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Research Article

Formulation And Evaluation of Poly Herbal Soap

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ABSTRACT

Polyherbal soap is a type of soap but contains combination of herbal extracts. The use of polyherbal soap has gained popularity due to its perceived effectiveness in treating various skin conditions. Herbal soap is a natural soap to conventional soap that is often made using herbs and plant-based ingredients. The use of herbal soap provides various benefits, such as healing the skin, provide natural fragrance, provide Smoothing, it is made using natural ingredients that do not harm the environment and is biodegradable. The formulation of polyherbal soap involves selecting and combination herbs based on their therapeutic properties and compatibility with soap making ingredients. Polyherbal soap are formulated by combining various herbal extracts or powders with a soap base. The soap base is typically made from oils, the herbal extracts or powders are added to the soap base during soap making process. Numerous chemical toxins and microorganisms present in the atmosphere may cause chemical infection and damage to the skin. Cosmetics alone are not sufficient to take care of the skin. The present aim is to formulate and evaluate the polyherbal soap by using different herbs such as azadirachta indica, aloe barbadensis, curcuma longa and ocimum tenuiflorum and multani mitti & evaluation various test such as colour, odour, shape, pH, foam retention, foam height and irritability test and total fatty matter were conducted to know the effectiveness of the formulated Polyherbal soap. Several studies have been conducted to evaluate the effectiveness of polyherbal soap in treating skin conditions such as dirt removal and glowing activity. These studies have shown promising results & we recommending that polyherbal soap is safe and effective to use & alternative when compared to conventional soap.

INTRODUCTION

Skin:

Skin is the most revealed part of the body which is prone to various foreign particles which may lead to various skin related disorders. Therefore, in

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order to prevent the skin from various disorders there is a need for the proper cleanliness as well hygiene for the most exposed part of the body and prevent it from pervasive microorganism spread in the environment thus, preventing various disorders of the skin. The better and officious way to remove all the foreign particles, dirt is the use of Soaps. The utilisation of soap helps in cleansing the skin along with the anti-microbial properties. Various micro-organisms such as *Staphylococcus aureus*, *Pseudomonas spp.*, *Klebsiella pneumonia* and *Proteus vulgaris* being the causative agents for various skin infections [1].

Soap:

A soap is a salt of a compound, known as a fatty acid. A soap molecule has a long hydrocarbon chain with a carboxylic acid group on one end, which has ionic bond with metal ion, usually sodium or potassium. The hydrocarbon end is non polar which is highly soluble in non-polar substances and the ionic end is soluble in water. They are carboxylate salts with very long hydro carbon chains. They can be made from the base hydrolysis of a fat or oil. It is used as a surfactant for washing, bathing and cleaning but used in textile spinning for lubricants saponification is the process in making the soap by reaction of triglyceride fats are hydrolysed into free fatty acids then it will combine with alkali to forming crude soap. The cleaning action of soaps are because of their ability to emulsify or disperse water-insoluble materials and hold them in the suspension of water. This ability is seen from the molecular structure of soaps. When soap is added to water that contains oil or other water-insoluble materials, the soap or detergent molecules surround the oil droplets. The oil is, dissolved in the alkyl groups of the soap molecules while the ionic end allows it to be dissolved in water. As a result, the oil droplets are to be dispersed throughout the water and can be washed away [2].

Classification of soap:

Based on usage

- Toilet soap
- Non toilet soap
- Glycerine soap
- Transparent soap

Based on form

- Handmade soaps
- Bar soaps
- Liquid soaps

Based on ingredients

- Milk Soap
- Animal Soap
- Luxury Soap
- Perfume

Based on method of manufacture

- Melt and Pour Method
- Hot Press Method and Cold Press Method
- Milling Method [3].

