

Formulation and Evaluation of Herbal Face Wash

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Abstract: *The present study was carried out to formulate and evaluate a herbal face wash using natural ingredients with cleansing, moisturizing, antimicrobial, and skin-protective properties. Herbal cosmetics have gained significant importance due to increasing awareness regarding the side effects associated with synthetic cosmetic products. Herbal face wash formulations are considered safer and more compatible with skin because they contain naturally derived ingredients with therapeutic benefits.*

The herbal face wash was prepared using medicinal plant extracts such as neem, aloe vera, turmeric, and tulsi along with other ingredients including honey, glycerin, Carbopol 940, sodium lauryl sulfate, methyl paraben, and rose water. Neem and tulsi were incorporated for their antimicrobial activity, aloe vera and honey for moisturizing and soothing effects, and turmeric for antioxidant and anti-inflammatory properties.

The prepared formulation was evaluated for various parameters such as physical appearance, pH, homogeneity, spreadability, foamability, washability, irritancy, viscosity, and stability. The formulation showed good appearance, smooth consistency, satisfactory foamability, suitable pH, and good cleansing action. No significant irritation or instability was observed during evaluation studies.

The results indicated that the prepared herbal face wash was stable, safe, and effective for skin cleansing and maintenance of healthy skin. The study supports the use of herbal ingredients in cosmetic formulations as natural and safer alternatives to synthetic skin care products..

Keywords: Herbal Face Wash, Neem Extract, Aloe Vera Gel, Turmeric, Herbal Cosmetics Skin Care, Antibacterial Activity, Formulation and Evaluation

I. INTRODUCTION

Skin is the outermost protective covering of the human body and plays an important role in maintaining overall health and protection against external environmental factors. It acts as a barrier against dust, microorganisms, harmful chemicals, ultraviolet radiation, and pollution. Healthy skin helps in regulating body temperature, preventing water loss, and protecting internal organs from infections and injuries. Due to increasing environmental pollution, stress, improper diet, and excessive use of chemical-based cosmetic products, various skin problems such as acne, dryness, irritation, pigmentation, and premature aging are becoming common among people of all age groups [1].

Cosmetics are substances used to cleanse, beautify, and improve the appearance of the skin. In recent years, there has been increasing demand for herbal cosmetics because consumers prefer natural and safer products over synthetic formulations. Herbal cosmetics are prepared using plant-derived ingredients that possess medicinal and cosmetic benefits. These products are considered safe, eco-friendly, biodegradable, and less harmful to the skin compared to synthetic cosmetic products [2].

A face wash is a cosmetic preparation specially designed for cleansing facial skin by removing dirt, sweat, excess oil, dead cells, makeup particles, and microorganisms from the skin surface. Proper cleansing is essential for maintaining healthy skin and preventing acne, pimples, blackheads, and other skin disorders. Conventional face wash products available in the market often contain synthetic detergents, preservatives, artificial fragrances, and chemicals that may cause irritation, dryness, allergic reactions, and damage to the natural skin barrier after prolonged use [3].

Herbal face wash formulations provide a better alternative to chemical-based products because they contain natural ingredients with therapeutic properties such as antibacterial, anti-inflammatory, antioxidant, moisturizing, and soothing



activities. Medicinal plants like neem, aloe vera, turmeric, tulsi, cucumber, sandalwood, and honey are commonly used in herbal skin care preparations due to their beneficial effects on skin health [4].

Neem (*Azadirachta indica*) is widely used in herbal cosmetics because of its antibacterial and antifungal properties. It helps in preventing acne and skin infections caused by microorganisms. Aloe vera (*Aloe barbadensis* Miller) acts as a natural moisturizer and soothing agent that hydrates the skin and reduces irritation. Turmeric (*Curcuma longa*) contains curcumin, which possesses antioxidant and anti-inflammatory activities that help in improving skin complexion and reducing pigmentation. Tulsi (*Ocimum sanctum*) is known for its antimicrobial and protective effects on the skin [5].

The use of herbal ingredients in cosmetic preparations offers several advantages such as fewer side effects, better skin compatibility, improved therapeutic value, and long-term safety. Herbal cosmetics are also economical and environmentally friendly because they are prepared using renewable natural resources [6].

The present study focuses on the formulation and evaluation of herbal face wash using natural ingredients such as neem, aloe vera, turmeric, tulsi, honey, and glycerin. The prepared formulation is expected to provide effective cleansing action along with moisturizing, antimicrobial, and soothing effects. Evaluation parameters such as pH, spreadability, foamability, washability, irritancy, and stability are studied to determine the quality, safety, and effectiveness of the formulation [7].

