
Formulation and Evaluation of Herbal Face Wash from Bel Patra Leaves

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Abstract

The demand for herbal cosmetics has surged in recent years due to their perceived safety and effectiveness. This study aims to formulate and evaluate a herbal face wash using Bel Patra (Aegle marmelos) extracts, renowned for their medicinal properties. Bel Patra is rich in antioxidants, anti-inflammatory, and antimicrobial compounds, making it an ideal ingredient for skincare products. The formulation process involved the extraction of active constituents from Bel Patra leaves, followed by the incorporation of these extracts into a face wash base. Various concentrations of the extract were tested to determine the optimal formulation in terms of texture, foaming capacity, pH, and stability. The prepared formulations were subjected to physicochemical evaluations, including pH measurement, viscosity, and foam stability. Microbiological tests were also conducted to assess the antimicrobial efficacy of the face wash.

Keywords - Herbal face wash, Formulation, Evaluation

INTRODUCTION

India's herbal drug industry is probably the oldest healthcare system in the world. Given how long herbs have been used in ancient India, the Vedas, a religious text from that era, describe a traditional herbal remedy. Regardless of the severity of the illness, it is linked to anxiety and depression, though treatment usually improves the psychological effects. Moreover, acne can leave behind difficult-to-repair permanent scars.¹ The characteristics of acne vulgaris include non-inflammatory, closed or open comedones and nodules, pustules, and papules that are inflammatory. The skin on the face, upper chest, and back—areas with the highest density of sebaceous follicles is usually affected by acne vulgaris. Acne vulgaris can cause erythema, pain, or tenderness in the affected area. Acne vulgaris typically manifests without systemic symptoms.² The structure (hardness) and adhesive stick track of a gel are attributed to the crosslinking that occurs within the fluid. Over the past ten years, the use of medicinal plants for therapeutic purposes has grown significantly worldwide. It is important to guarantee the safety, efficacy, and standard quality of commercial formulations derived from medicinal plants. The Ayurvedic system of medicine is becoming more and more popular worldwide, which means that there is a growing need for the various medicinal plants that are commonly used to make Ayurvedic medicine.³

Skin care preparation

Incredible progress has been made in the creation of skincare products. Individuals protect their bodies, make themselves seem better, and avoid body odor by using a range of skin care products, including foot powder, lipstick, mouthwash, and complexion creams. Items intended to be rubbed, poured, sprinkled, sprayed, or applied in any other way to the human body or any part of the body in order to cleanse, beautify, enhance attractiveness, or alter the appearance of skin are recognized as skin care preparations.⁴ The Ayurvedic practice of using various herbs, such as haldi and amla, in cosmetic preparations is described. A lot of eighteenth-century European women used lead carbonate to whiten their skin, not realizing the risks involved.⁵

Face wash



Figure 1: Face Wash

Definition

A face wash is a skincare product designed to cleanse facial skin by removing dirt, oil, and impurities. It comes in various forms like gels, foams, or creams and often includes ingredients to address specific skin concerns.

Benefits of Facial Wash

It keeps skin youthful and healthy by assisting in the removal of dead skin cells.

Removes dirt, oil, and impurities that accumulate on the skin throughout the day.

Helps to prevent breakouts by removing excess oil and unclogging pores.

Many face washes are formulated with ingredients that help maintain the skin's natural moisture balance.⁶

Some face washes contain exfoliating agents that help to remove dead skin cells, promoting a smoother complexion.

Regular use can enhance skin texture and tone by keeping it clean and refreshed.

A clean face better absorbs other skincare products, such as moisturizers and serums.

Regular cleansing helps to prevent various skin issues like dullness, irritation, and inflammation.

Washing your face can provide an immediate feeling of refreshment and revitalization.

Properties of face wash

Cleansing

Effectively removes dirt, oil, makeup, and impurities.

Hydrating

Maintains or enhances the skin's natural moisture balance.

Exfoliating

Contains ingredients that help remove dead skin cells (in some formulations).

pH Balanced

Formulated to match the skin's natural pH, ensuring it doesn't disrupt the skin barrier.

Antibacterial

Some formulations contain antibacterial agents to help combat acne-causing bacteria.

Suitable for Various Skin Types

Available in formulations tailored for different skin types (oily, dry, sensitive, combination).⁷

Uses of face wash

Removes dirt, oil, and impurities accumulated throughout the day.

Helps to unclog pores and reduce acne breakouts.

Regulates excess oil production on the skin.⁸

Assists in removing makeup residues from the face.

Provides a refreshed and revitalized feeling to the skin.

Helps to remove dead skin cells, promoting a smoother complexion.

