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AN COMPLETE STUDY ON HERBAL STRIPS FORMULATION FOR MOUTH ULCER USING JASMANIUM OFFICINALE

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ABSTRACT

This herbal strip for oral mouth ulcers combines Jasminum officinale, known for its anti-inflammatory properties, with white vinegar for antimicrobial effects. Potato starch serves as a binding agent, glycerine enhances moisture retention, and water ensures proper consistency. The formulation aims to provide a soothing and healing effect on oral ulcers, leveraging the natural properties of these ingredients.[1]

KEYWORDS: *Jasminum officinale, Anti- Inflammatory, Mouth Ulcer.*

INTRODUCTİON

The research paper explores a novel formulation of herbal strips designed for the management of oral mouth ulcers. The formulation incorporates key natural ingredients, each chosen for its specific therapeutic contribution.[2] Jasminum officinale, renowned for its anti-inflammatory properties, serves as a primary active component, aiming to alleviate the inflammation associated with oral ulcers.[3]

White vinegar has been included for its potent antimicrobial effects, contributing to the overall oral hygiene and potentially aiding in the prevention of secondary infections. Potato starch acts as a crucial binding agent, ensuring the cohesion and integrity of the herbal strip. Glycerine is incorporated to enhance moisture retention, promoting a soothing and moisturizing effect on the affected oral mucosa.

Water, forming the base of the formulation, plays a pivotal role in achieving the desired consistency and delivery of the herbal strip. The combination of these natural ingredients aims to synergistically address the multifaceted aspects of oral mouth ulcers, offering a potential alternative or complementary approach to conventional treatments. This research contributes valuable insights into herbal formulations for oral health and may pave the way for future developments in natural remedies for oral mucosal disorders.

Manufacturing and processing the herbal strip for oral mouth ulcers :

Ingredients and Materials:

1. Jasminum Officinale Leaves:
   - Collect fresh leaves and ensure proper identification.
   - Wash thoroughly to remove contaminants.
   - Dry the leaves using a suitable method (air drying, oven drying) and grind to a fine powder.
2. White Vinegar:
   - Use commercially available white vinegar with a known acetic acid concentration.
   - Measure the required quantity for antimicrobial effects.
3. Potato Starch:
   - Obtain high-quality potato starch.
   - Measure the precise amount needed for binding and texture.
4. Glycerine:
   - Choose pharmaceutical-grade glycerine.
   - Measure the required quantity to enhance moisture retention.
5. Water:
   - Use distilled water for consistency and to avoid impurities.

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Laboratory Equipment

- mixing apparatus, pH meter, dissolution apparatus, microbial testing equipment, UV Visible spectrophotometer. etc.
- Simulated oral mucosa substrate for adhesive testing.
- Volunteers for sensory evaluation.

Formulation Process

1. Extraction of Active Compounds from Jasminum Officinale Leaves:
   - Use a suitable solvent (e.g., water) for extraction.
   - Evaporate the solvent to obtain a concentrated extract.
2. Preparation of Herbal Extract:
   - Mix the Jasminum officinale extract with measured amounts of white vinegar, glycerine, and water.
   - Achieve a homogenous solution through stirring.
3. Incorporation of Potato Starch:
   - Gradually add potato starch while continuously stirring to prevent lumps.
   - Achieve a uniform consistency for proper binding.
4. Casting the Herbal Strip:
   - Pour the prepared mixture into suitable molds or trays.
   - Allow it to solidify at room temperature or in a controlled environment.
5. Cutting and Packaging:
   - Cut the solidified strip into uniform sizes.
   - Package the herbal strips in airtight and light-resistant containers to maintain stability.

