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FORMULATION AND EVALUATION OF HERBAL FACE WASH CONTAINING ZIZIPHUS MAURITIANA LEAF EXTRACT

Pravin Dere[1], Jagdish Sanap[2]*, Aniket Kachare[2], Akanksha Sarode[2], Abhishek Sapate[2], Aditya Khavane[2]

[1]Prof. of Pharmacognosy Department, Shri Vivekanand Nuresing Home Trust College of B. Pharamcy, Shrishivajinagar, Rahuri Factory, India.

[2]Pharmacognosy Department, Shri Vivekanand Nuresing Home Trust College of B. Pharamcy, Shrishivajinagar, Rahuri Factory, India.

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***Corresponding Author**
Jagdish Sanap
Pharmacognosy Department, Shri Vivekanand Nuresing home Trust College of B. Pharamcy, Shrishivajinagar, Rahuri Factory, India.

ABSTRACT

This study will focus on the formulation and evaluation of a herbal face wash containing Ziziphus mauritiana leaf extract, known for its natural cleanser, antimicrobial, astringent, exfoliating and antioxidant properties. Formulation will try to provide efficient skin cleansing by using natural ingredients. The prepared face wash was evaluated with parameters such as pH, viscosity, spreadability, formability, and stability in order to confirm its efficacy and safety.

KEYWORD: Ziziphus mauritiana, exfoliating, antioxidant, natural cleanser, astringent, antimicrobial.

INTRODUCTION

Define: A face wash is a type of facial cleanser that is specifically designed to remove makeup, Dirt, oil, dead skin cells, and other impurities from the skin of the face. The growing demand for natural skincare products has opened up the exploration of plant-based ingredients in cosmetic formulations. Ziziphus mauritiana, also known as Indian jujube, is a plant with significant medicinal properties, including antimicrobial and antioxidant activities. Its leaf extract can be incorporated into a face wash formulation, which may benefit the skin.

The term "cosmetics" originates from the Greek word "kosmetikos," meaning "to adorn" or embellish. Since the dawn of civilization, humans have sought to enhance their appearance, driven by an innate desire to look beautiful. This universal aspiration has fuelled the development of assorted beauty products, including.

- Skincare products
- Hair care products
- Fragrances
- Oral hygiene products
- Nail care products

From ancient tribal rituals to modern-day beauty routines, the concept of cosmetics has evolved significantly, yet its core purpose remains unchanged – to adorn and beautify.[1]

The application of herbal-based skin care products has received much attention because of their natural nature, fewer side effects, and therapeutic benefits. Among them, herbal face washes have gained popularity for their skin cleansing ability along with other medicinal benefits like antimicrobial and antioxidant activity.

Ziziphus mauritiana, also referred to as Indian jujube or ber, is a medicinal plant with high content of bioactive compounds like flavonoids, alkaloids, saponins, and tannins. The phytochemicals have potent antimicrobial action against skin pathogens and have powerful antioxidant activity that protects the skin from oxidative stress and premature aging. The natural saponins present in Ziziphus mauritiana make it a great cleansing agent, which cleanses the skin of dirt, excess oil, and impurities without drying out the skin.

This research involves the development and assessment of an herbal face wash with Ziziphus mauritiana extract. The antimicrobial activity of the formulation will be tested against prevalent skin pathogens, and its antioxidant activity will be measured to establish its capacity to prevent oxidative damage. The outcomes of this research seek to help in the production of safe, efficient, and environmentally friendly skincare products that tap the benefits of herbal products.

Herbal skincare products have become more popular because they are natural, have fewer side effects, and are more therapeutically beneficial. Herbal face washes, in general, provide a mild yet efficient way of cleansing the skin with added medicinal properties like

antimicrobial, antioxidant, anti-inflammatory, and skin nourishing. In contrast to synthetic face washes that could contain irritating chemicals resulting in skin damage and long-term harm, herbal products take advantage of the potency of plant bioactive compounds to ensure healthier skin of many medicinal plants, Ziziphus mauritiana or ber or Indian jujube has been used extensively in traditional medicine due to its various pharmacological properties, such as antibacterial, antifungal, antioxidant, and anti-inflammatory activity. This plant is endowed with bioactive compounds like flavonoids, alkaloids, tannins, saponins, and phenolics, which are responsible for its therapeutic activity. Its natural saponins make it a good cleansing agent that can remove dirt, oil, and impurities without drying the skin. Its antimicrobial activity also assists in the control of acne-causing bacteria, while its antioxidant capacity assists in mitigating oxidative stress and premature aging of the skin.

