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Formulation and evaluation of herbal soap

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Abstract

Introduction: Herbal soaps, often known as natural soaps, are made from plant-based ingredients and botanical extracts. They offer the skin several advantages since they are made of natural ingredients. Their inherent aroma, antioxidant content, nourishing and moisturizing attributes, and environmental friendliness are a few of the benefits.

Materials and Methods: The preparation of the extract of the Herbal soap is based on Herbal formulation and Evaluation including organoleptic and physico-chemical parameters determination. The pH, Total fatty matter, Alcohol insoluble matter, Foam height, Foam retention, Moisture content were measured and observed. The colour and odour was observed to be Brown, smooth in texture and aromatic odour.

Discussion: Our study's objective is to create herbal soap through the cold method. Lemon, Aloe vera, Tulsi, Neem, and Ritha were used to make herbal soap. Using varying concentrations of the soap solution in comparison to a standard, the herbal formulation was created and assessed for the measurement of pH, moisture content, foaming height, foam retention duration, saponification, TFM (total fatty matter), and alcohol soluble matter.

Keywords: Herbal soap, formulation, evaluation, saponification, skin care

Introduction

Theophrastus, a Greek philosopher, classified plants into three categories: trees, shrubs, and herbs. Three categories of herbs were originally recognized: sweet herbs (like thyme), salad herbs (like wild celery), and pot herbs (like onions). Pot herbs started to be referred to be vegetables around the seventeenth century as a result of selective breeding that altered the plants' size and flavor away from those of the wild plant. At that point, they were no longer only thought to be fit for pots.

Herbal soaps are skin-purifying and skin-beautifying products. The primary benefit of utilizing herbal cosmetics is their purity, which leaves the body rich in nutrients and other beneficial minerals instead of causing any negative side effects. Individuals' skin and hair beauty is influenced by their health, lifestyle choices, regular occupation, environment, and upkeep. Summertime dehydration from prolonged heat contact to the skin results in wrinkles, freckles, blemishes, pigmentation, and sunburns ^[1].

The majority of commercial soaps on the market today have chemical ingredients that have antibacterial action and may be able to depilate skin infections. Soaps and detergents are considered disinfectants that are necessary for everyday hygiene routines. Cleaning agents, such as soaps, can be liquid, solid, semisolid, or powdered. In order to preserve health and beauty and get rid of odors from the body or inanimate objects, such as clothing, they are used to eliminate dirt, including dust, bacteria, stains, and unpleasant smells. Commercial soap is typically composed of harmful substances such as plastics, aluminum, barium, mercury, and bisphenol, among others. These substances are vaporized and absorbed through the skin, both of which have detrimental side effects on the body ^[2].

The usage of herbal medicines has increased dramatically in the last several years. It is believed that around 80% of the world's population uses herbal plant extracts in their medicines, both in developed and developing nations. It is recognized as one of the main medical treatments, particularly in underdeveloped nations, for a variety of illnesses. The field of medicinal research known as "Herbal Medicinal Products" emerged as a result of the astounding increase in the use of herbal plants and their extracts ^[3].

Herbal soap has advantages over synthetic soap

Natural elements found in herbal soap, such as plant extracts, essential oils, and herbs, provide

a number of benefits over synthetic soaps.

- 1. Mild on the skin:** Herbal soaps are often kinder and milder on the skin than synthetic soap, which makes them appropriate for skin types that are more sensitive.
- 2. Natural ingredient:** They frequently include skin-nourishing and hydrating natural ingredients including shea butter, coconut oil, olive oil, and aloe vera.
- 3. Chemical-Free:** The absence of harsh chemicals, artificial perfumes, and synthetic colors in herbal soaps lowers the possibility of allergic responses and skin irritation.
- 4. Environmentally Friendly:** Compared to synthetic soaps, the herbal ones are typically biodegradable and environmentally friendly as they are made with natural ingredients.
- 5. Aromatherapy advantages:** By combining essential oils with herbal soaps, aromatherapy advantages including stress alleviation, mood enhancement, and relaxation can be experienced.
- 6. Natural antibacterial qualities:** Certain herbal substances, like neem and tea tree oil, have antibacterial qualities that assist to cleanse and shield the skin from infections.