Formula

Sr.No	Ingredients	Quantity Taken (For 100ml)	Category
1	Leaf Extract	15ml	Anti-inflammatory
2	Water	100ml	Solvent
3	Starch	15ml	Binding Agent
4	Vinegar	10ml	Anti- microbial
5	Glycerin	10ml	Moisturising Agent

Detailed information

Classification of Jasminum officinale [4]
Kingdom: Plantae
Subkingdom: Viridiplantae
Division: Tracheophyta
Class: Magnoliopsida
Order: Lamiales
Family: Oleaceae
Genus: Jasminum
Species: Jasminum officinale

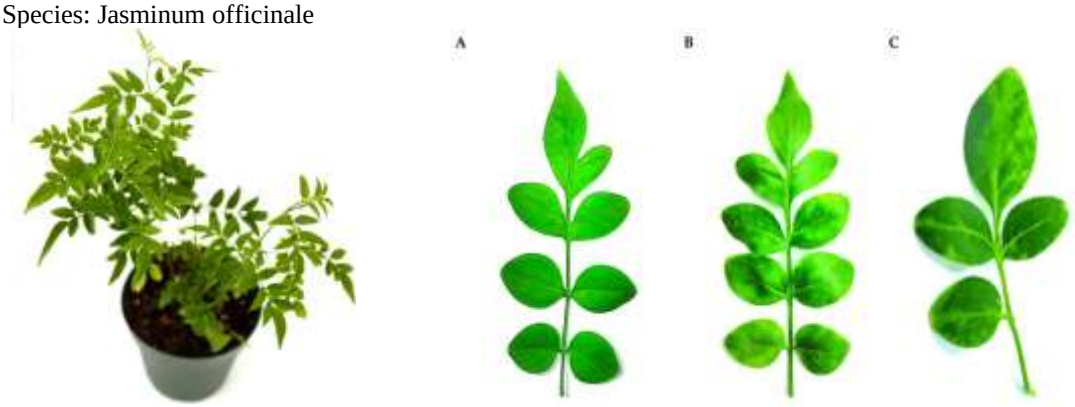

Fig: 1.Jasmanium officinale leaves.

Health Benefits of Jasminum officinale The aroma of jasmine is calming and soothing without being soporific and is indicated for depression And stress. It is indicated for sensitive skin conditions too. Jasmine also has a reputation as an aphrodisiac and Used for all kinds of sexual problems. Jasminum is used to treat skin problems, the leaf juices can be applied To clear up corns and treat mouth ulcerations, the anti-secretary and anti-oxidant components of Jasminum May also treat peptic ulcer. Jasminum also produces

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an antibiotic effect upon typhoid fever and staph Infections, they stressed that jasmine oil may serve as a main stream antibiotic treatment, the juice of the leaf Is applied to corns and ear discharges, the leaves and the barks contain salicylic acid and are used as analgesic, Febrifuge, etc. The roots are used in the treatment of ringworm, while the flowers are aphrodisiac, antiseptic, Antispasmodic, and tonic. One of the uses of J. officinale in urinary infections and diuretic the leaves of stem, Bark, and root of Jasminum has demonstrated detectable antibacterial activity against many microorganisms.[5]

1) Mouth ulcers

Mouth ulcers are painful sores on the inside lining of the mouth. They usually develop on the inside Of the lips and cheeks and on the underneath and edge of the tongue. Medicines from a pharmacist can reduce The pain and help mouth ulcers to heal. Mouth ulcers include sores, lesions, abrasions, laceration or any open break in the mucosa of the lips, mouth Or tongue. Mouth ulcers are also called stomatitis and are a symptom of a variety of mild to serious diseases, Disorders and conditions. Mouth ulcers can result from infection, vitamin deficiencies, trauma, inflammation, Malignancy and other diseases and abnormal processes.[6]

2) Causes

The exact reason of mouth ulcers developed is not yet clearly defined. Approximately 40% of people Who get mouth ulcers have a family history of the same. In some cases, the ulcers are related to diseases.

