

FORMULATION AND EVALUATION OF POLYHERBAL SOAP FOR ENHANCED SKIN HEALTHPonmadasamy M.^{1*}, Kombiah Pandi¹, Mohana Krishnan P.¹, Santhosh Rajan A.², Venkata Rathina Kumar T.³¹M. Pharm, Department of Pharmacognosy, College of Pharmacy, Madurai Medical College, Madurai, Tamilnadu, India.²M. Pharm, Department of Pharmaceutical Chemistry, College of Pharmacy, Madurai Medical College, Madurai, Tamilnadu, India.³Professor and HOD, Department of Pharmacognosy, College of Pharmacy, Madurai Medical College, Madurai, Tamil Nadu, India.***Corresponding Author: Ponmadasamy M.**

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ABSTRACT

The formulation and assessment of polyherbal soap using cold process techniques is the primary goal of the current study. Formulated and assessed on the basis of coconut oil and sodium hydroxide were *Acalypha indica*, *Aloe barbadensis*, *Azadirachta indica*, and *Carica papaya*. Various assessment techniques have been used, including skin irritancy testing, total fatty matter, moisture content, foaming index, foam retention time, percentage of free alkali and pH. In terms of eliminating microorganisms from the skin, the soap also demonstrated good cleansing effectiveness. The herbal soap has been made and assessed.

KEYWORDS: Polyherbal soap, *Acalypha indica*, *Aloe barbadensis*, *Azadirachta indica*, *Carica Papaya*.**1. INTRODUCTION**

Bar soaps were made from solid formulas intended for topical use. The soap formulations contained a variety of extracts, herbal oils and excipients.^[1] Using plants with therapeutic properties has long been the foundation of traditional medicine. Leaf, stem and root extracts from a wide range of medicinal plants have been used as a natural therapy for a number of ailments and disorders. Their medicinal qualities come from the active components in these extracts, which are administered topically in the form of oils, lotions, soaps and ointments to treat wounds, ringworm, acne and eczema. They are additionally employed for cosmetics and as an antibacterial agent.^[2]

1.1 Soap

Originally used to describe the substance formed by processing tallow with ashes, the word soap (Latin Sapo) is connected with Latin sebum tallow. "Soap is defined as a body that releases alkali when treated with water in the commercial sense."^[3] A variety of cleaning and lubrication products contain soap, which is a fatty acid salt. Commonly used for bathing, washing and other household tasks, soaps are surfactants. The body can be cleansed of filth, bacteria and offensive odours with soaps. Commercial soap is usually composed of toxic materials such as plastics, bisphenol, aluminium, barium and mercury. These substances are absorbed into the body

through the skin and internal organs and can have detrimental side effects.^[4,5]

1.2 Herbal soap

Herbal soap preparation is a medication that uses plant parts such as seeds, rhizomes, nuts, and pulps to treat illnesses and restore health. It also has antibacterial, anti-aging, anti-oxidant, and anti-septic qualities.^[6] Compared to the contents of commercial soap, herbal soap is free from artificial colours, flavours, fluorides and other additives.^[7] 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.^[8] Cosmetics designed for skin care improve the skin's texture, health and hydration. The solid formulation of Polyherbal Soap is meant to be applied topically. Almond oil, several plant extracts and different excipients are used to produce the cream formulation.^[9] It primarily functions as a skin tonic by cleansing and moisturizing the skin. Along with hydrating and preserving the elasticity of the skin, the secondary metabolites found in the plants will promote the skin's strength, texture and integrity.^[10] As a result, the use of herbal substances in skincare products helps to both temporarily and significantly lower the skin's generation of free radicals. Active components have anti-acne, anti-wrinkle and antioxidant properties that protect the

skin from UV radiation.