With the rising need for herbal and eco-friendly skincare products, the current study seeks to contribute to the development of natural, chemical-free skincare products that provide therapeutic benefits without the side effects that come with synthetic products. The work also identifies the potential of Ziziphus mauritiana as a valuable herbal active ingredient in cosmetic products, opening avenues for future work and commercialization in the field of skincare.[2]

Natural beauty blessings and cosmetic help in presenting and enhancing the beauty and personality aspects of human beings now days, people are preferring natural food, herbal medicines and natural curing practices for healthy life. The herbal cosmetics are the preparation containing phytochemical from a variety of botanical sources, which influences the function of skin and provides nutrients necessary for healthy skin. The natural herbs and their products when used for their aromatic value in cosmetic preparations are termed as herbal cosmetics.

Now a day's advertisements of many face washes and fairness cream are aimed at men. The face skin beauty of individuals depends on the health, routine job, habits, conditions and maintenance. The extreme winter cause damage to the skin in the form of cracks, cuts, infections and maceration. The skin due to excessive exposure to heat will dehydrate during summer and causes wrinkle, blemishes, pigmentation, freckles and sunburns. To make cosmetics for beautification and protection from external affects, the science of Ayurveda had utilized many herbs and floras.[3]

Fig. 01 Types of healthy skin.[4]

Types of Face Wash[5]

1. Gel-Based Face Wash

Key Ingredients: Aloe vera, neem, tea tree, Tulsi

Function: Deep cleansing, oil control, and refreshing feel

2. Cream-Based Face Wash

Key Ingredients: Shea butter, honey, almond, sandalwood

Function: Hydration, gentle cleansing, and soothing

3. Foam-Based Face Wash

Key Ingredients: Tea tree, citrus extracts, green tea

Function: Deep pore cleansing and oil control

4. Powder-Based Face Wash

Key Ingredients: Multanimitti, turmeric, gram flour, sandalwood

Function: Mild exfoliation, cleansing, and brightening

5. Clay-Based Face Wash

Key Ingredients: Bentonite clay, kaolin clay, charcoal

Function: Absorbs excess oil, detoxifies, and deep cleanses

6. Oil-Based Face Wash

Key Ingredients: Coconut oil, jojoba oil, argan oil

Function: Removes makeup, nourishes skin, and maintains moisture

7. Micellar Water-Based Face Wash

Key Ingredients: Rose water, cucumber extract, glycerine

Function: Gentle cleansing, hydration, and makeup removal

Properties of Herbal Face Wash[5]

1. Natural Ingredients

Formulated with herbal extracts, plant oils, and botanicals known for their skincare benefits, such as Aloe-Vera, green tea, chamomile, and neem Avoid synthetic fragrances, parabens, sulfates, and other harsh chemicals.

2. Gentle Cleansing

Provides effective cleansing without stripping the skin of its natural oils or causing irritation Gently removes dirt, oil, and impurities from the skin's surface without disrupting the skin barrier.

3. Moisturizing and Hydrating

Contains ingredients that hydrate and replenish the skin, such as glycerine, coconut oil, and hyaluronic acid Helps to maintain the skin's moisture balance and prevent dryness or dehydration.

4. Soothing and Calming

Includes ingredients with anti-inflammatory properties to soothe and calm irritated or sensitive skin. Helps to reduce redness, inflammation, and discomfort.

5. Antibacterial and Antimicrobial

Incorporates natural ingredients with antibacterial and antimicrobial properties, such as tea tree oil, neem, and turmeric Helps to combat acne-causing bacteria and prevent breakouts.