These include Injury from badly fitting dentures, harsh brushing of teeths, etc. Changes in hormone levels. Some women find that mouth ulcers occur just before their periods. A lack of iron or a lack of certain vitamins (such as vitamin B12 and folic acid) may be a factor in some cases. Rarely, a food allergy may be the cause. Stress is said to trigger mouth ulcers in some people. Some medicines can cause mouth ulcers. Examples of Medicines that can cause mouth ulcers are: nicorandil, ibuprofen etc. Mouth ulcers are more common in people With Crohn's disease, coeliac disease, HIV infection etc. [7]

3) Bacteriology

In the mouth there are many good and bad micro-organisms and bacteria, which now have access to The wound surface and produce toxins which in turn allows further cell death causing the ulcer to get larger. Also, at this stage the bacteria lining the ulcer. This situation continues till the causative agent is gone and the Body's immune system comes up with the solution and the bad bacteria are compressed. How long this takes Depends on many factors. Staphylococcus, Pseudomonas, Bacillus, E.coli, Enterococcus and Candida species Are an important component normal flora of the Oropharynx. [8]

Bacteria:

1. Escherichia coli.
2. Pseudomonas aeruginosa.
3. Staphylococcus aureus.
4. Bacillus subtilis.
5. Enterococcus faecalis

Traditional Uses

Leaves were chewed in aphthous, stomatitis, toothache and ulcer in the mouth. Leaf juice or oil obtained from it was dropped into the ear. Fresh juice of the leaves was used for sort corns between the toes, for ulceration in the mouth, throat and gums[9,10].Jasminum officinale was also used traditionally for the treatment of urinary tract infections [11], as CNS depressant, sedative, mild anesthetic and astringent[10,12].In addition, it was used in depression, nervous exhaustion and stress related conditions, It was said that the plant was also used to produce the feeling of optimism, confidence, euphoria, and it was good in cases of apathy, indifference, or listlessness. It was also used for catarrh, coughs, laryngitis, dysmenorrhoea, labor pains, uterine disorders, skin problem such as dry, greasy, irritated, sensitive skin, and for muscular spasms and sprains[13].The buds of Jasminum officinale L. var. grandiflorum [L.] were used as a folk remedy for the treatment of hepatitis, dysmenorrhea, stomatitis, and duodenitis in South China[14].

Part used medicinally: Leaves, juice, buds and oil [9,10].

Physicochemical Characteristics

The physicochemical characteristics [%] were total ash 10.89, acid insoluble ash 1.29, water soluble ash 2.92, loss on drying 4.25, petroleum ether extractive value 2.61, chloroform extractive value 3.58, acetone extractive value 8.72, alcohol extractive value 11.57 and water extractive value 12.14[9,15].

Chemical Constituents

The preliminary phytochemical analysis of the aqueous extract of Jasminum officinale leaves indicated the presence of alkaloids, coumarins, flavonoids, tannins, terpenoids, glycosides, emodine, leucoanthcyanins, steroids, anthocyanins, phlobatinins, essential oil and saponins[16-19]

Chemical analysis of the bud of the flowers of Jasminum officinale var. grandiflorum revealed the presence of six triterpenoid saponins [as 3-O-α-L-rhamnopyranosyl [1→2]-β-D-xylopyranosyl-hederagenin28-O-β-D-galactopyranosyl[1→6]-β-D-galactopyranosyl ester; hederagenin-3-O-β-D-glucopyranosyl[1→3]α-L-arabino pyranoside; 2α,3β,23-trihydroxyolean-12-en-28-oic-O-β-D-glucopyranosyl ester; hederagenin-3-O-β-D-xylopyranosyl[1→3]-α-Lrhamnopyranosyl[1→2]-α-L-arabino pyranoside; 2α,3β,23-trihydroxyolean-12-en-28-oic-O-α-L-rhamnopyranosyl[1→4]-β-D-glucopyranosyl[1→6]-β-D-glucopyranosyl ester and

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hederagenin-3-O-α-L-rhamnopyranosyl[1→2]-α-L-arabinopyranoside[20].Cell-free extracts from callus of Jasminum officinale contained epoxidase activities with isopentyl pyrophosphate, isopentenol, geraniol and nerol as substrates and also hydratase activities towards the resulting terpene oxides[21].

