

## RESEARCH ARTICLE

# Formulation and Evaluation of Soap Containing Extracts of Various Ethnomedicines

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## ABSTRACT

The herbal soap's formulation includes neem leaf; all herbal ingredients are easily obtained from the local herbal market. Use of cosmetics is part of caring for the skin and other body parts due to the damaging effects of modern pollution and UV rays on human health; aloe plants produce a material used in cosmetic goods to treat burns, psoriasis, acne, and other skin disorders; preparation of herbal soap is a medication or therapy with therapeutic benefits for the skin, including antibacterial and antifungal qualities; the raw material used to make soap has a number of properties that make it a good medicinal or cosmetic. The plant used to manufacture soap has properties that can help eliminate acne, soften the skin's epidermis, increase penetration, and hasten healing and resolution. Natural remedies like aloe vera are used to both prevent and cure a range of skin conditions. The medicinal properties of aloe vera soap include antiseptic, antimicrobial, antiviral, antioxidant, and antifungal properties. The aloe vera plant features tubular yellow blossoms, many-seeded fruits, and triangular, fleshy leaves with serrated edges. Each leaf consists of three layers: an inner, transparent gel that contains 99% water and glucomannans, amino acids, lipids, sterols, and vitamins in the remaining 2%. The intermediate layer of latex is composed of a bitter-yellow sap. Neem provides additional medicinal benefits. Studies have demonstrated the anti-inflammatory, anti-hyperglycemic, anti-ulcer, antimalarial, antifungal, antibacterial, antimutagenic, and anticarcinogenic properties of neem and its chemical components. Tulsi provides many skin-benefiting qualities, such as deep-clean skin. Turmeric and vitamin C are also used to help tone the skin when treating breakouts. Homegrown cleaning solutions with medicinal or sedative qualities, such as antimicrobial and antifungal qualities, can benefit the skin. The rough material used in the cleanser formulation has multiple prescription drugs or cosmetics attached to it. The plant used in cleanser formulations has the ability to smooth out skin imperfections, enhance skin texture, prevent breakouts, and hasten healing and resolution.

**Keywords:** Herbal soap, Neem, Tulsi, Vitamin E, Aloe vera, Turmeric, Skin.

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## INTRODUCTION

People have used medicinal plants as a means of treatment since the beginning of time. The leaves, stems, and roots of several medicinal plants have been used to make an extract that has been used to cure a number of ailments and disorders naturally.<sup>1</sup> The safety and effectiveness of Ayurvedic products have set standards, even if synthetic chemicals have supplanted many plant-based treatments.<sup>2</sup> The active ingredients that give these products their therapeutic qualities are applied topically in the form of creams, soaps, oils, and ointments to treat skin conditions such as ringworm, acne, eczema, and

wounds.<sup>3</sup> They are also used cosmetically. Consumer demand for natural ingredient-based cosmetics is rising these days as a healthier, more environmentally friendly, and organic product.<sup>4</sup> More and more customers are turning away from synthetic chemicals found in cosmetics and beauty goods. Natural soap is made by adding a functional component made of natural materials, like plant extract or essential oil, in place of a non-natural surfactant.<sup>5</sup> Based on the technique of manufacture, natural soap can be broadly classified into three categories: melt-and-pour, hot process, and cold process. Transparent or translucent soap is the term used to describe hot process soap.

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The soap smells excellent for a long time, is less irritating, and has good detergency or cleansing power. To make herbal soaps, mix different dry herbs, flowers, and stems into the soap base.<sup>6</sup> Since they are naturally occurring and have a high therapeutic value, they can be used to treat practically any ailment, including skin conditions, at a reasonable cost. It can, therefore, be used as a soap base. A soap's qualities include being soft on the skin, producing a thick lather, guarding against rashes, eczema, and scabies, treating infections on the skin like ringworm, maintaining even skin tone, and leaving the skin smooth. Compared to the contents of commercial soap, herbal soap is free of artificial colors, flavors, fluorides, and other additives. Natural soaps make it simple to maintain the pH balance of the skin without upsetting it.<sup>7</sup> Because of their great therapeutic worth, affordability, accessibility, and compatibility, herbs are the natural products that are typically used in the treatment of practically all diseases and skin issues.<sup>8</sup>

According to WHO research, skin diseases account for an astounding 34% of all occupational disorders. Data from 2020 showed that the number of deaths in India from skin diseases was 17,857, or 0.21% of all deaths. Therefore, the best course of action to address the situation is to include herbal potentials in the formulation, which have fewer effects and provide effective treatment alternatives that are safer and have fewer side effects.<sup>9</sup> Thus, the current study focuses on creating medicated herbal soap that incorporates the active properties of several herbs to create an antibacterial and antioxidant soap that can be used as a standard bath soap.<sup>10</sup>

