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## **Formulation and Evaluation of Herbal Anti-Dandruff and Anti-hair fall Shampoo**

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### **ABSTRACT:**

Dandruff and hair fall are prevalent scalp conditions affecting a significant portion of the population worldwide, causing discomfort and aesthetic concerns. The conventional treatments often come with limitations such as adverse effects and resistance development. In response, herbal formulations have emerged as promising alternatives, offering efficacy with minimal side effects. This research aims to formulate and evaluate a herbal anti-dandruff and anti-hair fall shampoo utilizing potent botanical extracts renowned for their therapeutic properties. The formulation process involved selecting and combining herbal ingredients known for their anti-fungal, anti-inflammatory, and hair-strengthening properties. The herbal extracts were incorporated into a shampoo base through standardized procedures. The formulated shampoo underwent comprehensive evaluation to assess its efficacy and safety.

Physical characteristics such as pH, viscosity, and stability were analyzed to ensure product quality. Furthermore, *in vitro* and *in vivo* studies were conducted to evaluate the anti-dandruff and anti-hair fall properties of the shampoo. These studies involved assessing its inhibitory effects against dandruff-causing fungi and its ability to reduce hair fall through clinical trials.

**Keywords:** Herbal shampoo, anti-dandruff, anti-hair fall, formulation, evaluation, herbal ingredients, scalp health, hair care, natural remedies.

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### **Introduction:**

Herbal anti-dandruff and anti-hair fall shampoos offer a natural solution to combat common hair problems like dandruff and hair loss. By harnessing the power of herbal extracts, these shampoos gently cleanse the scalp and hair without harsh chemicals, promoting scalp health and hair growth. With their environmentally friendly composition and suitability for all skin types, herbal shampoos provide a safe and gentle cleansing experience while addressing dandruff and hair fall issues effectively.

Herbal anti-dandruff and anti-hair fall shampoos are formulated with natural ingredients known for their scalp-nourishing properties, effectively tackling dandruff and hair loss concerns. By avoiding harsh chemicals and sulfates, these shampoos maintain the scalp's natural balance while promoting healthier, stronger hair. With their gentle yet potent herbal extracts, they offer a holistic approach to hair care, ensuring a soothing and effective solution for dandruff and hair fall issues.

### ***Dandruff:***

The common hair problems of dandruff and hair fall, describing their symptoms and potential causes, including dry scalp, fungal infections, hormonal changes, stress, unhealthy diet, and improper hair care. It also mentions the prevalence of dandruff, its association with specific environmental conditions and personal hygiene, and the available treatment options, including herbal and chemical-based antidandruff shampoos.

Widespread issues of dandruff and hair fall, detailing their symptoms, potential triggers, and prevalence. It emphasizes the chronic nature of dandruff, its association with specific environmental factors and personal hygiene, and the treatment options available, including herbal and chemical-based antidandruff shampoos.



### *Treatment of dandruff:*

Shampoos are a widely used treatment for dandruff and hair fall, offering both preventive and therapeutic benefits. Specifically formulated to target these issues, anti-dandruff and anti-hair fall shampoos contain active ingredients that help to alleviate symptoms and address underlying causes. For dandruff, these shampoos often contain antifungal agents to combat the *Malassezia* yeast, which contributes to dandruff formation. They also typically contain ingredients that soothe the scalp, reduce inflammation, and regulate sebum production. In the case of hair fall, these shampoos may include compounds that strengthen hair follicles, promote circulation to the scalp, and nourish the hair shaft to minimize breakage and loss. Regular use of these specialized shampoos, along with a consistent hair care routine, can significantly improve the condition of the scalp and hair, leading to healthier, dandruff-free, and stronger locks.