Six iridoid glycosides were identified from the buds of Jasminum officinale var. grandiflorum: jasgranoside B, 6-O-methy-catalpol, deacetyl asperulosidic acid, aucubin, 8-dehydroxy shanzhiside and loganin[22]. Secoiridoid glucosides: [20R]-20-methoxyoleuropein, [20S]-20-methoxyoleuropein, oleuropein, ligstroside, demethyloleuropein and oleoside dimethyl ester, a lignan, [2]-olivil and p-hydroxyphenethyl alcohol were isolated from the dried leaves of Jasminum officinale var. grandiflorum[23]. Six secoiridoids were identified in the flowers of Jasminum officinale L. var. grandiflorum included jasgranoside, jaspolyoside, 8-epi-kingiside, 10-hydroxy-oleuropein, 10-hydroxy-ligstroside and oleoside-7, 11-dimethyl ester[24]. Seven glycosides were isolated from the flower of Jasminum officinale var. grandiflorum included kaempferol-3-O-alpha-L-rhamnopyranosyl [1→3]-[alpha-L-rhamno pyranosyl [1→6]]-beta-D-galactopyranoside, kaempferol-3-O-rutinoside, 7-ketolo ganin, oleoside-11-methyl ester, 7-glucosyl-l1-methyl oleoside, ligstroside and oleuropein[25].

Thirty compounds were identified in the essential oil of Jasminum officinale L. var. grandifloroum. The major volatile components were phytol [25.77 %], 3,7,11-trimethyldodeca -1,6,10-trien-3-ol [12.54%]and 3,7,11- trimethyldodeca-6,10-dien-3-ol [12.42%]. However, the compounds identified in the Jasminum officinale L. var. grandifloroum oil [%] were: benzyl acetate 0.33; nerolidol 0.11; methyl myristate 0.75; 7-tetradecene 0.20; benzyl benzoate 4.84; neophytadiene 0.23; perhydrofarnesyl acetone 4.85; phytol acetate 0.22; nonadecane 0.14; geranyl linalool 0.12; methyl palmitate 1.57; 3,7,11,15-tetramethyl -1-hexadecen-3-ol 12.42; hexadecanoic acid 9.16; 3,7,11-trimethyl-1,6,10-dodecatrien-3-ol 12.54; 3,7,11,15-tetramethylhexadecanoic acid methyl ester 0.60; 9,12,15-octadecatrienoic acid methyl ester 1.33; heneicosane 3.12; Phytol 25.77; octadecanoic acid methyl ester 0.56; 9,12,15-octadecatrienoic acid 4.82; docosane 0.25; tricosane 4.00; tetracosane 0.58; pentacosane 1.51; hexacosane 2.54; heptacosane 1.86; octacosane 1.26; squalene 0.46 and nonacosane 3.00[19].

The total phenolic contents of the aqueous extract of Jasminum officinale leaves was 104.02 ± 1.28 mg/g gallic acid equivalent, the total flavonoids content was 10.76 ± 0.83 mg/g quercetin equivalent and the total flavonols content was 5.65 ± 0.45 mg/g quercetin equivalent[17].

1. Scientific Research

- Investigate the bioactive compounds in Jasminum officinale leaves through chromatographic methods, identifying potential anti-inflammatory agents.
- Examine existing research on the therapeutic effects of white vinegar, focusing on its antimicrobial properties against oral pathogens.
- Explore studies on the utilization of potato starch in oral pharmaceutical formulations and its impact on drug delivery.