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. Compared to the contents of commercial soap, herbal soap is free of artificial flavours, colour, and fluorides. 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 [4]. In this soap, Neem is main ingredient, and shows medicinal properties. Neem leaf and it extract exhibit immunomodulatory, Antiulcer, antimalarial, antifungal, antibacterial, antioxidant, anti-carcinogenic property. Tulsi has got the topmost medicinal value. Tulsi to be effective for diabetes they reducing blood glucose position Tulsi also used in severe acute Respiratory pattern. Juice of its leaves gives relief in cold fever bronchitis and cough. Tulsi reduce stress, enhance Stamina relief inflammation and also shows antifungal activity so Tulsi is also used as main compound in this herbal soap. The main antifungal activity of Tulsi serves to be beneficial in soap formulation [5]. The Aloe Vera has been known and used for centuries for its health, beauty, medicinal and skin care properties. Nowadays most frequently aloe Vera used in the field of cosmetology. Aloe Vera contain 75 potentially active constituents. Curcuma longa having properties like photo protection, anti-ageing, anti-wrinkle, moisturizing, anti-oxidants, astringent, anti-microbial and anti-inflammatory activity. Recent studies demonstrate that the Curcumin is excellent for wrinkles and can control the inflammation and the formation of free radicles. During COVID-19 pandemic the frequent and increased use of synthetic hand washing products may result in cellular damage. Using synthetic components in soap has caused severe health concerns for human and the ecosystem. So, the polyherbal soap formulated from natural sources to reduce the environmental effect and improve public health [6]. Herbal soaps are made of organic natural substances; they result in smoothening and rejuvenating the skin. Even the fragrance of herbal soap relaxes the mind without affecting environment. They will be devoid of artificial colour and aroma. Moreover, chemical soaps have animal fat and lack the essential oils from plant extract which give a natural and pleasing aroma [7]. While there is no particular entry barrier from the point of view of technology, adequate market thrust is necessary to competitively sell the product in the market. The toilet soap consumption in India is estimated at 1200000 tonnes per annum. The soap market is growing at the rate of about 9% per annum [8].

MATERIALS AND METHODS

Table 1: Plant Profile of Neem, Tulasi, Turmeric, Aloe Vera and Multani mitti

S. No	Name Of Plant	Biological Source	Parts Of Plants	Chemical Constituents	Uses
1.	Neem	Azadirachta indica	Leaves, seeds, flowers, bark.	Azadirachta, nimbin, nimbidin.	Moisturizing, cooling.
2.	Tulasi	Ocimum tenuiflorum	Leaves	Eugenol germacrceterpen	Anti-fungal, anti-bacterial, anti-septic.
3.	Turmeric	Curcuma longa	Roots	Curcumin, curcuminoids	Anti-bacterial, anti-aging, anti-oxidant

4.	Aloe Vera [9]	Dried latex of leaves of it	Green art of the leaf	Amylase, mono saccharides	Anti-oxidant, anti-aging, anti-diabetic.
5.	Multani Mitti [10]	Fuller's earth	Clay	Magnesium chloride	Brighten the skin tone, fighting acne

Extraction of Azadirachta indica:

1. Fresh Neem leaves are collected and shed dried for 15 days
2. The dried leaves are then powdered using mortar and pestle.
3. The leaves weighed 54.3gm and macerated in a beaker using 280ml distilled water and 120ml chloroform with continuous stirring.
4. The prepared mixture is covered with aluminium foil and allowed to macerate for three days, stirring every day. After that, filter paper is used to filter the mixture.
5. On a hot water bath, the mixture's extra solvent was dried.
6. The dried extract was collected and kept in desiccators for cooling.
7. The prepared extract is weighed.

Fig. 1.1. Dried Neem leaves

Fig. 1.2. Extraction of Neem

Fig. 1.3. Filtrate of Neem

Figure 1.1, 1.2 & 1.3: Collection and extraction of Dried Neem leaves, Extraction of Neem and Filtrate of Neem

Extraction of Ocimum tenuiflorum:

1. Fresh Tulsi leaves are collected and shed dried for 15 days.
2. The dried leaves are then powdered using mortar and pestle
3. The leaves weighed 4.90gm and macerated in a beaker using 110ml distilled water and 40ml chloroform with continuous stirring.
4. The prepared mixture is covered with aluminium foil and allowed to macerate for three days, stirring every day. After that, filter paper is used to filter the mixture.
5. The excess solvent in the mixture was dried on a hot water bath.
6. The dried extract was collected and kept in desiccator for cooling.
7. The prepared extract is weighed.[11]


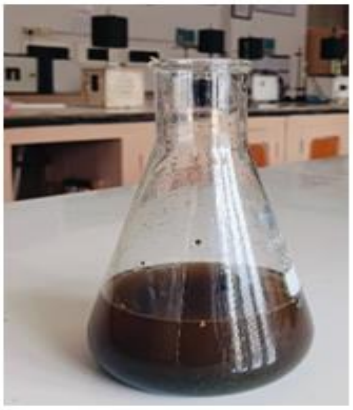


Fig. 2.1. Dried Tulsi leaves Fig. 2.2. Extraction of Tulsi Fig. 2.3. Filtrate of Tulsi
Figure 2.1, 2.2 & 2.3: Collection and extraction of Dried Tulsi leaves, Extraction of Tulsi & Filtrate of Tulsi