Skin is the largest organ of the body and protects against dust, microbes, pollution, and harmful radiations. Due to pollution, stress, and excessive use of chemical cosmetics, skin problems like acne, dryness, irritation, and dullness are increasing. Herbal cosmetics are widely used because they are safer, economical, and have fewer side effects compared to synthetic products.

A herbal face wash is a cosmetic preparation used to clean the face by removing dirt, excess oil, dead cells, and microorganisms. Herbal ingredients such as neem, aloe vera, turmeric, and tulsi possess antibacterial, anti-inflammatory, antioxidant, and moisturizing properties, making them suitable for skin care products.

Aim

To formulate and evaluate a herbal face wash using natural ingredients for cleansing and improving skin health.

Objectives of the Study

1. To formulate a herbal face wash using natural ingredients such as neem, aloe vera, turmeric, and tulsi for effective skin cleansing [8].
2. To prepare a face wash formulation with good cleansing, moisturizing, and antimicrobial properties suitable for daily use [9].
3. To develop a herbal cosmetic preparation with fewer side effects compared to synthetic face wash products [10].
4. To study the role of medicinal plant extracts in maintaining healthy and clean skin [11].
5. To evaluate the antibacterial activity of herbal ingredients against acne-causing microorganisms [12].
6. To prepare a formulation with suitable pH compatible with normal skin conditions [13].
7. To improve skin hydration and softness using natural moisturizing agents like aloe vera, honey, and glycerin [14].
8. To evaluate the physical properties of the prepared formulation such as color, odor, consistency, and homogeneity [15].
9. To determine the spreadability and washability of the herbal face wash for better user acceptability [16].
10. To evaluate the foamability and cleansing efficiency of the formulation [17].
11. To perform irritancy testing and ensure the safety of the herbal face wash on skin application [18].
12. To study the stability of the formulation under different storage conditions [19].
13. To develop an eco-friendly and biodegradable herbal cosmetic preparation [20].
14. To combine traditional herbal knowledge with modern pharmaceutical formulation techniques [21].
15. To promote the use of herbal cosmetics as safe and effective alternatives to chemical-based skin care products [22].



Advantages of Herbal Face Wash

Natural and Safe :

Herbal face wash is prepared using natural plant ingredients and is generally safer for the skin compared to synthetic cosmetic products [23].

Gentle Cleansing Action :

It effectively removes dirt, oil, sweat, and impurities from the skin without damaging the natural skin barrier [24].

Antibacterial Property :

Herbal ingredients such as neem and tulsi help in preventing acne, pimples, and skin infections due to their antimicrobial activity [25].

Moisturizing Effect :

Ingredients like aloe vera, honey, and glycerin help in maintaining skin hydration and prevent dryness after washing [26].

Anti-inflammatory Activity :

Turmeric and aloe vera help in reducing redness, irritation, and inflammation of the skin [27].

Antioxidant Protection :

Herbal extracts protect the skin from free radical damage caused by pollution and sunlight, helping to maintain healthy skin [28].

Fewer Side Effects :

Herbal face washes are less likely to cause allergic reactions, itching, or irritation compared to chemical-based formulations [29].

Suitable for Different Skin Types :

Herbal formulations are generally suitable for oily, dry, normal, and sensitive skin types [30].

Eco-friendly and Biodegradable :

Herbal cosmetic products are environmentally friendly because they contain naturally derived biodegradable ingredients [31].

Improves Skin Health :

Regular use of herbal face wash helps in maintaining clean, soft, smooth, and glowing skin naturally [32].

II. LITERATURE REVIEW

Herbal cosmetics have become increasingly popular due to growing awareness about the harmful effects of synthetic chemicals used in cosmetic products. Herbal formulations are considered safer, biodegradable, and more compatible with human skin [33]. Face wash preparations are mainly used for cleansing facial skin by removing dirt, excess oil, sweat, dead cells, and microorganisms. Proper cleansing helps in preventing acne, pimples, and other skin disorders [34]. Conventional face wash products often contain synthetic detergents, preservatives, and artificial fragrances that may cause dryness, irritation, and allergic reactions after prolonged use.