Many lubricating and cleaning chemicals contain soap, which is a fatty acid salt. Commonly used as a surfactant in bathing, cleaning, and other household tasks. To remove dirt, dust mites, and unpleasant odors from the body, soap is utilized. It possesses antibacterial, anti-aging, antioxidant, and antiseptic properties in the form of herbal soap, which mostly consists of plant parts, including seeds, rhizomes, and roots. Use nuts and pulps to treat disease or injury or to enhance health.<sup>11</sup> Natural colors, flavors, fluorides, and other ingredients are absent from herbal soap. When compared to what commercial soap contains, due to its strong therapeutic value, herbs are the natural items most frequently used in the treatment of practically all diseases and skin issues.<sup>12</sup> Value, affordability, accessibility, and compatibility. The health, aesthetic, medical, and skin care benefits of aloe vera have been well-known and utilized for generations. Aloe vera is now most frequently used in the cosmetology industry.

Herbal soap preparations are medications or medicines that contain antibacterial and antifungal compounds. These preparations are primarily made from plant parts, such as leaves, stems, roots, and fruits, and are used to cure illnesses and injuries, and promote overall health. This preparation has antimicrobial properties and can be used topically. It comes in a variety of forms, including creams, lotions, gels, soaps, solvent extracts, and ointments.<sup>13</sup> Many skin conditions have been treated with the properties of creams and soaps. *Streptococcus* species and *Staphylococcus aureus* are the two main types of fungi that cause skin infections. According to

ethnomedical practice, plant juice and extract are topically used as antimicrobial and anti-inflammatory medicines to treat skin conditions such as ringworm, eczema, and itch. The soft gel form is used to treat psoriasis diseases. Unprocessed soapy plant preparations have the power to penetrate the skin more deeply, soften the epidermis, clear up acne, and hasten its resolution.<sup>14</sup>

**MATERIALS AND METHOD**

**Formulation of Soap Base**

The formula for making the soap base, including all ingredients, is mentioned in Table 1.

**Methodology for Formation of Soap Base**

*Solution A*

About 40 g of distilled water was taken in a beaker, and 10 g of acoustic soda was added into it, mixed it properly and left for half an hour.

*Solution B*

Steel pot was put on a gas burner, 70 g of coconut oil and 30 g of stearic acid were added into the pot, and it was properly mixed with continuous heating.

Solution A was added into solution B, and mixed slowly by continuous stirring and cooked for 10 minutes. About 17 g of glycerine was added to it by heating and stirring continuously, and 70 g of alcohol was added to it. It was properly mixed and the pot was covered for 5 minutes. After that, 90 g of propylene glycol was added into it, mixed and cooked for 2 minutes. The above solution was settled for 5 minutes. An electric blender blended the solution. Then it was cooked again for 5 minutes. After that, the solution was removed into a suitable mold or container. Leave it for one day, suitable soap base is obtained (Figure 1).<sup>15</sup>

**Formulation of Herbal Soap**

Various ethnomedicines utilized to prepare the antibacterial soap are given in Table 2, along with their quantity.



**Figure 1:** Formulated soap base

**Table 1:** Quantity of ingredients used for formulation of soap base

S. No.	Name of ingredients	Quantity (g)
1.	Distilled water	40
2.	Caustic soda	10
3.	Coconut oil	70
4.	Stearic acid	30
5.	Glycerine	17
6.	Alcohol	70
7.	Propylene glycol	90

**Table 2:** Formulation of herbal soap (for quantity)

Ingredients	Quantity
Neem	5 g
Tulsi	2 g
Aloe vera	3 g
Turmeric powder	0.5 g
Vitamin E	1.5 g
Glycerine soap base	17 g
Orange oil	1-mL

**Table 3:** Evaluation of phytochemical study

Test	Presence/Absence in aqueous extract of herbal soap
Alkaloids	+
Flavonoids	+
Carbohydrates	+
Protein	+
Volatile oil	+
Steroid	+
Glycosides	+
Vitamin	+

Presence (+) Absence (-)

### Methodology for Formation of Soap

About 5 g of neem powder was taken into a beaker. In this beaker, 2 g of tulsi, 3 g of aloe vera, 1.5 g of vitamin E, and 0.5 g of turmeric powder were added, and all contents are properly mixed for 3 minutes. The double heating method was given to the glycerine soap base for melting the glycerine soap base. For melting purposes, induction was used.

