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Development of a Natural Herbal Shampoo: A Safer Alternative to Synthetic Products

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Abstract

The study focuses on the development of a natural herbal shampoo as a safer alternative to synthetic shampoos, which often contain harsh surfactants leading to scalp irritation, dryness, and hair fall. The formulation primarily incorporates Shikakai (Acacia concinna) and Reetha (Sapindus mukorossi), both known for their natural cleansing and conditioning properties. The shampoo is designed to provide effective hair cleansing without synthetic additives like sulphates and parabens.

Various quality control tests were conducted, including pH analysis, viscosity, foaming ability, surface tension, washability, and antimicrobial activity. The results confirmed that the herbal shampoo is non-irritant, maintains hair health, and offers an eco-friendly, chemical-free alternative. Stability tests further ensured that the formulation remains effective over time. This herbal shampoo formulation presents a sustainable solution for daily hair care, catering to consumer demands for natural, plant-based personal care products.

Keyword: Shikakai, Reetha, Herbal shampoo, Hair.

1. INTRODUCTION:

Hair, derived from the ectoderm of the skin, serves as a protective structure alongside sebaceous glands, sweat glands, and nails. Hair care products are designed to cleanse excess oil, dirt, and dandruff while also nourishing the hair for a healthier appearance. The concept of shampoo originated in India, derived from the Hindi word chāmpo, meaning "to massage." Initially, hair cleansing was done using herbal oils and soaps, evolving into modern shampoo formulations.[1]

Shampoos are an essential part of daily hair care, primarily used to cleanse the hair and scalp. Most commercially available shampoos contain synthetic surfactants that create foam and remove dirt. However, frequent use of these chemical-based shampoos can lead to dryness, hair fall, and scalp irritation. As a natural substitute, Shikakai-based shampoos have gained popularity due to their mild and scalp-friendly properties. Despite their benefits, achieving the same cleansing and foaming efficiency as synthetic formulations remains a challenge. Various medicinal plants with hair-nourishing properties are incorporated into herbal shampoos in the form of powders, crude extracts, or derivatives.[2]

This study focuses on the development of a pure Shikakai-based herbal shampoo, utilizing traditionally used plant ingredients, particularly catering to women in India and the Gulf region. The formulation will undergo several quality control tests, including visual inspection, pH analysis, viscosity, and density measurements, to ensure its effectiveness, safety, and stability.[2] Nowadays, the use of herbs in

cosmeceutical products has significantly increased, leading to a high demand for herbal cosmetics in personal care.[3]

Most shampoos contain sodium lauryl sulphate (SLS)-based detergents, with their concentration varying across brands. Budget-friendly shampoos often contain higher levels of detergents, while premium brands reduce these concentrations but enhance conditioning properties. Interestingly, shampoos designed for both oily and dry hair may have similar detergent content, with the primary difference being in conditioning agents or formulation design. Many users experience scalp irritation and hair loss due to synthetic shampoos, driving the demand for safer, plant-based alternatives. Shikakai-based shampoos, enriched with Ayurvedic herbs, offer a gentle yet effective cleansing solution, making them a promising option for maintaining healthy, nourished hair without the risk of chemical-induced damage.[2]

2. PLANT PROFILE:

2.1 Shikakai:

Scientific Name: Acacia concinna **Family**: Fabaceae (Leguminosae)

Common Names: Shikakai, Soap Pod, Seekaaya (Telugu), Sikakai (Kannada)

Description: Shikakai is a small, thorny shrub native to India and Southeast Asia. It has bipinnate green leaves, yellow flowers, and dark brown, wrinkled pods containing small brown seeds. The plant is known for its natural cleansing and conditioning properties.

Chemical Constituents:

Saponins – Natural surfactants responsible for cleansing and foaming, Tannins – Strengthen hair and reduce dandruff &Vitamins (C, A, D, E, K) – Nourish hair and scalp.

Uses:

Acts as a natural shampoo and conditioner, Strengthens hair, reduces dandruff, and promotes hair growth.

Fig no.1: Shikakai

2.2 Reetha:

Scientific Name: Sapindus mukorossi **Family:** Sapindaceae

Common Names: Reetha, Soapnut, Washnut

Description: A medium-sized deciduous tree with round, brown fruits containing seeds, known for natural cleansing properties.

Chemical Constituents: Saponins, Tannins, Flavonoids, Organic acids.