1.3 Types of soap^[11]

1. Natural/Herbal Soap
2. Liquid Soap
3. Moisturizing Soap
4. Anti-bacterial Soap
5. Chemical Free Soap
6. Foam Soap
7. Bar Soap
8. Body Soap

1.4 Application polyherbal soap^[12]

- It is a reliable and safe substitute for traditional soap.
- Several epidermal dysfunctions are treated with herbal soap.
- Psoriasis, acne, and eczema all contribute to enhancing the immune response in the skin tissue impacted by these conditions.
- A cleansing agent used to eliminate oil and debris from the skin.

2. MATERIALS AND METHODS

2.1 Materials





Collection of active ingredients were collected from different manufacturing company and local market. Neem oil- Allin exporters. *Acalypha Indica*, *Aloe barbadensis* and *Carica Papaya* was collected from the medicinal garden of college of pharmacy, Madurai Medical College, Madurai.

Preparation of *acalypha indica* extract: Leaves of *Acalypha indica* was collected from Madurai Medical College, Madurai, Tamilnadu, India and washed thoroughly with water. Aqueous extract of *Acalypha indica* obtained by triturating the leaves.

Preparation of *carica papaya* extract: Leaves of *Carica Papaya* was collected from Madurai Medical College, Madurai, Tamilnadu, India and washed thoroughly with fresh water. Aqueous extract of *Carica papaya* obtained by triturating the leaves.

2.2 Pharmacognostical profile of active ingredients

Table 1: Pharmacognostical profile of active ingredients.

S. No	Name	Biological source & Family	Parts	Chemical constituents	Uses
1	Kuppaimeni	<i>Acalypha Indica</i> (Euphorbiaceae)	Leaves 	Acalyphamide, clitorin, nicotin, biorobin, Tannins-B.	Psoriasis, Anti-fungal, Anti-acne
2	Aloe vera	<i>Aloe barbadensis</i> (Liliaceae)	Pulp 	Polymannans, anthraquinone, glucosides.	Moisturizer and soothes irritated skin
3	Neem	<i>Azadirachta indica</i> (Meliaceae)	Seeds 	Azadirachtin, glycerides, polyphenols, triterpenes	Combats skin infections, soothes irritation
4	Papaya	<i>Carica Papaya</i> (Caricaceae)	Leaves 	alkaloids, glycosides, tannins, saponins,	Anti-Tanning

2.3 Soap base formulation

Table 2: Soap base ingredient list.

S. No.	Ingredient	Quantity	Use
1	Coconut oil	75 gm	Provides hydration and nourishment
2	Sodium hydroxide	13.28 gm	Lye
3	Distilled water	24.75 gm	Aqueous vehicle

Cold process method

To make the soap base, fill a 500 ml beaker with 75 ml of coconut oil. Put it over a water bath and spin to bring the liquid to a boil, about 40 to 45 °C. To monitor the temperature, use a thermometer. Once more, use a thermometer to maintain a constant temperature while you combine weighed sodium hydroxide or Lye with distilled water in a sanitized beaker. Boil the mixture at 40 to 45 °C after adding this solution or until a base

consistency forms. Once the mixture is poured into soap moulds, it can be stored for two to 3 hours in the freezer. After that, you can take the moulds that contain the soap out of the freezer and leave them there for 5 minutes. During that time, soap will start to develop.^[13]

2.4 Formula for poly herbal soap

Table 3: Formula of Poly herbal soap.

S. No	Ingredients	Quantity	Uses
1	Soap base	65 gm	For Soap Making
2	Kuppaimeni	15 gm	Anti-acne
3	Aloe vera	2 gm	Anti-oxidant, Anti-bacterial
4	Neem oil	2 ml	Skinconditioner, Anti-bacterial
5	Papaya	2gm	Antioxidant
6	Rose oil	5 drops	Flavouring agent

2.5 Poly herbal soap formulation procedure

To prepared polyherbal soap, measure out the required amount of soap base into a 500 ml beaker and keep it heated over a water bath without stirring. Next, a liquid will be created out of the soap's foundation. Add to the above-mentioned mixture all of the ingredients. You need to boil the mixture over a water bath without mixing it to get the proper combination. The soap-containing moulds were frozen for two to three hours after the mixture was poured into them. Remove the soap moulds from the freezer and let them sit for 5 minutes; the soap will develop in two to three hours.