2. Therapeutics

- Evaluate the anti-inflammatory potential of Jasminum officinale leaves, highlighting their role in reducing oral mucosal inflammation associated with ulcers.
- Investigate the antimicrobial efficacy of white vinegar in addressing bacterial or fungal infections in the oral cavity.[26]
- Assess the soothing and moisturizing effects of glycerine in promoting oral ulcer healing.

3. Taxonomic Information

- Provide detailed taxonomic classification of Jasminum officinale, including family (Oleaceae), genus, and species, establishing its botanical identity.
- Examine any variations in the chemical composition of Jasminum officinale leaves among different geographical regions.[27]

4. Physiological Aspects

- Explore the physiological interactions between the herbal strip and oral mucosa, including absorption rates, tissue compatibility, and potential local effects.
- Assess the impact of water content in the formulation on oral mucosal hydration and the overall therapeutic outcome.

5. Pharmacological Information

- Investigate the pharmacodynamics of Jasminum officinale compounds, elucidating their mechanisms of action in reducing inflammation.
- Examine the pharmacokinetics of the herbal strip components, considering absorption, distribution, metabolism, and excretion.[28]
- Explore potential synergistic interactions between the components in the herbal strip for enhanced therapeutic efficacy.

➢ Pharmacodynamics:

1. Anti-inflammatory Activity:

- Jasminum officinale contains bioactive compounds like flavonoids and phenolic acids, which exhibit potent anti-inflammatory effects.[29]
- These compounds inhibit inflammatory mediators such as prostaglandins, leukotrienes, and cytokines, thereby reducing inflammation and pain associated with mouth ulcers.

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2. Antimicrobial Properties:
- Certain constituents of Jasminum officinale possess antimicrobial activity against oral pathogens, including bacteria and fungi.
- Compounds like linalool and benzyl acetate have shown inhibitory effects against oral bacteria like Streptococcus mutans and Candida albicans, which can exacerbate mouth ulcers.

3. Wound Healing Effects:
- Jasminum officinale extracts promote wound healing by accelerating the proliferation and migration of epithelial cells.
- Active compounds stimulate collagen synthesis, angiogenesis, and fibroblast activity, leading to faster resolution of mouth ulcers.

4. Analgesic Properties:
- Some constituents in Jasminum officinale exhibit analgesic effects by modulating pain receptors or neurotransmitter pathways.[30]
- Application of the herbal strip may alleviate pain and discomfort associated with mouth ulcers.

➢ Pharmacokinetics:

1. Absorption:
- The active compounds from Jasminum officinale are absorbed through the oral mucosa upon application of the herbal strip.
- Absorption rates may vary depending on the formulation's composition and the individual's physiological factors.

2. Distribution:
- Once absorbed, the bioactive compounds distribute systemically and locally within the oral cavity.
- Distribution to the site of the ulcer facilitates direct interaction with inflammatory mediators and microbial pathogens.

3. Metabolism:
- Metabolism of active compounds occurs primarily in the liver and may involve phase I and phase II reactions.
- Metabolites may retain or modify the pharmacological activity of the original compounds.

4. Excretion:
- Metabolites and unabsorbed compounds are excreted through urine, feces, or bile.
- Excretion pathways vary depending on the chemical properties of the compounds.

6. Dermatological Effect

Ampucare was a topical oil-based preparation containing Azadirachta indica, Berberis aristata, Curcuma longa, Glycyrrhiza glabra, Jasminum officinale, Pongamia pinnata,Rubia cordifolia, Terminalia chebula, Trichosanthes dioica, Symplocos racemosa, Ichnocarpus frutescens, Capsicum abbreviata, Nymphaea lotus etc.[31,32] Application of ampucare in second-degree burn showed burn healing effect with enhancement of antioxidant function. It increased wound contraction, decreased NO, decreased xanthine oxidase activity, increased protein level, increased vitamin C, reduced glutathione and decreased MDA in blood samples[33-35].