Uses: Natural shampoo, detergent, antifungal, and scalp cleanser.

Fig no.2: Reetha

3. AIM & OBJECTIVES:

Aim: Development of a Natural Herbal Shampoo: A Safer Alternative to Synthetic Products.

Objectives:

- Develop a herbal shampoo with natural cleansing and conditioning agents.
- Assess pH, viscosity, foaming, and stability for quality control.
- Evaluate scalp health benefits and potential irritation.
- Ensure a chemical-free, eco-friendly formulation without sulphates or parabens.
- Promote herbal alternatives for sustainable hair care.

Table no.1: Formula for preparation of Natural herbal shampoo

Sr. No.	Ingredients	Quantity given[50 ml]	Quantity taken[100 ml]	Use
1	Shikakai.	2 gm	4 gm	Cleans & conditions hair.
2	Gaur gum.	Q.S	Q.S	Natural thickener & stabilizer.
3	Reetha.	0.5 gm	1 gm	Foaming agent.
4	Tea tree oil.	0.5 ml	1 ml	Antibacterial.
5	Lemon juice.	0.5 ml	1 ml	Antifungal.
6	Citric acid.	Q.S	Q.S	pH adjuster.
7	Orange oil.	One drop	One drop	Flavouring.

4. MATERIALS & METHODS OF EXTRACTION:

Main ingredients for shampoo are:

- **Shikakai**
- **Reetha**
- **Gaur gum**

4.1 Method used for shikakai extraction :

1. 4 gm of shikakai powder is weighed & added to a beaker.
2. 80 ml of distilled water was poured into it.
3. Beaker is kept in water bath for 30-40 mins (boiling was avoided).
4. Then it was kept to cool down at room temperature (not filtered) & used.

4.2 Method used for reetha extraction:

1. 1 gm of reetha was weighed and added to the beaker.
2. 20 ml of distilled water was poured into it.
3. Beaker is kept in water bath for 30-40 mins (boiling was avoided).
4. Then it was kept to cool down at room temperature (not filtered) & used.

5. METHOD OF PREPARATION:

1. Accurately weighed the ingredients.
2. Extraction of shikakai & reetha is done.
3. Shikakai extract and gaur gum solution are mixed properly by shaking for 20 min.
4. Lemon juice is added & reetha extract is also added with continuous stirring.
5. Finally pH is adjusted by citric acid.
6. Drop of orange oil is added & volume is make up 100 ml with gaur gum solution.

6. EVALUATION PARAMETER:

1. Physical Appearance:

Consumers judge shampoo based on its look, including clarity, color, and smell.

2. pH Test:

The pH of the shampoo was tested using a pH meter at room temperature (25±2°C).

3. Foaming Ability and Stability:

The cylinder shake method was used to test foam formation. A 50 ml shampoo solution was placed in a 100 ml graduated cylinder, sealed, and shaken 10 times. The foam height was recorded after 60 seconds. To check foam stability, the same process was done, and the foam volume was measured again after 20 minutes.

4. Percentage of Solid Content:

Four grams of shampoo was placed in a dry evaporating dish and weighed (W_1). The dish was then heated in a hot air oven at 50°C until all liquid evaporated. After cooling, the dish with the remaining solid content was weighed again (W_2). The percentage of solid content was calculated using:

The percentage (%) of the solid content was calculated as

$[(W_1-W_2) \div W_1] \times 100$.

5. Surface Tension Measurement:

A stalagmometer was used for the drop count method. Surface tension determines the strength of liquid molecules sticking together. Water has high surface tension, while liquids like benzene have low surface tension. A liquid with lower surface tension forms smaller drops and a higher number of drops for the same volume. By counting the drops, surface tension can be measured.

6. Rheological Test:

The shampoo's viscosity was measured using an Ostwald viscometer. The time taken for the liquid to pass between two marks (A and B) was recorded and compared with the time taken by a reference liquid (usually water).

7. Skin Irritation Test:

The shampoo was applied to the skin for 5 minutes, then washed off. Any signs of irritation or inflammation were observed.

8. Washability:

The shampoo was applied to the hands and then washed off to check how easily it rinses away.

9. Wetting Time Test:

The canvas disc method was used to check how fast the shampoo wets a surface. A small round canvas disc was placed on the shampoo solution, and a stopwatch was started. The time taken for the disc to begin sinking was recorded as the wetting time.

