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Research

Formulation and Evaluation of Polyherbal Soap by Using Natural Plant Extract

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	Abstract
Published on: 29 Jun 2024	<p>Background: There is a growing demand to attain and preserve healthy skin. This leads to the complicated synthetic ingredients in the composition of antioxidant soap, whose safety for human health and skin is still unknown.</p> <p>Goals: The formulation of polyherbal soap and its physicochemical analysis are the focus of this work.</p> <p>Methods: <i>Glycyrrhiza glabra</i>, <i>Azadirachta indica</i>, <i>Aloe barbedensis</i>, <i>Ocimum tenuiflorum</i>, and <i>Curcuma longa</i> were used to make the herbal soaps, which were then assessed for a number of characteristics, including colour, smell, pH, foam retention (Fr), and foam height (Fh).</p> <p>Results: The most stable foam, achieved by dissolving a tiny amount of soap in distilled water, can be achieved for almost three minutes and twenty-four seconds using polyherbal soap. Formulas with one or more combinations exhibit significantly more action than those with two or more, according to the results of the soap formulations. In summary, the findings of the research present a viable substitute for the cosmetic sector in the manufacturing of polyherbal soap.</p> <p>Conclusion: The current investigation involves the formulation and testing of poly herbal soap. There, Polyherbal Soap performs exceptionally well. They also lather well and have good cleansing properties. In addition to brightening the skin, the poly herbal soap will shield it from the production of free radicals.</p>
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	<p>Keywords: Polyherbal, <i>Glycyrrhiza glabra</i>, <i>Azadirachta indica</i>, <i>Aloe barbedensis</i>, <i>Ocimum tenuiflorum</i>, <i>Curcuma longa</i>.</p>

INTRODUCTION

Skin

It is very important for all health care professionals to have basic information about the structure and function of human skin. The skin is also called the cutaneous membrane. In adults, the skin has a surface area ranging from 1.2 to 2.2 m². Skin has two types: hair-bearing skin, which covers much of the body, and hairless skin, such as the palms of hands and soles of feet. ⁽¹⁾

Since the skin is the body portion most exposed to external microorganisms, it must be protected ⁽²⁾. As a result, a better and safer product is needed to maintain cleanliness and hygiene with fewer adverse effects, such as rashes, redness, itching, or any other form of reaction. Herbal products have minimal adverse effects and are enhanced with vital nutrients and minerals that are beneficial to human health. Numerous vital elements or phytochemical compounds found in the diverse kingdom of plants not only have emollient properties but also aid in skin restoration, protection, and healing ⁽³⁾. The cosmetic or herbal preparation's constituents offer excellent nutritional value in addition to imparting antibacterial, antifungal, cleansing, and antispasmodic activities ⁽⁴⁾. Because plants are naturally highly complex, their medicinal efficacy is solely based on their chemical contents. Furthermore, standardizing herbal medications is crucial to preventing their adulteration ⁽⁵⁾.

Soap

A fatty acid salt called soap is utilized in many lubricating and cleaning goods. Soaps are surfactants that are typically used for bathing, washing, and other household tasks ⁽⁶⁾. Soaps are used to cleanse the body of impurities, such as dust mites and bacteria ⁽⁷⁾. Commercial soap typically contains harmful ingredients such as plastics, bisphenol, aluminum, mercury, and barium. These chemicals evaporate and penetrate the body through the skin, where they can have harmful side effects ⁽⁸⁾.

Herbal soap

Herbal soap preparation is a medication with antimicrobial, anti-aging, anti-oxidant, and anti-septic qualities. It mostly uses plant parts, such as seeds, rhizomes, nuts, and pulps, to treat illnesses or injuries and promote health ⁽⁹⁾. Compared to the contents of commercial soap, herbal soap is free of artificial flavours, colour, and fluorides ⁽¹⁰⁾. Because of their great therapeutic worth, affordability, availability, and compatibility, herbs are the natural items that are typically used in the treatment of practically all diseases and skin issues ⁽¹¹⁾.

Properties of good soap ⁽¹²⁾

- A high-quality soap dissolves effortlessly and eliminates stains from the body.
- Skin or any other substance that needs to be cleaned.
- When dissolved in water, it makes adequate suds.
- It provides a gleaming, transparent type of cleanliness.
- It emits a nice scent.
- An excellent soap does not leave clinging residue on the skin or clothing.
- Its colour is superb, streak-free, and even.
- It eradicates and disinfects microorganisms.

MATERIALS AND METHODS

Materials

Collection of active ingredients were collected from different manufacturing company and local market. Neem oil-Morpheme remedies Pvt.Ltd. Liquorice, Aloe vera, Tulsi and turmeric are obtained from local market.

