

Formulation And Evaluation of Herbal Anti-Dandruff Shampoo

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ABSTRACT

The present study aims to formulate and evaluate a herbal anti-dandruff shampoo using natural ingredients with a focus on safety, efficacy, and improved hair care performance. Shampoos represent one of the largest segments of hair care products and are widely used in daily personal hygiene. However, the extensive use of synthetic chemicals in conventional shampoos has raised concerns due to their potential adverse effects on scalp and hair health. This study emphasizes the replacement of harmful synthetic components with safer, plant-based alternatives. The herbal shampoo was formulated using extracts of *Aegle marmelos* (Bael fruit) as the primary active ingredient, along with *Eclipta alba* (Bhringraj), *Acacia concinna* (Shikakai), *Hibiscus sabdariffa* (Hibiscus), *Sapindus mukorossi* (Reetha), *Calendula officinalis* (Marigold), *Centella asiatica* (Brahmi), *Musa acuminata* (Banana root), *Vigna radiata* (Green gram), and *Citrus limon* (Lemon) in varying proportions. The formulated shampoo was evaluated using various physicochemical parameters, including physical appearance, pH determination, dirt dispersion, percentage solid content, surface tension, wetting time, viscosity, skin irritation, and foam stability. The results indicated that the shampoo exhibited a dark brown colour, satisfactory foam stability, effective cleansing ability, low surface tension, optimal pH, and good conditioning properties. Overall, the developed herbal shampoo demonstrated desirable characteristics comparable to standard formulations, suggesting its suitability for daily use. However, further studies, including stability testing and clinical evaluations, are recommended to validate its long-term safety.

Keywords: Herbal shampoo, Anti-dandruff activity, Bael fruit, Hibiscus, Natural ingredients.

INTRODUCTION

A shampoo may be defined as a preparation of a surfactant (i.e. Surface active material) in a suitable form-liquid, solid, or powder which when used under the conditions specified will remove surface grease, dirt and skin debris from the hair, shaft and scalp without affecting adversely the hair, scalp or the health of the user. This herbal shampoo was formulated using nature ingredients like Bael fruit,

Bhringraj, Shikakai, Hibiscus, Reetha, Marigold, Brahmi, Banana Root, Green gram, Lemon. Hair-care products are the products that help to repair and replenish the hair. These products may help to clean, modify the texture, change the colour of hair, provide nourishment, give healthy look, and give life to the stressed hair.

MATERIALS AND METHODS:

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

DRUGS REQUIRED:

S.NO	COMMON NAME	BIOLOGICAL SOURCE	PROPERTIES
1.	Bael fruit	Aegle marmelos	Anti-dandruff
2.	Bhringraj	Eclipta alba	Hair growth
3.	Shikakai	Acacia concinna	Detergent
4.	Hibiscus	Hibiscus sabdariffa	Hair growth promoter
5.	Reetha	Sapindus mukorossi	Detergent
6.	Marigold	Calendula officinalis	Conditioner
7.	Brahmi	Centella asiatica	Hair tonic
8.	Banana Root	Musa acuminata	Colouring agent
9.	Green gram	Vigna radiata	Anti-dandruff
10.	Lemon	Citrus limon	Preservative

FORMULATION OF HERBAL ANTI-DANDRUFF SHAMPOO

S.NO	INGREDIENTS (Extract)	QUANTITY TAKEN
1.	Bael fruit	13.3 %
2.	Bhringraj	10 %
3.	Shikakai	10 %
4.	Hibiscus	6.6 %
5.	Reetha	20 %
6.	Marigold	6.6 %
7.	Brahmi	10 %
8.	Banana Root	6.6 %
9.	Green gram	13.3 %
10.	Lemon	3.3 %

PREPARATION OF HERBAL ANTI-DANDRUFF SHAMPOO

- All the herbal ingredients such as Bael fruit, Bhringraj, Shikakai, Hibiscus, Reetha, Marigold, Brahmi, Banana root, and Green gram are collected, washed, shade-dried, and powdered separately.
- The powdered materials are then boiled in distilled water to prepare a decoction, which is cooled and filtered to obtain a clear extract.
- Fresh lemon juice is added to the filtrate, and the extract of Reetha and Shikakai acts as natural surfactants to provide cleansing and foaming action.
- The mixture is gently heated to concentrate to the desired consistency, then cooled and filtered again to remove impurities.



- Finally, the prepared herbal anti-dandruff shampoo is transferred into a clean container and stored in a cool, dry place.

EVALUATION

1.Viscosity determination :

Viscosity plays an important role in defining and controlling many attributes of the product such as shelf life stability, clarity, ease of flow, package removal, consistency and degree of spreading upon application on hair. Viscosity of the shampoo is measured by using viscometer. The viscosity was in the range 1.10-1.30 poise which gives great fluidity, which makes formulation easy to apply on and easy to spread on hair.

2.Skin irritancy test :

Skin irritancy of shampoo can be checked by taking small amount of product on skin, after few minute to check whether local irritation or any inflammatory reaction are produced or not. It should be free from any allergic reaction.

3.Foaming ability and Foam stability :

Cylinder shake method was used for determining foaming ability. 50ml of the 1% shampoo solution was put into a 250 ml graduated cylinder and covered the cylinder with hand and shaken. The total volumes of the foam contents after 1 minute shaking were recorded. The foam volume should be checked after 5 minutes. It should be remain unchanged which will suggests that the produced foams have good stability.

4.Physical appearance/Visual inspection :

The formulations were evaluated in terms of their clarity, colour, odour and texture.