Herbal face wash formulations are therefore preferred as safer alternatives [35]. Neem (*Azadirachta indica*) is widely used in herbal cosmetic preparations because of its antibacterial, antifungal, and anti-inflammatory properties. Studies have shown that neem extracts are effective against acne-causing microorganisms and help in reducing skin infections [36]. Aloe vera (*Aloe barbadensis* Miller) is an important medicinal plant used in skin care products due to its moisturizing, soothing, cooling, and wound-healing properties. It helps in maintaining skin hydration and reducing irritation [37]. Turmeric (*Curcuma longa*) contains curcumin, which possesses antioxidant and anti-inflammatory activities. It helps in improving skin complexion, reducing pigmentation, and protecting skin from oxidative damage [38]. Tulsi (*Ocimum sanctum*) contains antimicrobial and antioxidant constituents that protect the skin from bacterial infections and environmental stress. It is commonly used in herbal skin care formulations [39]. Honey acts as a natural humectant and moisturizing agent. It retains skin moisture, improves skin texture, and also exhibits antibacterial activity beneficial for skin care applications [40].



Research studies on herbal face wash formulations have reported good cleansing action, suitable pH, satisfactory foamability, spreadability, and stability with minimal skin irritation [41]. Stability studies conducted on herbal cosmetic formulations indicate that properly formulated herbal face wash remains physically and chemically stable under normal storage conditions [42]. Several researchers concluded that herbal face wash formulations provide effective cleansing along with antimicrobial, moisturizing, antioxidant, and soothing effects, making them suitable alternatives to synthetic skin care products [43].

Required Materials with Proportions

The following materials were used for the preparation of herbal face wash formulation. Each ingredient was selected based on its functional role such as cleansing, moisturizing, antimicrobial activity, thickening, preservation, and improvement of product stability. The proportions of ingredients were adjusted to prepare 100 ml of herbal face wash with suitable consistency, pH, and cleansing action [44].

Formulation Table

Sr. No.	Ingredients	Quantity (% w/v)	Role in Formulation
1	Neem Extract	2%	Antibacterial and anti-acne agent
2	Tulsi	2%	Antimicrobial and skin protective agent
3	Aloe Vera Gel	5%	Moisturizer and soothing agent
4	Turmeric Extract	1%	Anti-inflammatory and antioxidant agent
5	Glycerin	2%	Moisturizing and softening agent
6	Carbopol 9	1%	Gelling agent
7	Sodium Lauryl Sulfate	5%	Foaming and cleansing agent
8	Methyl Paraben	0.2%	Preservative
9	Rose Water	q.s. to 100ml	Vehicle and fragrance enhancer
10	Purified Water	q.s.	Solvent and dispersion medium

The herbal ingredients such as neem, aloe vera, turmeric, and tulsi were included in the formulation because of their medicinal and cosmetic benefits. Neem and tulsi provide antimicrobial action that helps in preventing acne and skin infections. Aloe vera and honey maintain skin hydration and reduce irritation, while turmeric provides antioxidant and anti-inflammatory effects. Carbopol 940 was used to provide gel consistency, and sodium lauryl sulfate was added to improve cleansing and foam formation. Methyl paraben was incorporated as a preservative to increase product stability and shelf life [45]. The selected proportions were found suitable for preparing a stable herbal face wash [46].

Role of Ingredients

The ingredients used in the formulation of herbal face wash perform specific functions such as cleansing, moisturizing, antimicrobial protection, thickening, preservation, and improving product stability. Proper selection of ingredients is important to obtain an effective and skin-friendly herbal formulation.

Neem extract acts as an antibacterial and antifungal agent. It helps in preventing acne, pimples, and skin infections caused by microorganisms. Neem also controls excess oil secretion and maintains skin cleanliness.

Tulsi acts as an antimicrobial and antioxidant agent. It protects the skin from bacterial and fungal infections and helps in maintaining healthy skin.

Aloe vera gel works as a natural moisturizer and soothing agent. It hydrates the skin, reduces irritation, and provides a cooling effect. Aloe vera also promotes healing of damaged skin tissues.

Turmeric extract possesses antioxidant and anti-inflammatory properties. It helps in reducing redness, pigmentation, and skin irritation while improving skin complexion.



Glycerin acts as a moisturizing and softening agent. It prevents dryness and improves the smoothness and spreadability of the formulation.

Carbopol 940 is used as a gelling and thickening agent. It provides suitable viscosity and gel consistency to the face wash formulation.

Sodium lauryl sulfate acts as a surfactant and foaming agent. It helps in removing dirt, oil, and impurities from the skin surface by producing foam.