Pharmacognostical profile of active ingredients

Table 1: Pharmacognostical profile of active ingredients

S.No	Name	Biological Source & Family	Parts	Chemical Constituents	Uses
1	Liquorice	<i>Glycyrrhiza glabra</i> (Leguminosae)	Root	Glycyrrhizin, Glucuronic acid	Skin whitening, anti-inflammatory
2	Aloe vera	<i>Aloe barbadensis</i> (Liliaceae)	Pulp	Polymannans, anthroquinone, C-glucosides.	Moisturizer and soothes irritated skin

3	Neem	<i>Azadirachta indica</i> (Meliaceae)	Seeds	Azadirachtin, glycerides, polyphenols, triterpenes	Combats skin infections, soothes irritation
4	Turmeric	<i>Curcuma longa</i> (Zingiberaceae)	Rhizomes	Curcumin, zingiberine	Reduces redness, brightens skin
5	Tulsi	<i>Ocimum tenuiflorum</i> (Lamiaceae)	Leaves	Oleanolic acid,Carvacrol, Uroslic acid	Anti-ageing, acne, Blackheads

Soap base formulation

Table 2: Soap base ingredient list

S.No	Ingredients	Quantity	Use
1	Coconut oil	75 gm	Anti-ageing, Moisturizer
2	Sodium hydroxide	13.28 gm	Lye
3	Distilled water	24.75 gm	Aqueous vehicle

Cold process method

75 ml of coconut oil should be placed in a 500 ml beaker to prepare the soap base. While swirling, place it over a water bath and bring the liquid to a boil between 40 and 45°C. Use a thermometer to keep an eye on the temperature. Once again, use a thermometer to keep the temperature consistent while you add sodium hydroxide or Lye, which has been weighed, to distilled water in a clean beaker. After adding this solution to the coconut admixture, boil it at between 40 and 45°C until a base consistency forms. After the mixture has been transferred into soap moulds, it can be kept in the freezer for two to three hours. After that, the moulds containing soap can be removed from the freezer and left undisturbed for 5 minutes, during which time soap will gradually form ⁽¹³⁾.

Formula for poly herbal soap

Table 3: Formula of Poly herbal soap

S.No	Ingredients	Quantity	Uses
1	Soap base	70 gm	Remove dirt from skin
2	Liquorice	15 gm	Skin whitening
3	Aloe vera gel	5 gm	Anti-oxidant, Anti-bacterial
4	Neem oil	2 ml	Skin conditioner, Anti-bacterial
5	Turmeric	2 gm	Anti-septic
6	Tulsi	1gm	Anti-ageing
7	Rose oil	5 drops	Perfume

Poly herbal soap formulation

Procedure

Measure out the necessary amount of soap base into a 500 ml beaker, then keep it heated over a water bath without stirring in order to make polyherbal soap. The basis for the soap will then be turned into a liquid. Moreover, incorporate all components into the mixture mentioned above. To achieve the right mixture, bring the mixture to a boil over a water bath without mixing. Following the pouring of the mixture into the soap moulds, the moulds containing the soap were frozen for two to three hours. The soap will form after two to three hours if the soap moulds are taken out of the freezer and left for five minutes.



Fig 1: Poly herbal soap

Evaluation parameters

Colour & shape: Colour and shape was checked by naked eye.

Odour: The smell of formulation was checked by applying preparation on hand and feels the fragrance of perfume.

pH: The pH of the prepared soap was assessed by touching a pH strip to the freshly formulated soap and jointly by dissolving 1 gram in 10 ml water with the help of digital pH meter ⁽¹⁴⁾

Foam Height: Sample of soap weighing 0.5 grams was taken and dispersed in 25 ml of distilled water. The mixture was then transferred into a 100 ml measuring cylinder, and the volume was adjusted to 50 ml with water. After 25 strokes, the mixture was left to stand until the aqueous volume measured 50 ml, and the height of the foam above the aqueous volume was measured.

Foam Retention: A 100 ml graduated measuring cylinder had 25 ml of the 1% soap solution poured into it. The cylinder was then sealed with a hand and shaken 10 times. The amount of foam was measured at 1-minute intervals for 4 minutes and recorded ⁽¹⁵⁾.

Skin irritation test: It is carried out by applying soap on the skin for 10 minutes. If no irritation then it is considered as non-irritant product.

Moisture content: About 10g of the sample under study were accurately weighed and transferred to a tarred china dish of known weight and kept in hot air oven at 100 –105°C for an hour. Then, the sample was weighed along with china dish to deduct the actual weight of tarred china dish. The weight of the content was noted to calculate the percentage moisture content ⁽¹⁶⁾.

Moisture content = (Difference in weight/initial weight) x 100

RESULT AND DISCUSSION

S.No	Parameters	Result
1	Colour	Brown
2	Odour	Aromatic
3	Shape	Oval
4	p ^H	7.5
5	Foam height	3cm
6	Foam retention	3 min 24sec
7	Skin irritation	Non irritant
8	Moisture content	5.4%

Tests were conducted on the physicochemical characteristics, including color, pH, shape, and smell. The soap's pH was determined to be 7.5. The findings of determining the remaining parameters, which included moisture content, irritation, foam height, and foam retention, are tabulated in the table. Furthermore, we have seen that

there are parallels between the manufactured polyherbal soap and the marketed soap when we compare the aforementioned parameters with the soap that is sold.

CONCLUSION

The current investigation involves the formulation and testing of poly herbal soap. There, Polyherbal Soap performs exceptionally well. They also lather well and have good cleansing properties. In addition to brightening the skin, the polyherbal soap will shield it from the production of free radicals. The evaluation included physicochemical criteria like color, smell, shape, pH, moisture content, and foam test. The outcome that was utilized to create the formulation for the herbal soap may have economic value. Thus, it can be inferred from the study that poly herbal soap with superior antibacterial properties for skin can be made efficiently. *Glycyrrhiza glabra* and *Ocimum tenuiflorum* were the two plants that were extracted using water and put through a battery of experimental procedures. The formulation of the developed poly herbal soap performed well in several tests. By using these soaps, it was established that soap does not irritate skin; hence, this claim is verifiable.

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