5.Determination of pH :

pH of your 10% shampoo solution. Dip one strip of pH paper in the solution and compare the colour of the strip to key. pH meter can also be used after calibration. Most shampoos are neutral or slightly acidic. Acidic solutions cause the cuticle (outer layer) of the hair to shrink and lay flatter on the shaft of the hair. Basic solutions cause the cuticle to swell and

open up. Acidic solutions make the hair seem smoother. Basic solutions make hair seem frizzier.

6.Dirt dispersion:

Two drops of shampoo were added in a large test tube contain 10 ml distilled water.

1 drop of India ink was added then the test tube was stoppered and shakes it ten times. The amount of ink in the foam was estimated as None, Light, Moderate, or Heavy. Shampoos that cause the ink to concentrate in the foam are considered poor quality. The dirt should stay in the water portion. Dirt that stays in the foam will be difficult to rinse away. It will redeposit on the hair.

7.Determination of percentage solid content :

A clean dry evaporating dish was weighed and added 4 grams of Shampoo to the evaporating dish. The dish and shampoo was weighed. The exact weight of the shampoo was calculated only and put the evaporating dish with shampoo was placed on the hot plate until the liquid portion was evaporated. The weight of the shampoo only (solids) after drying was calculated. If the shampoo has too many solids it will be hard to work into the hair or too hard to wash out. If it doesn't have enough it will be too watery and wash away quickly.

- A good shampoo will be between 20% - 30% solids.
- The foam height of two percent shampoo solution shall not be less than 150 mm.

8.Surface tension measurement:

The surface tension of 10% w/v shampoo in distilled water was measured using stalagmometer at room temperature. Thoroughly clean the stalagmometer using chronic acid and purified water. Because surface tension is highly affected with grease other lubricants. Lesser the surface tension stronger is the cleaning ability of the shampoo. A Shampoo is considered of good quality if it decreases the surface tension of pure water from 72.28 dyne/cm² to about 40 dyne/cm².

9.Wetting time :



Wetting time was calculated by noting the time required by the canvas paper to sink completely. A Canvas paper weighing 0.44 g was cut into a disc of diameter measuring 1-inch. Over the shampoo (1% v/v) surface, the canvas paper disc was kept and the time taken for the paper to sink was measured using the stopwatch. Wetting efficiency is considered to be higher if the disc takes less time for sinking.

10. Skin irritancy test :

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11. Foaming ability and Foam stability :

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RESULT AND DISCUSSION

1. Physical appearance/Visual inspection :

The colour of the formulated herbal shampoo was Dark brown.



2. Determination of pH :

The formulated herbal shampoo shows pH value 5. The ideal pH range for herbal shampoo typically falls between 4.5-5.5. Which is close to the pH of the skin.



3. Dirt dispersion :

The dirt dispersion activity of the formulated shampoo was found to be moderate.

4. Determination of percentage solid content :

The percentage of solid content in the formulated shampoo was found to be 25.75%. An ideal shampoo should have 20-30% solids for its balanced cleansing action. It complies with the specification.

5. Surface tension measurement :

The formulated shampoo decreases the surface tension of water up to 34.37 dynes/cm. Herbal shampoo typically decrease the surface tension water to a range of 30-40 dynes/cm². It is an indication of its good cleansing and detergent action.

6. Wetting time :

The wetting time of the formulated shampoo was found to be 152 sec. Wetting time for herbal shampoo can vary, but typically falls within a range of 2-187 sec.

7. Viscosity determination :

The viscosity of the formulation was found to be 1.15 poise. The Viscosity was in the range 1.10-1.40 poise for an ideal shampoo. The obtained complies with the specifications.

8. Skin irritancy test :

The formulated shampoo produce no irritation or harmful effect on skin.

9. Foaming ability and Foam stability:

The formulated shampoo produces good and stable foam.

Sl.No	Number of the test containing ml of solution	Height of foam in cm
1.	1ml	0.6
2.	2ml	0.9
3.	3ml	1.2
4.	4ml	1.7
5.	5ml	2



S.NO	PARAMETERS	OBSERVATIONS
1.	Physical Appearance/ Visual inspection	Dark brown
2.	pH	Nearly 5
3.	Dirt dispersion	Moderate
4.	Percentage of solid content	25.75%
5.	Surface tension	34.37 dynes/cm ²
6.	Wetting time	152sec
7.	Viscosity	1.15 poise
8.	Skin irritation	No irritation
9.	Foaming ability and Foam stability	Good and stable foam

CONCLUSION:

One of the major problems, these generation facing today is dandruff. Synthetic shampoos available nowadays with antidandruff property are mostly made up of synthetic compounds which have more side effects that may cause damage to the hair and it may not be effective. To overcome these problems, we took the concept of preparing antidandruff shampoo based upon traditional knowledge and emphasis was laid on to formulate a stable and functionally effective herbal shampoo. We have used a ten herbal extract (Bael fruit, Bhringraj, Shikakai, Hibiscus, Reetha, Marigold, Brahmi, Banana Root, Green gram, Lemon) formulate the shampoo and evaluated for various parameters to check its efficacy. This formulated shampoo shows good cleaning action, better foaming capacity, and quick wetting time. The formulated shampoo was not only safer than the chemical conditioning agents, but also greatly reduces the protein loss during combing. The pH of the shampoos was adjusted to 5, to retain the acidic mantle of scalp. Thus, we concluded that the prepared shampoo was devoid of harmful chemicals, safer to use as compared to synthetic shampoo and relatively effective. The need of a pure herbal shampoo is on demand in the current generation. This concept may act as the stepping stone for future inventions

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