10. Antimicrobial Activity:

Nutrient broth is prepared to grow bacteria (Staphylococcus aureus). Then bacteria is inoculated from plates to the nutrient broth and kept to the incubator for 24 hrs. After 24 hours bacterial growth is cultured & further used for antimicrobial activity.

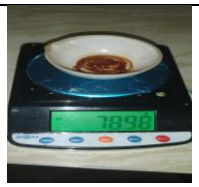
Agar plate method was used to test the shampoo's ability to kill microorganisms. Melted agar was cooled to 45°C, mixed with test bacteria, and poured into sterile petri dishes. Once the agar solidified, 9 mm holes were made using a sterile cork borer. The shampoo was placed in one hole, and a standard antimicrobial agent was placed in another. The plates were incubated at 30-35°C for 2-3 days. The zone of inhibition (clear area around the hole) was measured to determine how effective the shampoo was against microbes.

11. Stability Test:

Stability tests were conducted following ICH guidelines. The shampoo was tested for appearance, solid content percentage, transparency, and pH over time to ensure its stability.

7. RESULT:

Table no.2: Evaluation parameter

Sr. No.	Evaluation Test	Result	Image
1	Physical appearance	Brown, Aromatic, Smooth appearance	
2	pH	4.13	
3	Foaming ability & foaming stability	20 ml for more than 20 minutes	
4	Percentage of solid contents	5.85%	
5	Surface Tension Measurement	61.15 dyn/cm	

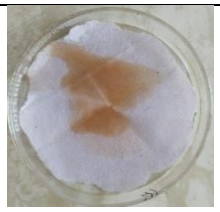
6	Rheological evaluation	20.50 cp	
7	Skin Irritation test	Non-irritant	
8	Washability	Easily washable	
9	Wetting Time	52 seconds	
10	Antimicrobial activity	3.1 cm	

Table no.3: Stability testing

Sr. No.	Evaluation parameter	Initial value	After 30 days	After 60 days
1	Colour	Brown	No change	No change
2	Solid content	5.85%	5.85%	5.21%
3	Transparency	Non-transparent	No change	No change
4	pH	4.13	4.10	4.11

8. CONCLUSION:

The formulated herbal shampoo successfully provides an effective and natural alternative to commercial shampoos. It ensures gentle cleansing, scalp nourishment, and hair strengthening without the use of harsh chemicals like sulphates and parabens. The evaluation of pH, viscosity, foaming ability, and stability confirms its safety and efficacy. Additionally, the presence of herbal ingredients enhances hair texture, reduces hair fall, and promotes scalp health.

With growing consumer preference for natural and eco-friendly products, this herbal shampoo offers a sustainable and safe option for daily hair care. Further studies and user feedback can help refine the formulation for improved performance and market acceptance.

9. REFERENCES:

1. PSS Prasanna Kumar, N Priyanka, M Ganesh Subrahmanyam, K Akshay Kumar, A Eswar Venkat, V Sangeetha, K Manjari, D Pavani and D Sirisha. Formulation and evaluation of herbal shampoo. J Pharmacogn Phytochem 2024;13(2):165-170. DOI: 10.22271/phyto.2024.v13.i2b.14897
2. Sayyed, A., & Borhade, A. Formulation and Evaluation of Shikakai Shampoo. International Journal of Pharmacy and Research,2022 2(1),617-622.
3. Namita N. Formulation and evaluation of herbal shampoo having antimicrobial potential. Int J Pharm Pharm Sci. 2013;5:708-12.
4. Sayyed, A., & Borhade, A. Formulation and Evaluation of Shikakai Shampoo. International Journal of Pharmacy and Research,2022 2(1),617-622.
5. Patel IM, Talathi AD. Use of traditional Indian herbs for the formulation of shampoo and their comparative analysis. International Journal of Pharmacy and Pharmaceutical Sciences. 2016 Mar;8(3):28-32.
6. Bartkutė E. Formulation and Evaluation of Herbal Shampoo (Master's thesis, Lithuanian University of Health Sciences (Lithuania)).
7. Telrandhe MU. Formulation, Evaluation, and Comparison of Herbal Shampoo with Commercially Available Shampoos. Asian Journal of Pharmaceutics (AJP). 2023 Sep 15;17(03).