SJIF Impact Factor (2024): 8.675| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 9 | Issue: 6 | June 2024 - Peer Reviewed Journal

FORMULATION AND EVALUATION OF ANTIACNEY FACEWASH

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ABSTRACT
Natural remedies are often favored due to their perceived safety and minimal side effects compared to synthetic alternatives. There is a growing global demand for herbal formulations. This study focuses on the development and evaluation of an herbal anti-acne face wash, incorporating aqueous extracts of betel leaves (Piper betel), turmeric (Curcuma longa), and walnut (Juglans regia). Despite the availability of many herbal acne treatments on the market, our objective is to create a completely herbal product devoid of synthetic ingredients. The selected plants are renowned for their antimicrobial, antioxidant, and anti-inflammatory properties. We prepared several formulation batches (F1 to F3) using varying concentrations of honey and evaluated them based on parameters such as color, appearance, consistency, washability, pH, and spreadability. The optimized formulation was then compared to a commercial product. Among all the formulations, batch F2 was found to be optimal across all parameters. This study is a significant step toward developing an effective herbal anti-acne face wash using betel leaf, walnut, turmeric, and other natural ingredients.

KEYWORDS: *Anti-acne, herbal, betel leaf, walnut, honey, face wash*

INTRODUCTION

Acne vulgaris is a highly prevalent skin disorder affecting nearly all individuals at least once in their lifetime. While the incidence of acne peaks during adolescence, a significant number of men and women aged 20-30 also experience this condition.(1) The pathogenesis of acne involves several physiological factors, including follicular hyper-proliferation, increased sebum production due to elevated androgen levels, and the colonization of Propionibacterium acnes and Staphylococcus epidermidis. Emerging concepts in acne pathogenesis highlight variations in target cell sensitivity, biological markers, neuro-endocrine factors, genetics, and environmental influences. Both herbal and synthetic ingredients have shown remarkable benefits in treating acne vulgaris. (3.4)

Herbal cosmetics: Herbal healing involves the use of herbs, herbal extracts, or natural products to improve health conditions. In recent years, medical practitioners in Western countries have increasingly prescribed medicines containing plant extracts. This appreciation of traditional and ancient forms of medicine has led to a growing global demand for Indian herbal drugs. The surge in popularity of herbal remedies, including skin care products and cosmetics, is evident. Herbal products are often perceived as safer, possessing numerous therapeutic properties with minimal side effects compared to modern chemical treatments. The skin, being the body's most exposed organ, requires protection from pathogens. Formulations with antibacterial, antioxidant, and anti-inflammatory properties are essential for preventing skin diseases. Hormonal imbalances during puberty can cause various skin issues, highlighting the need for effective skincare solutions. (5)

Skin care preparation for face

1. Face packs and masks
2. Cleansing creams and lotions
3. Rouges
4. Face washes
5. Compact powders

Facewash

Effective acne prevention requires a balanced approach, combining moisturizing and oil control, exfoliation, and cell renewal. Washing your face twice daily, in the morning and at night, helps remove debris, germs, and sebum that clog pores, making the skin prone to

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pimples. Face washes can aid in pimple reduction and some are formulated to prevent acne while also addressing issues like lines and wrinkles, while others are intended simply to cleanse the skin**.**

A. Properties of face wash

- It should be stable and aesthetically pleasing.
- It should soften upon application and spread easily without dragging.
- It should not feel oily or greasy during application.

B. Function of Face wash [(6)]

- Removing dead skin cells
- Rejuvenating skin cells and alleviating tension

C. Face wash benefits include:

- Removes dead skin cells, allowing new cells to replace the old ones
- Keeps skin fresh and healthy
- Makes the skin look radiant by unclogging pores, preventing acne, whiteheads, blackheads, and reducing the overall tired appearance

D. Advantages of face wash:

- Helps remove dead skin cells, promoting new cell growth
- Keeps skin fresh and healthy
- Enhances skin radiance

Objective:

- Formulate an herbal face wash suitable for all ages, targeting skin tanning.
- Develop a product particularly effective in soothing irritated or inflamed skin conditions, such as acne or redness.
- Avoid the use of harmful chemicals on facial skin.

Need of this product

An effective anti-acne face wash should contain ingredients like walnut, turmeric, and betel leaf oil. These ingredients help unclog pores, reduce inflammation, and eliminate acne-causing bacteria. It is crucial to choose a gentle cleanser that preserves the skin's natural oils, as overly drying products can worsen acne.