After melting the glycerine soap base, all ingredients were added to it by proper mixing. Finally the heating was stopped and the orange essential oil was added to it. Finally, the prepared solution was removed into a suitable mold or container. Leave it for one day; suitable soap is obtained.<sup>16</sup>

### RESULT

By using the powder of herbal soap, a preliminary phytochemical study was done. It shows the presence or the absence of the chemical constituent. The detailed results are shown in Table 3.

### Physicochemical Evaluation of Aqueous Extraction of Herbal Soap

After the successful physicochemical analysis study was done and, it shows the ash value, loss on dry, pH determination, total fatty matter and thermal stability (Table 4).

### Stability Test

The stability test was completed by using standard operating procedures (Table 5).

### Comparative Study of Prepared Soap with the Marketed Soap

A comparative study of prepared soap and marketed soap is performed and results are expressed in Table 6. The results of antioxidant activity are given in Table 7.

**Table 4:** Physicochemical evaluation

S. No.	Parameters	Temperature
1.	Color	Dark green color
2.	Odor	Orange like
3.	pH determination	8.5
4.	Smoothness	Smooth
5.	Irrigation	No irrigation

**Table 5:** Evaluation of stability study

S. No.	Parameters	Results (% w/w)
1.	Ash value	0.18%
2.	Loss on dry	1.7%
3.	Total fatty matter	73.21%
4.	Thermal stability	60–70/RH
5.	Foam retention	1-cm per minute
6.	Foam height	3 cm

**Table 6:** Physicochemical parameters of formulation

Parameters	Prepared herbal soap	Marketed herbal soap
Physical parameters (Color, Clarity and odor)	Color: Dark green color Odor: Orange-like Clarity: Crystal clear	Color: Green Odor: Pleasant Clarity: Turbid
pH	8.5	8.2
Total fatty matter (%)	73.21	72.26
Foam retention ( cm per minute)	1	1.2
Foam height	3cm	2.8cm
Thermal stability	60-70/RH	59-71/RH

**Table 7:** Antioxidant activity of the formulations

Concentration (µg/mL)	Prepared herbal soap absorbance	Standard herbal soap absorbance
0.1	0.225	0.252
0.2	0.322	0.143
0.3	0.333	0.083
0.4	0.522	0.212
0.5	0.663	0.099

**Table 8:** Zone of inhibition of the formulations

Samples	Dose (µg/mL)	Zone of inhibition G-ve bacteria ( <i>S. typhi</i> ) (mean of 3)	Zone of inhibition G+ve bacteria ( <i>B. subtilis</i> ) (mean of 3)
Prepared soap	400	0.80	0.82
Marketed soap	400	0.75	1.62

The antibacterial activity was also studied and results are reported in Table 8.

## DISCUSSION

The current project, the formulation and assessment of herbal soap, aimed to reduce the harmful effects of synthetic soap by making a soap with herbal constituents. Human use of makeup has significantly expanded thanks to herbal soaps. Additionally, it helps with the antimicrobial, antibacterial, acne treatment, and preventative processes as well as skin softening and moisturizing. A review of previous studies on these herbal plants suggests that they might not be as harmful as synthetic ones. The effect of various natural ingredients on key formulation assessment parameters was investigated.

Key natural ingredients were used to manufacture natural soap that contains diverse natural agents derived from various natural plants. Natural ingredients such as antibacterial agents like nimbin, azadirone (derived from neem), eugenol (tulsi), and *Curcuma longa* (turmeric) are used to manufacture natural herbal soaps. A few of the parameters used to evaluate soap compositions are color, pH, melting point, breaking point, thixotropy, surface anomalies, scent, and aging stability. The use of cosmetics by humans has grown significantly in recent decades.

The health of the user is at risk due to the chemicals employed in the manufacturing of these cosmetics. But the goal of the current study was to create and assess herbal soap to lessen the negative effects of the synthetic soap that is now available. Therefore, although more thorough clinical trials may be needed to increase the formulation's efficacy, the results of this study suggest that the herbal formulation is a better choice with fewer adverse effects.<sup>17</sup>

## CONCLUSION

The extraction of aloe vera, tulsi turmeric, and neem plant components was investigated. When examined for various tests, the created mixture produced positive results. It has been established through the use of these soaps by a small number of volunteers that they do not irritate the skin, proving that soap does not cause skin irritation. Additionally, the manufactured soap was standardized by assessing a number of physical and chemical characteristics, including pH appearance and odor, that showed satisfactory results.

Many different skin conditions can be healed with herbal therapy. In India, almost 80% of the population uses traditional medicine and other plant-based medicines to treat skin conditions. Ayurvedic medications are considerably inexpensive as compared to contemporary allopathic pharmaceuticals and can be quite beneficial for Indians, particularly the impoverished. Herbal medications include a high concentration of active components and can be a safer and more cost-effective treatment for skin infections ranging from rashes to skin cancer.

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