Synergistic and Antagonistic Effect

1. Synergistic Interactions
- Jasminum officinale with White Vinegar:
  - Potential synergy in anti-inflammatory and antimicrobial actions, addressing both the inflammatory component and microbial aspects of oral ulcers.
- Potato Starch with Glycerine:
  - Synergistic enhancement of strip consistency and adhesive properties, ensuring prolonged contact with the affected area for improved therapeutic outcomes.
- White Vinegar with Potato Starch:
  - Possible synergy in creating a stable formulation with enhanced microbial control, as vinegar may act as a preservative.

2. Antagonistic Interactions
- Jasminum officinale with White Vinegar:
  - Careful consideration needed to avoid potential chemical reactions that might compromise the stability or efficacy of the herbal strip.
- Glycerine with White Vinegar:
  - Glycerine's moisture-retaining properties could counteract the drying effect of vinegar, balancing the formulation but requiring precise formulation control.
- Potato Starch with Water:
  - Monitoring starch-water interactions is crucial to prevent unwanted changes in the herbal strip's texture or consistency.

Future Trends And Traditional Knowledge

1. Future Trends
- Biotechnology Integration:
  - Explore the potential of biotechnological methods for extracting and enhancing bioactive compounds from Jasminum officinale, optimizing therapeutic benefits.
  - Investigate nanotechnology applications for improving the delivery and bioavailability of herbal strip components.
- Personalized Medicine:

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- Consider the feasibility of tailoring herbal strip formulations based on individual genetic and physiological variations for personalized and optimized treatment.
- Clinical Trials and Evidence-Based Medicine:
- Advocate for further clinical trials to establish the efficacy and safety of the herbal strip, contributing to evidence-based integrative medicine for oral health.

2. Traditional Knowledge

- Ethnobotanical Insights:
- Document and integrate traditional knowledge regarding the historical use of Jasminum officinale, white vinegar, and other components for oral health within various cultural practices.
- Community Engagement:
- Explore community-based participatory research to involve local communities in sharing their traditional knowledge and experiences related to herbal remedies for oral ulcers.
- Synergies with Conventional Medicine:
- Investigate potential synergies between traditional herbal knowledge and modern medicine, promoting the integration of herbal strips into mainstream oral healthcare practices.

Result, Observation, and Evaluative Steps

Sr.no.	1] Physical Test	2] Sensory Test
1 2 3 4 5	Appearance – Jelly type semisolid strip Size – Fine particles uniform size Colour – Greenish brown Texture – Slightly Gritty Consistency – Strip wet	Odour – Earthy herbal scent with hint of bitterness Flavour – Mild slightly bitter Taste – Mildly bitter with herbal notes
Sr.no.	**3] Chemical Test**	**4] Stability Testing**
1 2 3 4 5 6 7	PH – 5 to 6 Polarity – Non polar to moderately polar Caffeine content – Absent Alkaloid – May be present Flavonoids – Present Tannins – Moderate Glycoside – May be present	Temprature – Room temperature (25°c) and below Humidity – Relatively stable under normal humidity Light Exposure – Sensitive to prolonged exposure to direct sunlight. - Should be stored in opaque container or packaging. Storage Duration – Stable for upto 6 months when stored in cool & dry place. Moisture content – Ranging from 5 to 10 %

5] In-vitro HCL / Buccual model (Acidic Dissolution)
- 1 to 2 min in acidic conditions having in 6 pH.