Application: -[(7)]

- Helps keep skin fresh and healthy
- Enhances skin radiance

Drug profile & Excipients profile

Betel Leaves



Fig.1 Betel Leaves

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- **Common Name:** Piper betel
- **Scientific Name:** Piper siriboa L.
- **Family:** Piperaceae

Taxonomical Information:
- Kingdom: Plant
- Order: Piperales
- Family: Piperaceae
- Genus: Piper
- Species: betle

Pharmacology

The analgesic and anti-inflammatory activities of Piper betle can be attributed to the presence of phytochemical compounds such as flavonoids, tannins, phenols, and glycosides. [8]

Uses:

Betel leaves help cleanse and purify the skin by removing dirt and grime from pores, resulting in smooth, supple, and glowing skin. [9]

2.Walnut



Fig.2 Walnut

- **Common Name:** Akhroot
- **Scientific Name:** Juglans regia
- **Family:** Juglandaceae

Taxonomical Information: [10]
- Kingdom: Plant
- Family: Juglandaceae
- Genus: Juglans
- Species: Juglans regia

Pharmacology

The antioxidant activity of walnut compounds is 15 times greater than that of vitamin E. Walnuts reduce inflammation caused by free radicals, thanks to the presence of γ-tocopherol. Antioxidants such as selenium and melatonin provide protection against various chronic diseases, including atherosclerosis and oxidative stress. Polyphenols like gallic acid and ellagic acid prevent the oxidation of LDL in the blood. [11]

Uses

Walnuts impart a bright and youthful glow to the skin. Their texture, vitamins, and antioxidant content make them excellent exfoliants for the skin.

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3. Turmeric



Fig.3 Turmeric

- **Common Name:** Curcumin
- **Scientific Name:** Curcuma longa
- **Family:** Zingiberaceae

Taxonomical Information
- Kingdom: Plantae
- Order: Zingiberales
- Family: Zingiberaceae
- Genus: Curcuma
- Species: longa

Pharmacology
Curcuma longa Linn. is known for its various medicinal properties. The rhizome of Haridra (turmeric) possesses therapeutic activities and is used by medical practitioners for its anti-diabetic, hypolipidemic, and anti-inflammatory effects. [12]

Uses
Curcumin protects the skin by neutralizing free radicals and reducing inflammation through the inhibition of nuclear factor-KB. It also shortens wound-healing time, improves collagen deposition, and increases fibroblast and vascular density in wounds.

4. Aloe vera



Fig.4 Aloe vera

- **Common Name:** Aloe barbadensis Mill
- **Scientific Name:** Aloe perfoliata L.
- **Family:** Asphodelaceae

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Taxonomical Information
- Kingdom: Plant
- Order: Asparagales
- Family: Asphodelaceae
- Genus: Aloe
- Species: barbadensis-miller

Pharmacology
Aloe vera softens the skin through its cohesive action on superficial flaking epidermal cells and the action of amino acids. [13]

Uses
Aloe vera prevents ulcers and enhances the healing process of dermal injuries.

5. Honey



Fig 5 .Honey

- Common Name: Honey purified, mel, madhu
- Scientific Name: Honey
- Family: Apidae

Taxonomical Information
- Kingdom: Animalia (Insecta)
- Order: Hymenoptera
- Family: Apidae
- Genus: Apis
- Species: Apis mellifera

Pharmacology
Raw honey helps balance the bacteria on your skin, making it an excellent product for acne treatment. Studies have shown honey to be significantly more effective than other popular acne products. As a natural exfoliator, raw honey removes dry, dull skin, revealing new skin cells underneath. [14]

Uses
- Naturally antibacterial
- Anti-inflammatory
- Suitable for sensitive skin

6. Rose Water
Rose water is ideal for cleansing the skin and removing impurities that can cause blemishes. It also acts as a fragrant component in herbal cosmetic products.

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7. Coco Glucoside
Coco glucoside is used to build viscosity and increase the foaming capacity of liquid soaps in hair and skincare products. It primarily functions as a foaming agent.

Materials and Equipment
Mixing bowls: For blending and mixing the ingredients to prepare the face wash formulation.
Measuring instruments: Weighing balance for accurate measurement of ingredients.
Blender or grinder: To grind or blend ingredients such as walnut or betel leaves (Piper betel) into powder form.
Heating apparatus: Heating mantle for betel leaf oil extraction.
Stirring rods or spatulas: For thorough mixing and homogenization of the formulation.
Soxhlet apparatus: For oil extraction process.
Sieve shaker: For separation of tiny particles into smaller particles.

Formula

Sr.no	Drug	Quantity	Use
1	Betel leaf oil	5 ml	Reduce dark spots, help to reduce premature ageing and skin damage
2	Honey	5 ml	Moisturizing agent
3	Aloe Vera gel	5 ml	Smoothing and tightening agent
4	Turmeric powder	2 gm	Antiacne
5	Rose Water	3 ml	Hydrating
6	Walnut	3 gm	Exfoliating agent, provide hydration, brightness and Refresh the skin
7	coco-glucoside	2 gm	Foaming agent

Table no.1

Steps / Methodology
Collection
Betel leaves were collected from the market in Badnapur, Jalna district.
Walnuts were collected from Sant Eknath Ayurvedic Hospital, Chanakwadi, Taluka Paithan.
Honey, Aloe vera, Turmeric, coco-glucoside, and rose water were collected from the laboratory of the Institute of Pharmacy, Badnapur.