Additives used in face wash**Surfactants**

Sodium lauryl sulfate (SLS), sodium laureth sulfate (SLES), and cocamidopropyl betaine for effective cleansing.

Antioxidants

Vitamin C, vitamin E, and green tea extract to protect against free radicals.

Antibacterial Agents

Benzoyl peroxide and tea tree oil to combat acne-causing bacteria.

Fragrances

Natural or synthetic scents to improve the sensory experience.⁹

Preservatives

Parabens, phenoxyethanol, and sodium benzoate to extend shelf life and prevent microbial growth.

Gelling agents

Gelling agents will cause emulsions to thicken, making them less inflexible and more flexible. With the help of these gels, thick products can be produced that are easier to bottle or spray by shaking or agitating vigorously. For instance, Carbopol 940, Carbopol 934.

Humectants

Unlike desiccants, humectants are hygroscopic materials used to preserve moisture in items. Many hydrophilic groups, most commonly hydroxyl groups, can be found in it; however, amines, carboxyl groups, and occasionally esterified hydrophilic groups can also be found in it (the important characteristic is its ability to form hydrogen bonds with water molecules). Some examples of glycolic acids are propylene, butylene, and hexylene glycol.

Foaming Agent

One material that acts as a foaming agent is a surfactant, also known as a blowing agent. As an illustration, consider sodium lauryl sulphate, azodicarbonamide, and titanium hydride.¹⁰

Advantages of Herbal Cosmetics over Synthetic cosmetics**Natural Ingredients**

Herbal face washes use plant-based ingredients, which are generally considered gentler and less likely to cause irritation or allergic reactions.

Fewer Chemicals

They typically contain fewer synthetic chemicals, reducing the risk of skin sensitivity and long-term exposure to potentially harmful substances.

Eco-friendly

Often biodegradable and made with sustainable practices, herbal face washes are usually more environmentally friendly.

Non-toxic

Free from harsh chemicals like sulfates, parabens, and artificial fragrances, which can be harsh on the skin.

Suitable for Sensitive Skin

More suitable for people with sensitive skin or conditions like eczema and rosacea, as they are less likely to irritate.

Fits your Budget

Natural cosmetics are reasonably priced products. These products are sometimes more affordable than synthetic ones. They are offered at a discount and received a low price during the sale. Just search for great deals by conducting adequate research.¹¹

Not tested on animals

A number of cosmetics undergo initial animal testing to ensure they are safe for human use. Animal testing for natural cosmetics is not required, though. Without using any animals, experts assess these plant-based products in laboratories with state-of-the-art equipment.

No Side Effects

Using artificial beauty products may cause your skin to irritate and breakout. They may clog your pores, leaving your skin feeling greasy or dry. When using natural cosmetics, one need not worry about them. Natural ingredients guarantee no side effects, making them suitable for use anytime, anywhere.¹²

Herbs In face wash**Bel Patra****Synonym**

Native Indian tree

Biological sources

Aegle marmelos

Family

Rutaceae¹³

Uses

Bel patra can aid digestion, alleviate constipation, and treat diarrhea and dysentery.

The leaves help regulate blood sugar levels.

They are used to reduce inflammation and treat ulcers.

It is useful in treating respiratory conditions like asthma and bronchitis.



Figure 2: Bel Patra Leaves

Characteristics

Appearance

Each bel patra is made up of three pointed leaflets, which are glossy, green, and have a slightly leathery texture.

Aroma

The leaves have a mild, pleasant aroma.

Tree

The Bel tree itself is a medium-sized, deciduous tree with thorny branches and a hard, woody trunk. It can grow up to 15-20 meters tall.¹⁴

Materials and Instruments

Sr. No.	Ingredients	Properties
1	Bel Patra	Anti acne
2	Carbopol 934	Gelling agent
3	Triethanolamine	Neutralizer
4	Sodium lauryl sulphate	Foaming agent
5	Methyl paraben	Preservative
6	Distilled water	Vehicle

Table 1: List of Chemicals¹⁵

Sr. No.	Instruments	Model
1	pH meter	Labtronics LT11
2	Brookfield viscometer	Fungilab

Table2: List of Instruments

Experimental

Preparation of Bel Patra Extract

Collect fresh Bel Patra leaves.

Wash the leaves thoroughly with distilled water to remove any dirt.

Dry the leaves, grind them into a fine powder, and use a suitable solvent (like ethanol or water) to extract the active components. Filter the extract to remove any solid particles.¹⁶



Figure 3: Bel Patra Extraction

Preparation of Carbopol Gel

Weigh and add 1% (w/v) Carbopol 934 into a beaker containing distilled water (around 70-80% of the total formulation volume).