6] In- vitro realase study (Release Rate)

I) UV Frequency λmax (Absorbance) Absorbance Vs Wavelength

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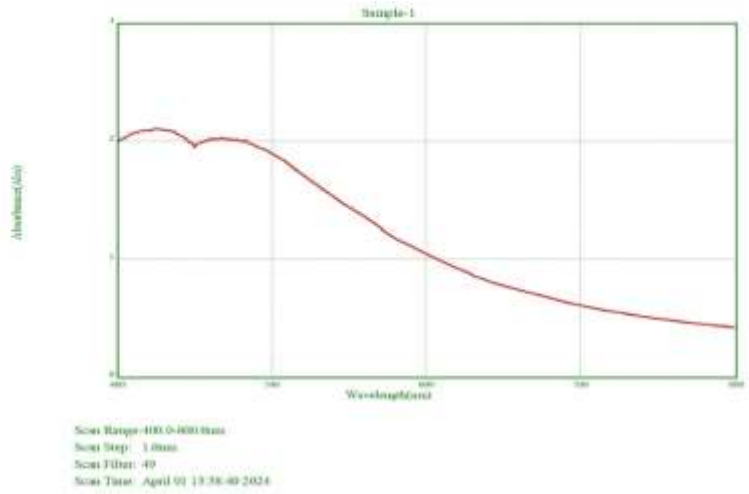
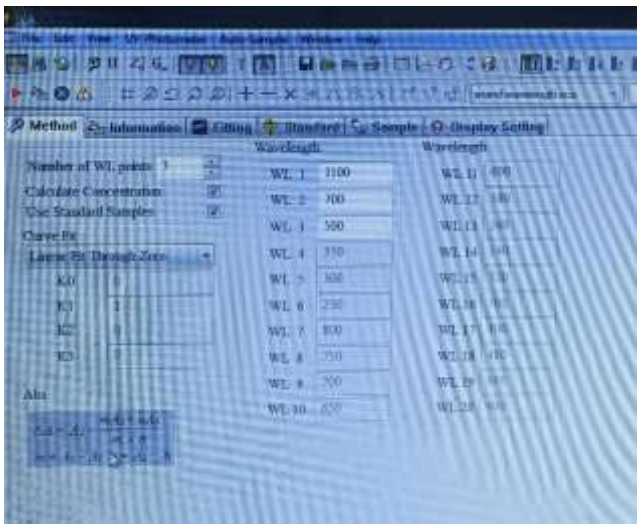


II) UV visible Kinetics Absorbance Vs Time



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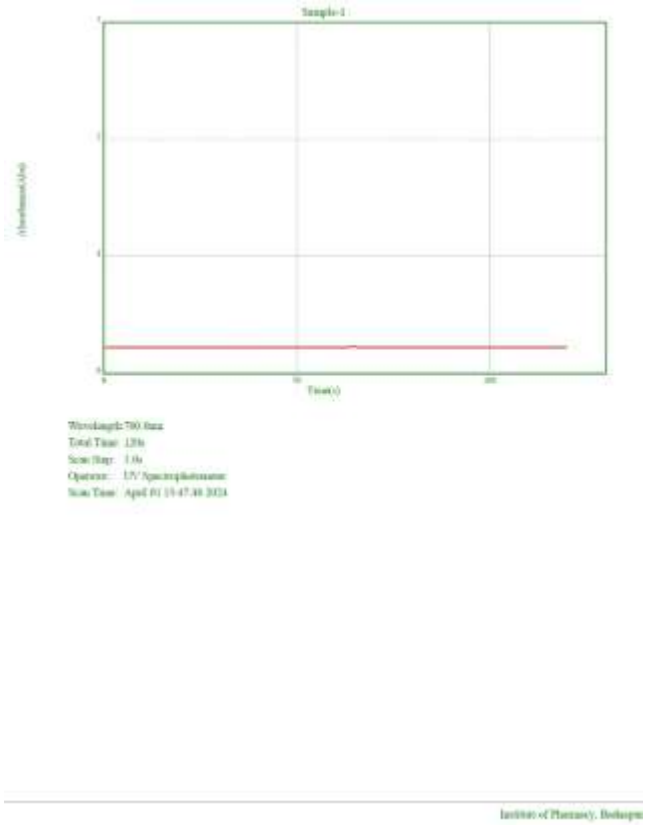