Extraction
1. Collect and wash betel leaves with water to remove dirt.
2. Dry the leaves naturally for 4-5 days.
3. Extract oil using the Soxhlet apparatus.
4. Collect walnuts and grind them into powder form using a grinder.
5. Pass the powder through a sieve.
6. Add other ingredients like Aloe Vera gel, honey, turmeric, coco-glucoside, and the foaming agent. [15]

Preparation
1. Measure all the ingredients accurately.
2. Mix the ingredients thoroughly in a mixing bowl using stirring rods or spatulas until a homogeneous formulation is achieved.
3. Store the face wash in appropriate containers.

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Fig 6. Soxhlet apparatus

Development of Formulation

Various formulation batches were prepared according to Table 1. The desired concentrations of herbs were weighed accurately and dispersed in betel leaf oil with moderate stirring. The required amount of aloe vera gel was mixed with the appropriate amount of honey by gentle stirring. The concentrated herbal extracts were then added to the remaining amount of betel leaf oil and combined with the honey mixture through gentle stirring. This mixture was finally incorporated into the previously prepared formulation. The completed formulations were filled into suitable containers and labeled accordingly. [16]



Fig 7. Formulation

Sr.no	Ingredients	Quantity taken for 25ml		
		F1	F2	F3
1	Betel leaf oil	5ml	2.5ml	2ml
2	Honey	5ml	2.5ml	5ml
3	Aloevera gel	5ml	2.5ml	5ml
4	Turmeric powder	2gm	1gm	1gm
5	Rose water	3ml	1.5ml	1ml
6	walnut	3gm	1.5gm	3gm
7	Coco-glucoside	2gm	2gm	2gm

Table no.2

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Evaluation Test

Physical evaluation

Physical parameters such as color, appearance, and consistency were checked visually.

1. Washability

Formulations were applied to the skin, and the ease and extent of washing with water were checked manually.

2. pH

The pH of the face wash formulation was measured using pH paper, and the result was found to be pH 6.5. [17]



Fig 6. pH

3. Spreadability

Spreadability denotes the extent of area to which the gel readily spread on application to skin or the affected part. The bioavailability efficiency of a gel formulation also depends on its spreading value. The spreadability is expressed in terms of time in seconds taken by two slides to slip off from the gel, placed in between the slides, under certain load. Lesser the time taken for separation of two slides, better the spreadability. Two sets of glass slides of standard dimensions were taken. The herbal gel formulation was placed over one of the slides. The other slide was placed on the top of the gel, such that the gel was sandwich between the two slides in an area occupied by a distance of 6 cm along the slide. 100gm weight was placed upon the upper slide so that the gel between the two slides was pressed uniformly to from a thin layer. The weight was removed & the excess of the gel adhering to the slides was scrapped off. The two slides in position were fixed to stand without slightest disturbance & in such a way that only the upper slide to slip off freely by the force of weight tied to it. A 20gm weight was tied to the upper slide carefully. The time taken for the upper slide to travel the distance of 6 cm7 separated away from the lower slide under the influence of the weight was noted. The experiment was repeated three times both formulated gels & marketed gel & the meantime taken for calculation.

Spreadability was calculated by using the following formula,

$S=M\times L/T$ $10\times3.25/3 = 10.83$

Were, S- Spreadability

M- Weight tied to the upper slide (20gm).

L- Length of the glasss (6.5cm).

T- Time in sec.

4. Stability test

Stability tests were carried out at room temperature (25°C) and 45°C for two weeks. The samples were observed for sweating, solution deformation, and phase separation. The system was considered stable if no deformation or oil droplets were observed on the surface of the face wash. The color of the formulations was also monitored for any changes. [18]

Result

1)	Colour	Orange	Orange	Orange
2)	Consistency	Semi solid gel	Semi solid gel	Semi solid gel
3)	Washability	Good	Good	Good
4)	PH	6.2	6.4	6.7
5)	Spreadability	10.15	11.14	11.76
6)	Skin irritation	No irritation	No irritation	No irritation

Table no.3

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Extraction of Chemical Constituents from Betel Leaf and Their Formulation for Face Wash

The formulation and evaluation of a face wash using chemical constituents extracted from betel leaf were undertaken in this project. The test methods described serve as examples of a suitable face wash formulation. The aim was to collect recommended herbal medicines for assessing anti-acne activity and content of herbal materials, aiding national laboratories in pharmaceutical evaluation tests. This publication includes detailed descriptions of the preparation and formulation of a face wash using herbal ingredients, primarily betel leaf oil, walnut, and honey. Additionally, the evaluation tests of the face wash, including its physical characteristics, visual inspection, and pH measurement, were discussed.

CONCLUSION

Natural remedies are increasingly preferred due to their perceived safety and fewer side effects compared to synthetic alternatives. Herbal formulations are in growing demand globally. This study successfully established an herbal face wash containing betel leaf oil, turmeric powder, and walnut. The results indicated that the developed herbal formulation of batch F2 was superior to other formulations. Herbal face washes offer multiple benefits, including refreshing the skin, maintaining elasticity, removing grime, and enhancing blood flow. They are non-toxic and nourish the skin effectively, helping to remove scars, marks, and pimples. Additionally, herbal face washes exfoliate the skin and provide a cooling, soothing effect, working efficiently in a short amount of time.

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