Methyl paraben is used as a preservative to prevent microbial contamination and increase the shelf life of the formulation.

Rose water acts as a vehicle and fragrance enhancer. It provides a refreshing effect and improves the pleasant odor of the face wash.

Purified water is used as a solvent and dispersion medium for mixing all ingredients uniformly in the formulation

Neem Extract



Fig. No. 1 Neem Leaves Powder

Synonym:

Indian Lilac, Margosa, Neem

Biological Source:

Neem extract is obtained from the leaves and seeds of *Azadirachta indica*.

Family: Meliaceae

Description:

Colour – Green

Odour – Pungent

Taste – Bitter

Chemical Constituents:

Neem contains various active chemical constituents such as:

Azadirachtin, Nimbin, Nimbolide, Nimbidin, Quercetin, Gedunin



Uses

- Acts as an antibacterial and antifungal agent.
- Helps in preventing acne and pimples.
- Reduces skin infections and inflammation.
- Controls excess oil secretion from the skin.

Tulsi



Fig. No. 2 Tulsi Leaves Powder

Synonym:

Holy Basil, Sacred Basil, Tulsi

Biological Source:

Tulsi is obtained from the leaves and flowering tops of *Ocimum sanctum*.

Family: Lamiaceae

Description:

Colour – Green

Odour – Aromatic

Taste – Pungent

Chemical Constituents:

Tulsi contains various active chemical constituents such as:

Eugenol, Ursolic acid, Rosmarinic acid, Flavonoids, Linalool, Caryophyllene

Uses

- Acts as an antimicrobial and antioxidant agent.
- Helps in preventing acne and skin infections.
- Reduces skin irritation and inflammation.
- Protects the skin from environmental damage.



Aloe Vera Gel



Fig. No. 2 Aloe Vera Gel

Synonym:

Aloe, Ghritkumari, Barbados Aloe

Biological Source:

Aloe vera gel is obtained from the fresh leaves of *Aloe barbadensis* Miller.

Family: Liliaceae

Chemical Constituents:

Aloe vera contains various active constituents such as:

Aloin, Aloe-emodin, Vitamins (A, C, E), Polysaccharides, Amino acids, Enzymes.

Uses

Acts as a natural moisturizer and soothing agent.

Helps in maintaining skin hydration.

Reduces skin irritation and inflammation.

Provides cooling and healing effect on the skin.

Used in herbal cosmetics and skin care preparations for soft and healthy skin.



Turmeric Extract



Fig. No. 3 Turmeric

Synonym:

Haldi, Curcuma, Indian Saffron

Biological Source:

Turmeric is obtained from the dried rhizomes of *Curcuma longa*.

Description:

Colour – Yellow

Odour – Aromatic

Taste – Bitter

Chemical Constituents:

Turmeric contains various active chemical constituents such as:

Curcumin, Demethoxycurcumin, Bisdemethoxycurcumin, Volatile oils, Turmerone

Uses

Acts as an antioxidant and anti-inflammatory agent.

Helps in reducing acne, redness, and skin irritation.

Improves skin complexion and glow.

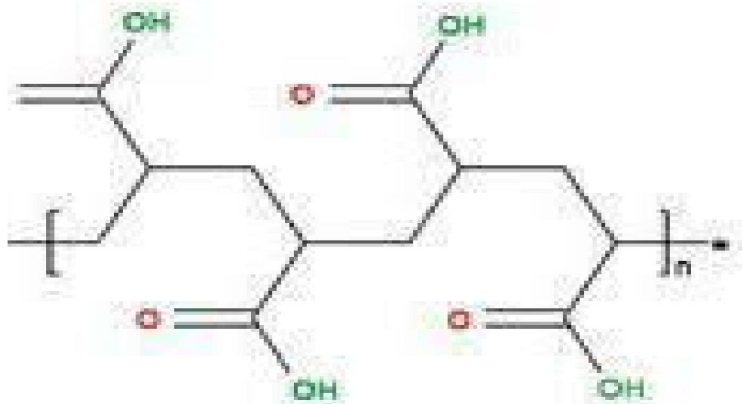
Protects the skin from microbial infections.

Used in herbal cosmetic and skin care preparations.