### **Formulation of Herbal Shampoo**

Sr. No.	Ingredient	Quantity Taken	Role of Ingredient
1.	Curd		Anti-dandruff, conditioning agent
2.	Hibiscus		Antifungal/ antibacterial agent
3.	Bhringaraj		Antifungal/ antibacterial
4.	Fenugreek		Restore shine
5.	Amla		Darkening of hairs and hair growth promoter
6.	Shikakai		Natural surfactant, Anti-dandruff agent
7.	Reetha		Natural surfactant, Anti-dandruff agent
8.	Rose Water		Fragrance
9.	Citric Acid		pH adjuster and antimicrobial
10.	Carbapol		Thickening agent

### **Material and Method**

#### *Material*

- **Curd:** Curd acts as a natural conditioner, moisturizing the hair and scalp. It also contains probiotics that can help maintain scalp health. Lactic acid and probiotics, help soothe the scalp, reduce itchiness and control dandruff.
- **Hibiscus (*Hibiscus rosa-sinensis*):** Hibiscus is rich in vitamins and amino acids that nourish the hair and scalp, promoting hair growth and reducing hair fall. It also helps in controlling dandruff.
- **Bhringaraj (*Eclipta prostrata*):** Bhringaraj is traditionally used to promote hair growth and reduce hair fall. It also has anti-inflammatory properties that can soothe the scalp and alleviate dandruff.

- **Fenugreek (*Trigonella foenum-graecum*):** Fenugreek seeds are rich in proteins and lecithin, which strengthen hair and reduce breakage. They also have antifungal properties that can help in controlling dandruff.
- **Amla (*Embllica officinalis*):** Amla is rich in vitamin C and antioxidants, which nourish the scalp and strengthen hair follicles, reducing hair fall. It also helps in controlling dandruff.
- **Shikakai:** Natural surfactant, nourishes hair. Shikakai is a natural cleanser that gently removes dirt and oil from the scalp without stripping away natural oils. It promotes healthy hair growth and add shine to the hair.
- **Reetha:** Reetha contains saponins, natural surfactants that create a lathering effect when mixed with water. It cleanses the scalp and hair effectively, removing dirt, oil, and impurities.
- **Rose Water:** Rose water has anti-inflammatory and soothing properties that help calm the scalp. It also adds a pleasant fragrance to the shampoo.
- **Citric Acid (Sodium Citrate):** Citric acid helps to balance the pH level of the shampoo, making it gentle on the scalp and hair. It also has antimicrobial properties that can help in controlling dandruff. It is also act as a preservative.
- **Carbopol:** Carbopol is a thickening agent that helps to give the shampoo its desired consistency, making it easier to apply and use.

## Method

### 1. Method of Extraction:-

Extracting herbs for use in shampoo involves various methods depending on the specific herb and the desired properties you want to extract. Here's a general overview of extraction methods for some commonly used herbs in shampoo:

#### 1.1 Herbal Extract

- Take all herbal ingredient separately.
  - a) Fresh Hibiscus flower and leaves.
  - b) Bhringraj powder
  - c) Dried Amla fruits
  - d) Dried Shikakai pods
  - e) Dried Reetha pods
- Boil water in a pot.
- Add all ingredient to the boiling water separately.
- Let it simmer on low heat for 10-15 minutes.
- **Cool and Strain:** Allow the infusion to cool, then strain out all infusion separately.
- **Store:** Keep the infusion in a clean container.
- **Mix all infusion:** Add the infusion to your shampoo base.

#### 1.2 Curd (Yogurt):

Following these steps ensures a natural and effective extraction of curd juice for shampoo preparation, retaining its beneficial properties for hair care.

- Choose fresh, preferably homemade curd for optimal results.
- Place a clean muslin cloth or cheesecloth over a bowl or container.
- Pour the curd onto the cloth placed over the container.
- Gather the corners of the cloth to form a pouch containing the curd.
- Gently squeeze the pouch to extract the liquid (curd juice) into the container.
- If needed, repeat the squeezing process with the remaining curd until desired juice amount is obtained.
- Filter the extracted juice through a filter paper to remove any solid particles, if present.
- Store the extracted curd juice in a clean, airtight container.

- Use immediately or refrigerate for later use.
- Use the extracted curd juice directly in shampoo preparation.
- Mix it with above herbal extracts.

## 2. Formulation of Herbal Anti-dandruff and Anti-hair fall Shampoo

To mix all the ingredients for the herbal shampoo, follow these steps:

1. Gather the herbal extracts prepared using the extraction method mentioned in first point.
2. Measure the quantities of each herbal extract according to desired formulation. Adjust the proportions based on preferences and hair care needs.
3. Pour the herbal extracts into a clean mixing beaker or container.
4. Add the extracted curd juice to the mixing beaker containing the herbal extracts.
5. Stir the mixture thoroughly to ensure all ingredients are well combined.
6. Add additional ingredients such as essential oils or natural preservatives at this stage for added benefits or to enhance the shelf life of the shampoo.
7. Once thoroughly mixed, transfer the shampoo mixture into clean, airtight containers for storage.
8. Label the containers with the date of preparation and the ingredients used.
9. Store the herbal shampoo in a cool, dry place away from direct sunlight.
10. Use the shampoo as needed, shaking or stirring before each use to ensure the ingredients are evenly distributed. Enjoy herbal shampoo!