Aim And Objectives

Aim: To prepare and evaluate Herbal soap.

Objective:

- To prepare the extract of *Azadirachta indica*, *Ocimum tenuiflorum*, *Sapindus mukorossi*, *Aloe barbadensis*.
- Formulation of Herbal soap by using plant extract and lemon as flavouring agents.
- Evaluation of Herbal soap with the different organoleptic and physico-chemical parameters.

Materials and Methods

Plant Collection

Collection of Neem

The leaves of *Azadirachta indica* (Neem) were collected from Majhitar, East Sikkim, after that the leaves were shade dried and coarsely powdered using mortar and pestle.

Collection of Tulsi

The leaves of *Ocimum tenuiflorum* (Tulsi) were collected from Majhitar, East Sikkim, after that the leaves were shade dried and coarsely powdered using mortar and pestle.

Collection of Ritha

The seeds of *Sapindus mukorossi* (Ritha) were collected from Singtam, Sikkim, after that the seeds were shade dried and using mortar and pestle the seeds were grinded and coarse powder was obtained.

Collection of Aloe Vera: The Fruit pods of *Aloe barbadensis* (Aloe Vera) were collected from Singtam, Sikkim, after that the fresh Fruit pods were cut into small pieces and Aloe Vera gel were collected by using spatula.

Collection of Lemon

The Peels of *Citrus limon* (Lemon) were collected from Singtam, Sikkim, after that the Lemon were cut into two half and squeeze it as hard as possible by using hand.

Chemicals

These include soft paraffin, ethanol, rose oil, glycerine.

Extraction

The *Azadirachta indica*, *Ocimum tenuiflorum*, *Sapindus mukorossi* and *Aloe barbadensis*, *Citrus limon* powder was extracted with water and chloroform at 70:30 ratio by above stated powder was taken in conical flask and extracted with water for four hours with occasional agitation then filtered.

Preparation Of Solvent Extract

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 aluminum 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: Dry leaves of Neem



Fig 2: Extract of leaves 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 aluminum 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.

- The dried extract was collected and kept in desiccator for cooling.
- The prepared extract is weighed.



Fig 3: Dry leaves of Tulsi



Fig 4: Extract of leaves of Tulsi



Fig 5: Filtration process of the Tulsi

Extraction of *Sapindus mukorossi*

- New ritha leaves are gathered, dried for 15 days, and then shed.
- Next, a pestle and mortar are used to ground the dried leaves.
- The leaves weighed 154.3gm and macerated in a beaker using 840ml distilled water and 360ml chloroform with continuous stirring.
- The prepared mixture is covered with aluminum foil and allowed to macerate for three days, stirring every day. After that, filter paper is used to filter the mixture.
- On a hot water bath, the mixture's extra solvent was dried.

- After drying, the extract was gathered and stored in a desiccator to chill.
- Weighing the produced extract is done.



Fig 6: Dry seeds of Ritha



Fig 7: Extract of seeds of Ritha



Fig 8: Evaporating of extract on water bath

Formulation Of Herbal Soap

A mixture of powdered herbs of weight containing 1gm Ritha extract, 1gm Tulsi extract, 2gm Neem extract, Lemon oil(q.s.), 2gm Alovera gel, Vitamin E(q.s.), Rose water 2ml, Glycerine (q.s.) were taken to prepare herbal soap by following steps:

Procedure

- The Soap base (Glycerine) was taken in a beaker and was melted in a hot water bath.
- Along with the glycerine, the extract of Ritha, Tulsi & Neem was added with Alovera gel.
- Then Vitamin E, Rose water and Lemon was also added and stirred continuously to mix the herbal soap ingredients as mentioned above.
- It was poured in a soap base and cooled for 12 hrs.



Fig 9: Herbal Soap in mould



Fig 10: Herbal Soap after cooling

Evaluation parameters

1. Organoleptic evaluation

- **Colour:** Brown.
- **Odour:** Aromatic.
- **Appearance:** Smooth texture.