Table 2: Preparation Of Soap Base and Formulation of Soap Base:

S. No	Ingredients	Formulations			
		F1	F2	F3	F4
1.	Coconut oil	100ml	100ml	100ml	Glycerine soap base is used.
2.	Sodium hydroxide solution	20gms	20gms	20gms	Glycerine soap base is used.
3.	Sodium lauryl sulphate	10ml	1ml	12ml	Glycerine soap base is used.
4.	Aloe Vera	10ml	10ml	10ml	Glycerine soap base is used.
5.	Stearic acid	1.3gms	1.5gms	1.8gms	Glycerine soap base is used.
6.	Ethanol	5ml	5ml	5ml	Glycerine soap base is used.
7.	Soft paraffin	0.5gms	0.7gms	1gm	Glycerine soap base is used.
8.	Triethanolamine	10ml	12ml	15ml	Glycerine soap base is used.

Procedure:

The glycerine soap base was prepared using a modified method based on traditional soap-making techniques. Coconut oil (100 ml) was heated in a water bath for 5 minutes, after which a sodium hydroxide solution (20 g NaOH in 100 ml H_2O) was added with continuous stirring for 8-10 minutes. Sodium lauryl sulphate (10 ml) was then incorporated and stirred for 2 minutes, followed by the addition of aloe Vera (10 ml) with further stirring for 2-3 minutes. To enhance the soap's properties, stearic acid (1 g) was added as a hardening agent, along with ethanol (5 ml) as a solvent. Soft paraffin (0.7 g) was then introduced and stirred for 5-8 minutes. Finally,

triethanolamine (10 ml) was added and mixed thoroughly to form a thick paste. The resulting mixture was poured into Moulds and allowed to solidify at room temperature [12].

Table 3: Preparation of Herbal Soap

S. No	Ingredients	Quantity
1.	Neem Extract	5ml
2.	Tulasi Extract	4ml
3.	Turmeric Powder	0.5gms
4.	Vitamin E	2 Capsules
5.	Soap Base	75gms
6.	Rose Water	5ml
7.	Lavender Oil	2ml
8.	Multani Mitti	1gm

Procedure:

The double boiler was placed on the hot plate. The soap bases were cut into cubes, and were filled up to 75% volume in container. 1-2% of water was added to compensate the soap base. The top was covered and allowed to melt with stirring lightly in between. The melting temperature was around 75-80°C. Once the base completely melted, different extracts were added which include Neem extract 5ml, Tulasi extract 4ml, turmeric powder 0.5gms, Multani mitti 1gm, vitamin E 2 capsules, rose water 5 ml and lavender essential oil 2ml. It was then poured into a mould. It was allowed to cool at room temperature and then remoulded [13].

Evaluation Tests for Herbal Soap

Organoleptic Evaluations:

- Colour- Yellowish brown
- Odour- Pleasant
- Appearance- Good

Physico chemical Evaluations:

- **pH Determination:** pH values of all formulations ranged from 8.5 to 9.0, which falls within the ideal pH range for soap (alkaline pH), ensuring compatibility with skin [14].

- **Foam Height:** 0.5gm of the sample of soap was taken and dispersed in 25 ml of distilled water. Then, transferred it into 100 ml measuring cylinder; the volume was made up to 50 ml with water. 25 strokes were given and stand till aqueous volume was measured up to 50 ml and measured the foam height.

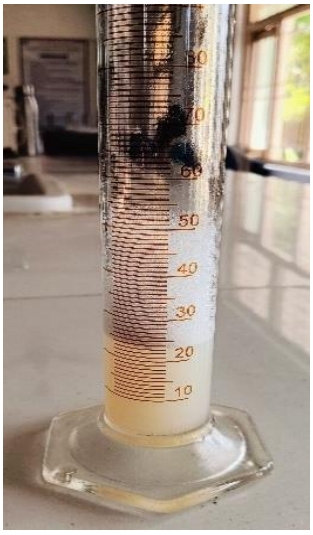

Fig 3: Foam Height Test

- **Foam Retention:** Prepared the 25 ml of the 1% soap solution and transferred it into the 100 ml measuring cylinder. Then the cylinder was shaken 10 times. The volume of foam was recorded at one minute for 4 to 5 minutes [15].