Carbopol 934

Structure:



Carbopol 934P

Fig. No. 4 Carbopol 934 structure

IUPAC name:

Poly (acrylic acid)

Other names:

PAA, PAAc, Acrysol, Acumer

Chemical formula:

$(C_3H_4O_2)_n$

Molar mass:

Variable

Uses

Polyacrylic acid and its derivatives are used in disposable diapers, ion exchange resins and adhesives. They are also popular as thickening, dispersing, suspending and emulsifying agents in pharmaceuticals, cosmetics and paints.



Sodium lauryl sulphate

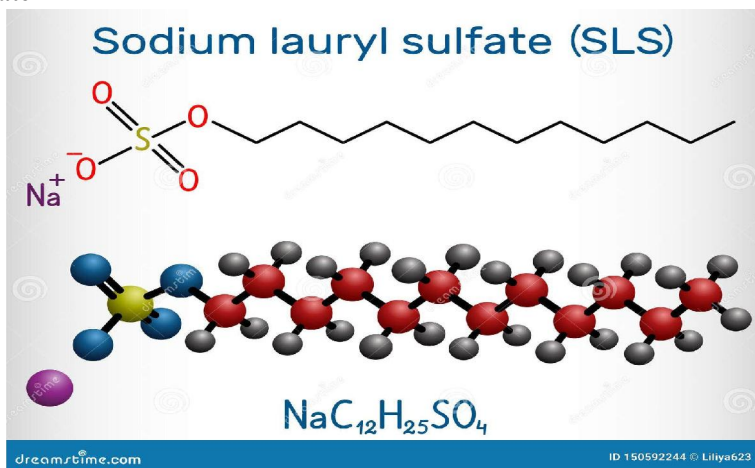


Fig. No. 5 Sodium lauryl sulphate

IUPAC Name:
Sodium lauryl sulfate

Other Names:
Sodium monododecyl sulfate

Chemical Formula:
 $\text{NaC}_{12}\text{H}_{25}\text{SO}_4$

Molar Mass:
288.372 g/mol

Density:
1.01 g/cm³

Melting point:
206 °C (403 °F; 479 K)

Uses

SLS is mainly used in detergents for laundry with many cleaning applications. SLS is a highly effective surfactant and is used in any task requiring the removal of oily stains and residue.



Methyl Paraben

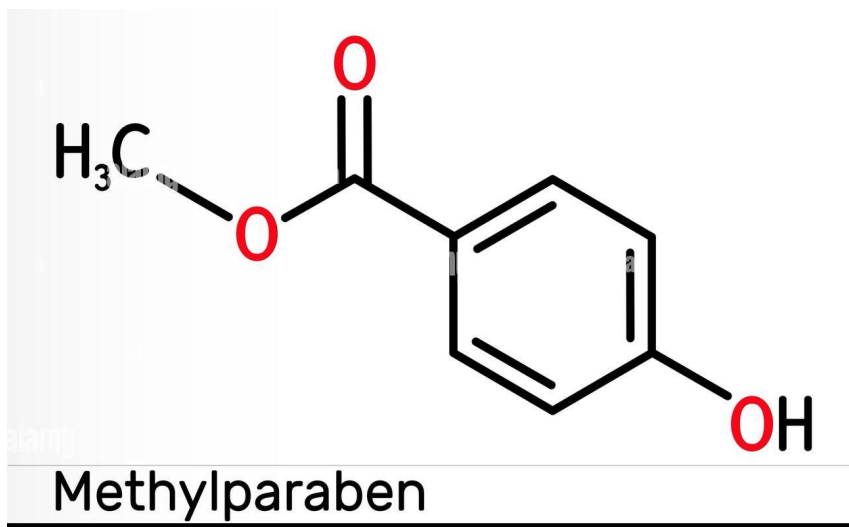


Fig. No. 6 Methyl Paraben

IUPAC name:

Methyl 4hydroxybenzoate

Other names:

Methyl paraben

Chemical Formula:

C₈H₈O₃

Molar mass:

152.15 g·mol⁻¹

Uses

Methyl paraben is an antifungal agent often used in a variety of cosmetics and personal care products.

It is also used as a food Preservative.

Methyl paraben is commonly used as a fungicide in Drosophila food media.

Method of Preparation

Step 1: Preparation of Gel Base

Carbopol 940 was weighed accurately and dispersed slowly in purified water with continuous stirring to prepare a smooth gel base.

Step 2: Hydration of Polymer

The Carbopol dispersion was allowed to stand for proper hydration and swelling of the polymer to obtain suitable gel consistency.



Step 3: Addition of Aloe Vera Gel

Aloe vera gel was added gradually into the prepared gel base with continuous stirring to provide moisturizing and soothing properties.