2. Physico-chemical evaluation

- **pH:** Sing 10 ml of distilled water and stirring, 2 g of the finished soap was dissolved, yielding a dissolved sample. A pH meter was used to measure the pH.
- **Foam retention:** After making 25 milliliters of the 1% soap solution and pouring it into a 100 milliliter measuring cylinder, shake it ten times. For four to five minutes, the volume of foam was measured every minute [4].



Fig 11: Foam retention

Foam height

A sample of soap weighing 0.5 grams was obtained and dissolved in 25 milliliters of distilled water. After that, put it into a 100 ml measuring cylinder and added water to get the volume up to 50 ml. After giving 25 strokes, the aqueous volume was measured up to 50 ml, and the foam height was measured above the aqueous volume [5].



Fig 12: Foam height

Alcohol insoluble matter

A 5g sample of soap was placed in a conical flask and 50ml of warm ethanol was added to dissolve it. The liquid was filtered using tarred filter paper and heated to 105⁰ degrees Celsius for an hour. It was no longer weighted filter paper [6].



Fig 13: Alcohol insoluble matter

Total fatty matter

By reacting soap with acid in the presence of hot water and measuring the resulting fatty acid, TFM was determined. After dissolving 10g of the designed soap in 150ml of distilled water, the mixture was heated. 20 milliliters of 15% H₂SO₄ were added to this and heated until a clear solution was achieved. The resulting solution's surface fatty acid was solidified by heating it once again and adding 7g of beeswax. It was then permitted to cake. After removing the cake, it was blotted dry and weighed using formula [7].

%TFM= (Weight of the cake- Weight of the wax) in gm/Weight of the soap in gm x 100



Fig 14: Heating of solution to obtain TFM



Fig 15: Total Fatty Matter

Moisture content

A little over 5g of the sample under investigation were precisely weighed, moved to a known-weight tarred porcelain dish, and then heated to 105°C for 2 hours in a hot air oven. In order to determine the true weight of the tarred china dish, the sample and the dish were weighed together. To determine the % moisture content⁶, the content's weight was recorded¹⁸.

$$\text{Moisture content} = \frac{\text{Difference in weight}}{\text{initial weight}} \times 100$$

Result And Discussion

Colour and appearance: Herbal soap was taken for evaluation of colour and appearance. It was found that the Herbal soap was brown and smooth in texture.

Table 1: Evaluation of Parameters for Herbal Soap

Sl. No.	Parameter	Standard Value	Observed Value
1.	Colour, Odour And Appearance	-	Brown, Aromatic and Smooth texture
2.	Ph	8-10	9.04
3.	Foam Height	1.3-22cm	7cm
4.	Tfm(Total Fatty Matter)	36.8%	0.03%
5.	Alcohol Soluble Matter	17.60%	25%
6.	Foam Retension	Over 5min.	Over 4minutes foam was stable
7.	Moisture Content	About 10%	1.01%

Discussion

The created herbal soap had a smooth texture, a pleasant aroma, and a brown color. The herbal soap's physical and chemical characteristics were meticulously extracted. Herbal soap's pH was checked and found to be 9.04, which is within the optimal range. The ideal foam height that soap should create is between 1.3 and 22 cm, however the foam height of herbal soap was found to be 7 cm. After measuring the herbal soap's total fatty matter, the percentage TFM was computed, and the result showed that the soap's alcohol-soluble matter was 25%. When the volume of foam was measured at one minute for four to five minutes, it was discovered that the herbal soap's foam retention was steady. Herbal soap's moisture content was measured, and the percentage of moisture content that was obtained was 1.01%.

Conclusion

The plants *Azadirachta indica*, *Ocimum tenuiflorum*, *Sapindus mukorossi*, *Aloe barbadensis*, and *Citrus limon* underwent a series of evaluation tests following their water extraction. The produced compound tested well, yielding favorable findings

multiple times. The fact that a small group of volunteers has used these soaps and found them to be skin-friendly indicates that soap does not irritate skin. Furthermore, the produced soap was standardized through evaluation of various physical and chemical attributes, including pH, look, and odor, where the product demonstrates acceptable outcomes.

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