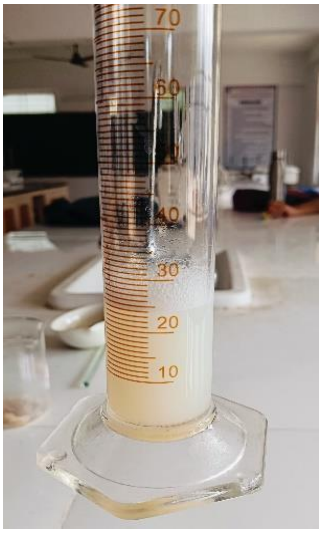

Fig 4: Foam Retention Test

- **Skin irritation:** Take a 0.1 grams of soap that has been soaked in water. Then applied to the skin, allowed for 1 hour observe the symptoms caused after applied.

Fig 5: Skin Irritation Test

- **Determination of TFM (total fatty matter):** The total fatty matter of a soap is tested by making the soap react with acid in association with hot water. 10 gm of soap is dissolved in 150 ml of distilled water by heating. The soap solution was treated with 20 % of sulphuric acid and was heated till the solution cleared. The fatty acids were then observed at surface of film which was solidified by addition of 7 gm of bees wax and was again subjected to heat. The formation of cake was removed and TFM was calculates as following-

% Total Fatty Matter= (A-X)/WX100 Where,

X=weight of wax

A= Weight of wax+ Oil

W=Weight of Soap [16].

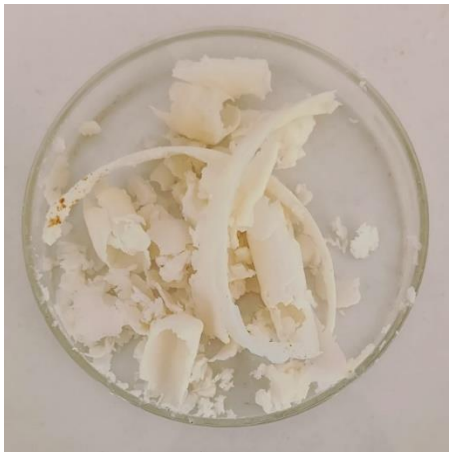

Fig 6: Total Fatty Matter

RESULT

Among all the formulations the formulation f3 is exhibited good result. The physicochemical parameters such as colour, odour, appearance, and pH were tested. The pH of the soap was found to be 9 with pH strip. Remaining parameters such as foam Height was found to be: 25 Foam Retention was found to be: 6min and total fatty matter was found to be – 13%.

Table 4: Evaluation Parameters of Herbal Soap

S.NO	Parameters	Standard value	Observed value		
			F1	F2	F3
1.	Colour, Odour, Appearance	Brown, Aromatic, Smooth texture.	Brown, Aromatic, Smooth texture	Brown, Aromatic, Smooth texture	Brown, Aromatic, Smooth texture
2.	pH	10	9	9	9
3.	Skin irritation	No irritation	No irritation	No irritation	No irritation
4.	Foam height	32	15	20	25
5.	Foam retention	8mins	4mins	5mins	6mins
6.	(TFM) Total fatty matter	15%	8%	10%	13%
7.	Washability	Easily washable	Easily washable	Easily washable	Easily washable

DISCUSSION

The above given table describes the colour, odour, shape, irritation, foam height and foam retention of the poly herbal soap. The colour of all the three formulation were brown. The odour of all the three formulation was aromatic. The shape of all the three formulation was oval. As per evaluation test formulation F3 is may be the most standard formulation compared to other formulation. There is no irritation beside foam retention and foamability of F3 is may be much better than other formulations.

CONCLUSION

The formulated soap showed considerable dirt removal and glowing activity as the commercial standard and all the other parameters were good. The plant Neem and Tulsi were extracted using water and chloroform subjected to various evaluation test according to previous research. The prepared formulation when tested for different test gave good results. It does not give any irritancy to skin it was determined by using these soap by few volunteer hence it is proved that soap does not give any irritancy to skin . Furthermore the prepared soap were standardized by evaluating various physico chemical properties such as pH appearance odour in which the exhibit satisfactory effect. The soap was free from harsh chemicals which are used in commercial soaps .Herbal soap can be used as a promising alternative to commercial chemical containing skin whitening soaps.

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