6. Exfoliation

Contains gentle exfoliating agents, such as fruit enzymes or finely ground herbs, to remove dead skin cells and unclog pores. Promotes cell turnover and reveals smoother, brighter skin.[5]

Advantages Of Herbal Face-Wash[6]

1. Gentle on Skin
2. Free from Harsh Chemicals

3. Rich in Natural Nutrients
4. Helps with Acne and Pimples
5. Balances Skin's Natural Oils
6. Reduces Signs of Aging
7. Brightens and Improves Skin Tone
8. Eco-Friendly and Sustainable
9. Reduces Redness and Inflammation
10. Prevents Blackheads and Whiteheads
11. Prevents Skin Darkening from Pollution
12. Cost-Effective and Easily Available
13. Protects Against UV Damage
14. Prevents Skin Infections
15. Supports Ayurvedic Skincare

AIM AND OBJECTIVE

Aim

To formulate and evaluate the herbal face wash containing Ziziphus mauritiana leaf extract, ensuring its effectiveness and stability for potential use in skincare applications.

Objectives

1. To prepare extract of ziziphus mauritiana leaves.
2. To develop stable face wash by incorporating ziziphus mauritiana leaf extract.

To evaluate the formulated face wash based on physicochemical parameters

MATERIAL AND METHODS

Plant Collection

The Leaves of Ziziphus mauritiana leafs was collected from their natural habitats at Mahatma Phule krishi Vidyapeeth, Rahuri, Maharashtra and the collected specimen of the plant was authenticated at. Padmashri Vikhe Patil College of Arts, Science and Commerce Pravaranagar, Post Graduate Dept. of Botany And Research Centre.

Ziziphus Mauritiana

Fig. 02: Ziziphus mauritiana.[7]

Synonyms: Indian jujube, Indian plum.

Biological Source

Ziziphus mauritiana is a tropical shrub native to Indian Subcontinent, the Southeast Asia, Iran and some regions of Africa. Various parts of *Ziziphus mauritiana* are used for nutritional and medical purposes belonging to family *rhamnaceae*.

Part use: Leaves.

Chemical Constituents[8]

Saponins: (Natural Cleansers & Exfoliants) Act as natural surfactants, removing dirt, oil, and dead skin cells.

Flavonoids: (Antioxidant & Skin Renewal Agents) Reduce oxidative stress, preventing dull skin and premature aging.

Tannins: (Astringent & Exfoliating Agents) Tighten pores and control excess oil production. Help remove dead skin cells and improve skin texture.

Alkaloids: (Detoxifying & Cleansing Agents) Possess antimicrobial properties, reducing acne

Polysaccharides: (Hydrating & Skin Soothing Agents) Aid in hydration, preventing excessive dryness after exfoliation.

Phenolic Compounds: (Natural Skin Renewing Agents) Help in skin repair and reducing hyper pigmentation.

Uses

Antioxidant, Exfoliant, antimicrobial, astringent, Hydration, Skin soothing, Detoxifying, Natural cleansers.

PROCEDURE FOR PREPARATIONOF ZIZIPHUS MAURITIANA LEAF EXTRACT[9]

1. Preparation of Sample & Weighing

Dry the herb completely and grind it into a fine powder for better extraction.

Weigh the required amount of powdered herb (50 g).

2. Setting up the Soxhlet Apparatus

Place the extraction chamber between the condenser and the round-bottom flask.

Fill the round-bottom flask with an appropriate amount of 70% methanol (500 ml).

3. Extraction Process

Heat the solvent using a heating mantle or water bath.

The solvent evaporates, condenses in the condenser, and drips onto the sample in the extraction chamber.

The solvent extracts the active compounds from the herb and flows back into the flask through the siphon mechanism. This cycle repeats continuously for 6-8 hours, ensuring thorough extraction.

4. Completion of Extraction

Stop heating once the solvent in the siphon tube appears colourless, indicating that no more extraction is occurring. Allow the apparatus to cool down before dismantling it.

5. Solvent Evaporation & Concentration:

Filter the extract & remove the solvent using a digital water bath to obtain the concentrated herbal extract.

6. Storage

Store the extract in an airtight container at a low temperature to preserve its active compounds.

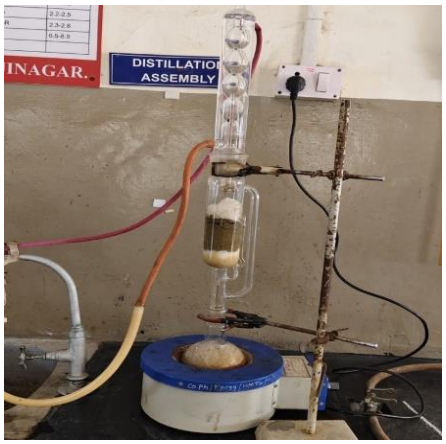

Fig. 03 Extraction.