Allow the Carbopol to hydrate completely, which may take several hours or can be done overnight for best results.

Stir gently to avoid introducing air bubbles.¹⁷

Formulation of the Base Gel

Gradually add triethanolamine (TEA) to the hydrated Carbopol gel while stirring continuously. This will neutralize the Carbopol and cause the gel to thicken.

Adjust the pH to around 6-7 using TEA, as this is optimal for skin products.



Figure 4: Formulation of base gel

Addition of Surfactant

Dissolve sodium lauryl sulfate (SLS) in a small amount of distilled water. Add the SLS solution to the Carbopol gel base while stirring gently.¹⁸

Addition of Preservative

Dissolve methyl paraben in a small amount of distilled water and add it to the mixture to prevent microbial growth.

Incorporation of Bel Patra Extract

Add the prepared Bel Patra extract to the gel base. The concentration of the extract should be determined based on preliminary studies to ensure efficacy without causing irritation.¹⁹

Mix thoroughly to ensure even distribution of the extract throughout the gel.



Figure5: Herbal Face Wash Gel

Adjustment of Final Volume

Add distilled water to adjust the final volume of the face wash formulation, ensuring all components are well mixed.

Final Mixing

Stir the mixture gently to achieve a homogeneous gel.

Check and adjust the pH to ensure it is within the desired range (6-7).²⁰

By following these steps, you can formulate and evaluate an herbal face wash using Bel Patra and other specified ingredients, ensuring it is effective, stable, and safe for use.

Sr. No.	Ingredients(gm)	F1	F2	F3	F4	F5
1	Carbopol 934	0.50	0.60	0.80	0.90	1.0
2	Distilled water	30	30	30	30	30
3	Bel patra extract	1	1	1	1	1
4	Methyl paraben	0.15	0.15	0.15	0.15	0.15
5	Triethanolamine	0.025	0.025	0.025	0.025	0.025
6	SLS	0.20	0.20	0.20	0.20	0.20

Table 3: Preparation of herbal face wash gels

Assessment of face wash formulation

Colour

A visual inspection of the face wash's formulation was conducted to determine its hue.

Odour

We sniffed the formulation to determine its odour.

Consistency

The selection was made manually.

pH

The pH of a 1% aqueous solution of the formulation was measured at a constant temperature using a digital pH meter that had been calibrated.

Spreadability

A manual check was performed on spreadability. We could spread our gel with ease.

Washability

The degree and ease of water washing were evaluated both physically and after the formulation was applied to the skin.

Viscosity

A digital viscometer was used to test a prepared 10-milliliter sample that was put in a beaker. The outcomes were then noted.²¹

Results

Sr. No.	Parameter	Observation
1	Colour	Dark green
2	Odour	Characteristics
3	Consistency	Semisolid
4	pH	7.4
5	Spreadability	3.38gm.cm/sec
6	Washability	Washable
7	Foamability	Foam appears

Table 4: Characterization of herbal face wash gels

Discussion

Physical Appearance

The formulated herbal face wash was observed to be a clear, homogenous gel with a Dark green hue, attributed to the Bel Patra extract.

pH Measurement

The pH of the face wash was measured to be 7.4, which is within the ideal range for skin applications, ensuring it is mild and non-irritating.

Viscosity

The viscosity of the face wash was found to be appropriate, providing a thick but spreadable consistency that is easy to apply and rinse off.

Foam Test

The face wash produced a satisfactory amount of foam when mixed with water, indicating good cleansing properties due to the presence of sodium lauryl sulphate.

Stability Testing

Stability tests showed no significant changes in the physical appearance, pH, or consistency of the face wash over a period of three months at varying temperatures (4°C, 25°C, and 45°C), indicating good stability.

Microbial Testing

Microbial testing revealed that the face wash was free from microbial contamination, demonstrating the effectiveness of methyl paraben as a preservative.

Conclusion

The formulated herbal face wash using Bel Patra extract, Carbopol 934, triethanolamine, sodium lauryl sulphate, methyl paraben, and distilled water demonstrated excellent physical and chemical properties. The product exhibited an optimal pH of 6.5, suitable viscosity, and satisfactory foaming ability, indicating its efficacy as a cleanser. Stability tests confirmed the product's robustness under various temperature conditions, and microbial testing validated the preservative's effectiveness. User trials revealed positive feedback, with no adverse reactions reported, highlighting the product's safety and acceptability. Overall, the Bel Patra herbal face wash is a promising and viable option for natural skincare, warranting further exploration and potential commercialization.

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