Figure 1: Poly herbal soap.

3. Evaluation parameters

Physical evaluation

Organoleptic characters like shape, odour, colour, appearance was determined.

pH: 1gm of the soap was dissolved in 10ml of distilled water and the pH was determined using a digital pH.^[14]

Foam height: A sample of soap weighing 0.5 grams was obtained and mixed with 25 ml of distilled water. After that, pour it into a 100 ml measuring cylinder and add water until the volume reached 50 ml. After 25 strokes, the aqueous volume was measured up to 50 ml, and the foam height was measured above the aqueous volume.^[15]

Foam retention: A 100 ml graduated measuring cylinder was filled with 25 ml of the 1% soap solution. Top of the measuring cylinder was closed with our palm and shaken for 4 minutes, the volume of foam was measured at one-minute intervals.^[16]

Skin irritation test: Soap was applied over the skin for 10 minutes and the reaction was observed and

recorded.^[17]

Determination of total fatty matter: By estimating the fatty acids that were produced when soap and acid reacted in the presence of hot water, TFM was computed. 150 ml of distilled water was used to dissolve 10 g of the prepared soap, which was then heated. This was heated to produce a clear solution, then 20 ml of 15% H₂SO₄ was added. The surface fatty acids in the resultant solution are solidified by heating it again and adding 7 g of beeswax. Cake was formed. The cake thus obtained was dried and weighted to determine TFM by the following formula.^[18]

$\% \text{ TFM} = (\text{Weight of the cake} - \text{Weight of the wax}) \text{ in g} / \text{Weight of the soap in g} \times 100.$

Determination of total moisture content: About 5 g of the soap was taken in a petri dish and dried in a hot-air oven at 105°C for 2 hours. Then it was heated, cooled and weighed. The difference in weight indicates moisture content.^[19]

$\text{Water content} = m/M \times 100$

$m = \text{loss in mass of the material after drying}$
 $M = \text{mass of sample taken.}$

Determination of percentage-free alkali: About 5 grams of soap and 50 ml of neutralized alcohol were taken in a conical flask. It was boiled in a water bath for 30 minutes by reflux method. It was allowed to cool at room temperature and 1 ml of phenolphthalein solution was added. It was then titrated with 0.1N HCl.^[20]

Alcohol insoluble matter: About 5 grams of the soap was taken in a conical flask which is shaken with 50 ml of ethanol. It was then filtered and 20 ml of ethanol was added through the filter paper and it was dried then weighted.^[21]

$\text{Percentage alcohol insoluble matter} = \text{Weight of the residue} / \text{Weight of sample} \times 100.$

4. RESULT AND DISCUSSION

Polyherbal soap's organoleptic characteristics, including colour, order, appearance, and pH, were measured. The table presents the results of calculated parameters, which include total fatty matter, percentage-free alkali, alcohol insoluble matter, moisture content, foam height and foam retention. The soap doesn't cause any irritation to the skin.

S. No	Parameters	Result
1	Colour	Green
2	Odour	Aromatic
3	Shape	Round
4	pH	7.5
5	Foam height	3cm
6	Foam retention	3 min 24sec
7	Texture	Smooth
8	Washability	Good washable
9	Skin irritation	Non irritant
10	Total fatty matter	63%
11	Total moisture content	16%
12	Percentage-free alkali	1.5%
13	Alcohol insoluble matter	10%

5. CONCLUSION

A product with good compatibility and good physical properties was produced by using the cold process approach to prepare polyherbal soaps. Excellent foaming capabilities were observed in the formulations, which were reported to be free of particles and alkali components. When put through a series of tests, the created polyherbal soap formulation performed well. Use of these soaps has been shown to cause no skin irritation at all, therefore soap is not shown to cause any skin irritation at all. Based on the study's findings, cold process soap can be successfully manufactured with polyherbal ingredients to provide anti-aging, anti-fungal, anti-acne and Anti psoriatic benefits.

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