Fig. 04 Solvent Evaporation.

PHYTOCHEMICAL ANALYSIS

Sr. No	Test	Observation	Inference
1.	**Test For Alkaloid** **a.** Mayer's Test Add a few drops of Mayer's reagent to 2-3 ml of the herbal extract b. Wagner's Test Add a few drops of Wagner's reagent to 2-3 ml of the herbal extract.	Cream white ppt Reddish-brown ppt	+ +
2.	**Test For Tannins** Ferric Chloride Test: Add 1% FeCl, solution to the extract	Greenish-black coloration	+
3.	**Test for Flavonoids**: a. Alkaline Reagent Test: Add 2 ml of 2% NaOH to the extract. b. Lead Acetate Test: 10% Lead acetate solution Add a few drops to herbal extract	Yellow color that becomes colorless on adding acid Yellow precipitate	+ +
4.	**Test For Saponins:** Froth Test: Shake extract with water vigorously.	Stable persistent froth indicates presence	+
5.	**Test for Terpenoids** Salkowski Test: Add chloroform and conc. H_2SO_4 to extract	Reddish-brown interface	+

PROCEDURE & FORMULATION TABLE OF FACE WASH

Table 02.

Sr. No	Name of the ingredient	Quantity in %	Role
1	Ziziphus mauritiana	2%	Nature Cleanser, Exfoliant, Antimicrobial
2	Carbapol 940	1%	Thickening Agent
3	Triethanolamine	1%	pH adjuster
4	Sodium Lauryl sulphate	10%	Surfactant
5	Methyl paraben	0.2%	Preservative

6	Rose water	10%	Fragrance
7	Distilled water	Q.S	Solvent

Procedure[10]

1. Extracting Ziziphus mauritiana

Nature's magic is in the bioactive compounds of the plant, so the extraction process is key to preserving its skin-loving benefits.

Method: Soxhlet Extraction (For a More Potent Extract)

Place the powdered plant material in a Soxhlet extractor.

Use ethanol or water as a solvent.

Heat for 4-6 hours to extract maximum bioactive compounds

Concentrate the extract using a rotary evaporator or air-drying method.

2. Creating the Gel Base

Take 100 ml of distilled water in a clean beaker.

Slowly sprinkle Carbopol 940 (1-2%) while stirring continuously to avoid clumping.

Let the gel swell for 4-6 hours at room temperature until it forms a smooth, uniform texture.

3. Adding the Cleansing and Active Agents

Slowly mix in Sodium Lauryl Sulfate (SLS, 5-10%) while stirring gently to prevent excessive foam formation. Add Methyl Paraben (0.1-0.2%) as a preservative and stir until it completely dissolves. Incorporate the Ziziphus mauritiana extract (5-10%) and mix thoroughly. Add Rose Water (2-5%) for a refreshing, natural fragrance.

4. Adjusting the pH

Check the pH using a pH meter. The ideal range is 5.5-6.5, which matches the skin's natural pH. If needed, add Triethanolamine drop by drop while stirring to adjust the pH.

5. Final Mixing & Packaging

Stir the entire formulation for 15-20 minutes to ensure all ingredients mix perfectly.

Check the consistency and it should be smooth, non-sticky, and easy to spread.

Transfer the face wash into sterilized plastic or glass containers

Store in a cool, dry place, away from direct sunlight

EVALUATION PARAMETERS[10]

1. **Organoleptic Evaluation.**(Appearance, Texture & Odor)

a. Color & Clarity Check

The formulation was visually checked for its colour against a white background.

b. Texture & Feel

A small amount is applied to the fingers to check smoothness and consistency it should be gel-like and free from lumps.

c. Odor Stability Test

Odour of facewash was checked manually.

2. PH Measurement

pH of 1% aqueous solution of the formulation was measured by using a calibrated digital PHmeter at constant temperature.