Step 4: Incorporation of Neem Extract

Neem extract was added slowly into the formulation and mixed properly to obtain uniform distribution throughout the gel.

Step 5: Addition of Turmeric Extract

Turmeric extract was incorporated into the formulation to provide antioxidant and anti-inflammatory activity.

Step 6: Addition of Sodium Lauryl Sulfate

Sodium lauryl sulfate was added carefully with gentle stirring to avoid excessive foam formation and to provide cleansing action.

Step 7: Adjustment of Volume

The final volume of the formulation was adjusted using purified water and mixed thoroughly to obtain a homogeneous preparation.

Step 8: Packaging and Storage

The prepared herbal face wash was transferred into clean airtight containers and stored at room temperature for further evaluation studies.



Fig No 7: Extraction Of Herbal Material

Evaluation Parameters

1. Physical Appearance

The prepared herbal face wash was evaluated for color, odor, consistency, and homogeneity by visual examination. A good formulation should possess smooth texture.



2. pH Determination

The pH of the formulation was measured using a digital pH meter. The pH should remain within the skin-friendly range to avoid irritation and dryness.

3. Spreadability

Spreadability test was carried out to determine the ease of application of the formulation on the skin. Good spreadability ensures uniform application and better user acceptability.

4. Foamability

Foamability was evaluated by shaking the formulation with water and observing the foam produced. Adequate foam formation is important for effective cleansing action.

5. Washability

Washability test was performed to determine the ease of removal of the face wash from the skin using water without leaving residue.

6. Homogeneity

The formulation was checked visually for uniform distribution of ingredients and absence of aggregates or lumps.

7. Irritancy Test

The herbal face wash was applied on the skin to observe any signs of redness, itching, or irritation. The formulation should be safe and non-irritant for topical application.

8. Stability Study

The prepared formulation was stored under suitable conditions and observed for changes in color, odor, pH, and consistency to determine its stability.

III. RESULTS AND DISCUSSION

The prepared herbal face wash formulation showed satisfactory physical appearance with smooth texture, pleasant odor, and good homogeneity. The pH of the prepared face wash was found to be within the acceptable skin-friendly range, which indicates that the formulation is suitable for topical application without causing irritation or dryness.

The formulation exhibited good foamability and cleansing action due to the presence of sodium lauryl sulfate. It effectively removed dirt, excess oil, and impurities from the skin surface and was easily washable with water without leaving any residue. Spreadability of the formulation was found to be satisfactory, showing easy application on the skin surface.

The herbal ingredients such as neem, aloe vera, and turmeric provided moisturizing, soothing, antimicrobial, and antioxidant properties that may help in maintaining healthy skin. Stability studies showed that there were no significant changes in color, odor, pH, or consistency of the formulation during storage, indicating good stability and acceptable shelf life of the herbal face wash.

Overall, the results suggested that the prepared herbal face wash formulation was stable, safe, effective, and suitable for daily skin care use.

Formulation Table

Sr. No.	Ingredients	Quantity
1	Neem Extract	2 ml
2	Tulsi	1 ml
3	Aloe Vera Gel	5 gm



4	Turmeric Extract	1 ml
5	Carbopol 934	1 gm
6	Sodium Lauryl Sulphate	5 gm
7	Methyl Paraben	4 gm
8	Purified Water	100 ml

Evaluation Parameters

Sr. No.	Evaluation Test	Result
1	Colour	Pale Yellow
2	Odour	Characteristics
3	Consistency	Semi - Solid
4	pH	7.2
5	Spreadability	Easily Spreadable
6	Washability	Good
7	Foamability	Good



Fig No 8: Herbal Fesh Wash

IV. CONCLUSION

The present study concluded that the herbal face wash formulation prepared using natural ingredients such as neem, aloe vera, and turmeric showed satisfactory cleansing, moisturizing, and antimicrobial properties. The formulation exhibited good appearance, suitable pH, acceptable foamability, spreadability, and stability for skin application. The herbal face wash was found to be safe, skin-friendly, and free from significant irritation during evaluation studies. The herbal ingredients provided effective cleansing along with soothing and protective effects on the skin. Stability studies indicated that the formulation remained stable without significant changes in color, odor, consistency, or pH during storage. The prepared herbal face wash can therefore be considered suitable for daily skin care use.



Overall, the study supports the use of herbal cosmetics as safe, effective, and economical alternatives to synthetic cosmetic preparations.

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