

A detailed analysis of cases of women seeking medical help at an adult clinic before cancer was detected made it possible to establish that, on average, each patient made 2.3 visits to doctors at the clinic in the year before diagnosis. However, only in 67.5% of cases the standard of examination for oncological pathology was fully implemented. In 32.5% of examinations, deviations from the standard were noted. In particular, in 18.7% of cases there was no mark on examination of the mammary glands. In addition, it was found that in 24.3% of cases the instrumental capabilities of the examination were not fully used. In no case were patients offered breast ultrasound or mammography. In a number of cases (12.4%), patients were referred late for consultation with a breast and oncologist.

Defects were identified in the work of examination rooms in adult clinics. It was noted that in 13.7% of cases, women visited the examination room of the clinic before being diagnosed with cancer, but the signs of a malignant neoplasm were not identified. It should be noted that the level of coverage of the female population with medical examinations in the area served by polyclinics was 75.0%.

The examination also showed that one of the leading reasons for the late detection of breast cancer in women is the lack of consistency in organizing preventive work in adult clinics and poor coordination of actions between the clinic and the oncology clinic. Thus, it was determined that in 15.4% of cases there was a violation of continuity in the management of a patient with suspected breast cancer; the patient's path from the first contact doctor to the consultant doctor was not tracked.

At the premorbid stage, as the examination data showed, in 98.7% of cases there was no mark on a conversation with the patient about the possibilities and methods of preventing cancer, in 89.5% - anamnesis data about the patient's industrial, household, hereditary and other individual risk factors for breast cancer, in 97.6% of cases recommendations were not given to neutralize them and health-improving measures were not proposed, in 23.4% of cases a consultation with an oncologist was not prescribed. Consequently, we can talk about the incomplete realization of the capabilities of medical workers in the implementation of preventive measures and early diagnosis of cancer.

During the analysis of expert data, the leading medical and organizational defects that impede the early diagnosis of breast cancer in urban women were identified.

As can be seen from the data, the structure of medical and organizational defects in the early diagnosis of breast cancer is dominated by the following: diagnostic (failure of medical personnel to comply with the cancer screening standard, failure to use instrumental and laboratory research methods) - 70.5%; organizational and tactical (violation of continuity in communication channels "polyclinic-oncological dispensary"; violation of the rules for recording the results of an oncological examination in the primary medical documentation) - 18.0%; therapeutic and preventive (insufficient attention to women with risk factors for cancer pathology, low level of sanitary and educational work) - 11.5%.

Analysis of data from a sociological survey of women with advanced breast cancer showed that 64.8% of women were satisfied with the care provided in the clinic, despite its low results, and 35.2% were dissatisfied. Every fourth of the women surveyed (25.2%)

When I went to the clinic, I did not receive the expected help from the doctor. Some respondents (11.5%) noted cases of violation of ethics and professional duty on the part of medical workers, rudeness and inattention (35.0%). Among the preventive recommendations given by doctors, women noted the following: the use of vitamins (80.0%), adherence to sleep and rest (7.5%), diet (6.5%). Women indicated as limiting factors for timely consultation with a doctor and early diagnosis of cancer: difficulty getting an appointment (50.7%), incompleteness and low quality of preventive recommendations (12.0%), difficulty following recommendations (2.9%),



personal reasons (36.4%). It should be noted that almost all women surveyed (96.0%) noted the lack of recommendations from clinic doctors on the technique and procedure for self-examination of the mammary glands. According to the patients, palpation of the mammary glands was carried out only in 31.0% of cases of visits to the attending physician of the clinic. This indicates, on the one hand, the low level of cancer alertness among clinic doctors, and on the other, their lack of commitment to preventive work.

CONCLUSION

Thus, the data obtained allowed us to draw the following conclusions.

1. Analysis of expert opinions on advanced cases of breast cancer showed that the majority of identified defects are preventable and associated with low oncological alertness of doctors and failure to fully and properly comply with the standard of examination for oncological pathology.
2. Improving the system of early diagnosis of breast cancer in urban women requires coordinated efforts of primary care doctors and oncologists, as well as careful attention to their health and adequate medical activity of women themselves.
3. Improving the quality of early diagnosis of breast cancer should be based on the rational use of human resources in primary healthcare, the introduction of “zero defects” quality assurance technology, the creation of organizational conditions for defect-free work, and social and hygienic monitoring of the preparedness of the social and medical environment for cancer prevention.

BIBLIOGRAPHY

1. Zaridze D.G., Kaprin A.D., Stilidi I.S. Dynamics of incidence of malignant neoplasms and mortality from them in Russia. *Questions of Oncology*. 2018; 64(5):578–591.
2. Gordienko V.P., Mazharova O.A., Korobkova T.N. Some aspects of the epidemiology of malignant neoplasms in the Far Eastern Federal District. *Amur Medical Journal*. 2018; 3(23):38–41. DOI: 10.22448/AMJ.2018.3.38–41
3. Aksel E. M., Vinogradova N. N. Statistics of malignant neoplasms of female reproductive organs. *Oncogynecology*. 2018; 3(27):64–78.
4. Sych G.V., Kosolapov V.P., Letnikova L.I., Lastochkina K.S. Oncological morbidity and mortality from malignant neoplasms in the Voronezh region. *System analysis and control in biomedical systems*. 2018; 17(2):479–485.
5. Vaninov A. S. Incidence of malignant neoplasms of the female reproductive organs and mammary gland in the Kyrgyz Republic. *International Journal of Applied and Basic Research*. 2019;(8):50–3. DOI: 10.17513/mjpf.12824
6. Merabishvili V.M. Medium-term variant forecast of mortality of the Russian population from malignant neoplasms. *Siberian journal of oncology*. 2019; 18(4):5–12. DOI: 10.21294/1814–4861–2019–18–4 -5–12
7. Leonov M. G., Akhmatkhanov Kh. U., Chernov S. N., Goryashko O. V. Analysis of the detection and diagnosis of malignant neoplasms of the cervix in the Russian Federation in 2016. *Effective Pharmacotherapy*. 2018; (25):30–32.
8. Voroshina N.V., Vazhenin A.V., Tyukov Yu.A. Efficiency of the system for early detection of malignant neoplasms of the mammary glands and cervix as assessed by women of fertile age. *Ural Medical Journal*. 2019; 4(172):91–95.
9. Baltabekov N. T., Olzhaev S. T., Nurmalov S. R., Zhumashev U. K., Iginova G. S., Amanbekov N. A., et al. Ways to improve early diagnosis of malignant neoplasms among older people 65 years old. *Oncology and Radiology of Kazakhstan*. 2018; 1(47):6–11.
10. Kaprin A. D., Aleksandrova L. M., Starinsky V. V., Mamontov A. S. Diagnostic and screening technologies in the early detection of malignant neoplasms. *Oncology journal named after. P. A. Herzen*. 2018; 7(1):34–40. DOI: 10.17116/onkolog20187134–40
11. Sych G.V., Kosolapov V.P., Gulov V.P., Dzhavakhadze R.E. Organization of oncological services in the Voronezh region: status, problems and development prospects. *Bulletin of new medical technologies electronic publication*. 2018; 3:112–126. DOI: 10.24411/2075–4094–2018–16048
12. Ikonnikova A.V., Juraeva Sh.F. Cancer alertness of -Dentists: Issues of Primary Diagnosis of Tongue Cancer. *Modern Dentistry*. 2019; 2(75):46–48.
13. Gatagazheva Z. M. Introduction of new organizational forms of gynecological and oncological care to the female population in the work of the republican gynecological oncological service and its results. *Social aspects of public health*. 2018; 1(59):6.