Sample-1

0.0s 0.2190	34.0s 0.2178	68.0s 0.2197	102.0s 0.2176
1.0s 0.2190	35.0s 0.2181	69.0s 0.2198	103.0s 0.2175
2.0s 0.2190	36.0s 0.2182	70.0s 0.2198	104.0s 0.2171
3.0s 0.2184	37.0s 0.2186	71.0s 0.2198	105.0s 0.2175
4.0s 0.2183	38.0s 0.2190	72.0s 0.2199	106.0s 0.2170
5.0s 0.2183	39.0s 0.2191	73.0s 0.2196	107.0s 0.2179
6.0s 0.2183	40.0s 0.2192	74.0s 0.2190	108.0s 0.2184
7.0s 0.2182	41.0s 0.2193	75.0s 0.2190	109.0s 0.2181
8.0s 0.2181	42.0s 0.2192	76.0s 0.2189	110.0s 0.2183
9.0s 0.2182	43.0s 0.2192	77.0s 0.2191	111.0s 0.2182
10.0s 0.2182	44.0s 0.2188	78.0s 0.2191	112.0s 0.2177
11.0s 0.2185	45.0s 0.2184	79.0s 0.2192	113.0s 0.2178
12.0s 0.2184	46.0s 0.2180	80.0s 0.2193	114.0s 0.2176
13.0s 0.2182	47.0s 0.2178	81.0s 0.2195	115.0s 0.2176
14.0s 0.2181	48.0s 0.2180	82.0s 0.2195	116.0s 0.2177
15.0s 0.2179	49.0s 0.2181	83.0s 0.2196	117.0s 0.2175
16.0s 0.2180	50.0s 0.2182	84.0s 0.2195	118.0s 0.2174
17.0s 0.2183	51.0s 0.2181	85.0s 0.2195	119.0s 0.2174
18.0s 0.2187	52.0s 0.2180	86.0s 0.2193	120.0s 0.2175
19.0s 0.2189	53.0s 0.2178	87.0s 0.2192	
20.0s 0.2188	54.0s 0.2177	88.0s 0.2189	
21.0s 0.2186	55.0s 0.2180	89.0s 0.2186	
22.0s 0.2187	56.0s 0.2186	90.0s 0.2189	
23.0s 0.2187	57.0s 0.2188	91.0s 0.2190	
24.0s 0.2187	58.0s 0.2193	92.0s 0.2191	
25.0s 0.2186	59.0s 0.2197	93.0s 0.2191	
26.0s 0.2184	60.0s 0.2199	94.0s 0.2191	
27.0s 0.2184	61.0s 0.2195	95.0s 0.2191	
28.0s 0.2184	62.0s 0.2196	96.0s 0.2190	
29.0s 0.2186	63.0s 0.2199	97.0s 0.2186	
30.0s 0.2184	64.0s 0.2200	98.0s 0.2184	
31.0s 0.2181	65.0s 0.2201	99.0s 0.2181	
32.0s 0.2180	66.0s 0.2198	100.0s 0.2180	
33.0s 0.2178	67.0s 0.2197	101.0s 0.2178	

Conclusion on Herbal Strip Formulation

After a comprehensive investigation into the formulation of the herbal strip designed for oral mouth ulcers containing Jasminum officinale leaves, white vinegar, potato starch, glycerine, and water, the following conclusions can be drawn:

1. Efficacy of Herbal Components:

properties contributing to potential therapeutic effects in addressing oral mucosal inflammation.

In conclusion, the herbal strip formulation, combining Jasminum officinale leaves, white vinegar, potato starch, glycerine, and water, holds promise as a natural remedy for oral mouth ulcers. Its favorable physical, chemical, and sensory characteristics, along with the synergistic effects of its components, provide a solid foundation for further development and clinical exploration. This research contributes valuable insights to the field of herbal formulations for oral health, offering a potential alternative or complementary solution for managing oral mucosal disorders

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