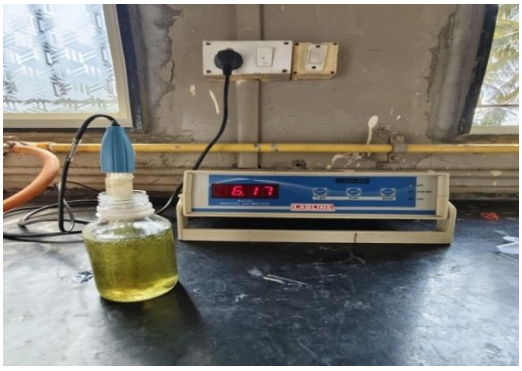

Fig. 05: Ph meter testing.

3. Viscosity Measurement

Viscosity was evaluated using Brookfield viscometer.

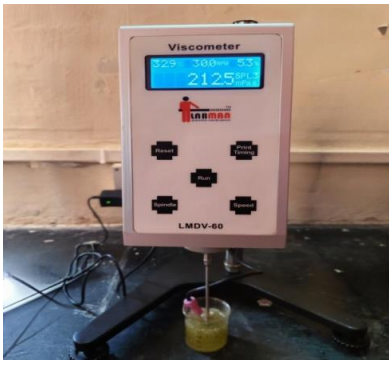

Fig.0.6: Viscosity determination by the Brookfield Viscometer.

4. Consistency

The consistency of facewash was evaluated by applied on the skin.

5. Foaming Test

Small amount of gel was taken in a beaker containing water to perform foamability test.

We measure the foam height immediately.

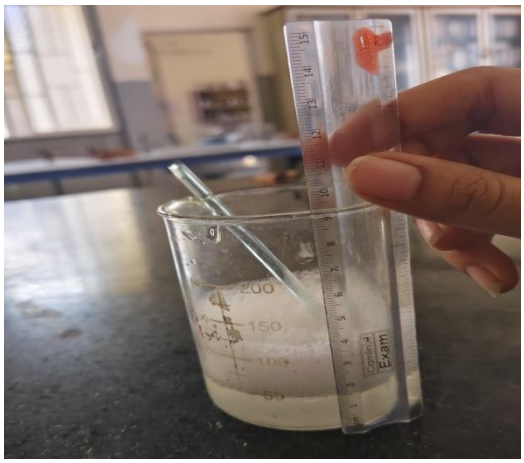

Fig.07: Foamability test.

6. Washability Test

Effectively the product can be rinsed off the skin, leaving no residue or film behind. Formulation was applied on the skin and then eases and extent of washing with water was checked manually.

Fig.08: Washability test.

7. Stability Testing

Store samples at different temperatures like

4°C (Refrigeration)

25°C (Room Temperature)

35°C (High Temperature)

8. Grittiness

The grittiness test checks if there are any rough bits in the formula. Face wash was applied and rubbed gently and observed for any granules is present. The grittiness test showed that there were no gritty particles in the herbal face wash when applied to the skin.

Fig.09: Grittiness test.

9. Irritation test

Test for skin irritation was carried out by applying herbal gel face wash on hand after washing observe any itching, rashes or redness on hand by visual surveillance.

RESULT AND DISCUSSION

The prepared herbal face wash containing Ziziphus mauritiana leaf extract was evaluated based on various physicochemical parameters to assess its stability, efficacy, and suitability for skin application.

Sr. No	PARAMETERS	OBSERVATION
1.	Organoleptic Parameter Colour Texture Odor	 Greenish yellow Gel-like Unpleasant
2.	pH	6.17
3.	Viscosity	212 mPas
4.	Consistency	Smooth
5.	Foamability test	Foam appear
6.	Washability test	Easily washable
7.	Stability test	Physically stable
8.	Grittiness	No Gritty particles
9.	Skin irritation	No irritation

CONCLUSION

This study involved making and testing a herbal face wash using Ziziphus mauritiana leaf extract. Tests like pH, viscosity, consistency, foaming, washability, skin irritation, grittiness and stability showed that the face wash is suitable for skin use.

Earlier studies have shown that Ziziphus mauritiana leaves have useful properties like antimicrobial, anti-inflammatory, antioxidant, woundhealing, astringent, moisturizing properties and protecting the skin, which makes them good for skincare products.

Further studies needed to confirm efficacy and stability.

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