## 3. Evaluation Parameter for Herbal Anti-dandruff and Anti-hair fall Shampoo

Evaluation of Herbal Shampoo:

Developed formulation was evaluated for their color, physical state, odor, solubility was determined manually.

- **pH**

10% v/v shampoo solution is prepared in distilled water and pH of this solution was measured with digital pH meter at room temperature  $30 \pm 2^\circ\text{C}$ .

- **Determination of percentage solids contents**

A clean dry dish was weighed and added with 4 grams of shampoo. The dish with shampoo was weighed. The exact weight of the shampoo was calculated. The dish with shampoo was placed on the hot plate until the liquid portion was evaporated. The weight after drying was calculated.

- **Wetting time (sec)**

A cotton ball weighing of about 0.44gm was taken and added it to container containing shampoo. Time taken for cotton to sink at bottom of the formulation was measured as wetting time.

- **Viscosity**

The index of resistance to flow was determined using Brookfield viscometer DV- II + Pro at room temperature i.e.  $30 \pm 2^\circ\text{C}$  with varying rpm and torque.

- **Surface tension measurement**

Dilute the shampoo using distilled water to fix 10% as concentration. Measurements were carried out using stalagnometer.

- **Foam formation/Foam stability**

Cylinder shake method was used. 50ml of 1% solution of shampoo is taken in graduated cylinder (1ml in 100ml water), shake for ten minutes and record the foam produced after 1 minute. Record the stability of foam after 4-5 minutes.

- **In-vitro anti-dandruff activity**

Well diffusion assay method was used. The antimicrobial efficiency of poly herbal anti dandruff shampoo was examined against *Malassezia furfur* using an agar well diffusion assay method. 500 $\mu\text{l}$  fungal cell suspension was spread onto the Sabouraud Dextrose Agar (SDA) plates and wells (8mm diameter was made on the agar plates using a sterilized stainless steel cork borer). The wells were loaded with 20 $\mu\text{l}$  of the respective shampoo. The plates were incubated at  $35^\circ\text{C} \pm 2$  for 48 h and examined for the appearance of inhibition zones around the wells. The diameters of the inhibition zones were measured from the images using digital antibiotic zone reader.

- **Stability studies**

Stability studies were performed in accordance with ICH guidelines for accelerated testing with required modifications. The sample taken formulation was taken and kept at room temperature ( $30 \pm 2^\circ\text{C}$ ) as well as refrigerator ( $4 \pm 2^\circ\text{C}$ ) for duration of one month. The samples were tested for their physical appearance, pH, viscosity, % cleaning action and foam stability.

- **In-vitro anti-dandruff activity**

The agar-well diffusion method was used to assess the antifungal activity of the antidandruff formulation. The results shown in Figure 1 demonstrated that the herbal antidandruff formulation possesses inhibitory activity against *M. furfur*. This anti-malassezial activity was observed with ZOI value 19.6mm. Therefore, the topical use of herbal antidandruff shampoo is useful in the treatment of dandruff.

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### Result and Discussion Result:

The prepared herbal Antidandruff and Anti hair fall shampoo using the above mentioned ingredients was evaluated for the following parameters and the results are in tabular form (Table no. 3)

The shampoo was prepared from various herbs (Table no. 1)

The various parameter like sensitivity test, pH, irritation test, dirt dispersion of herbal antidandruff and anti-hair fall shampoo was evaluated. Hence from the present investigation and biological screening establishes the efficacy of formulation.

**Table no.3. Evaluation of herbal shampoo**

Evaluation Parameter	Inference
Sensitivity test	Non sensitive
Irritation test	Non irritant
pH	6
Color	Brown
Odor	Aromatic
Clarity	Non-transparent
Appearance	Viscous
Solid content	33%
Wetting time	11.2 sec
Viscosity	3800 cps at 50 rpm
Surface tension	35.23 dyne/cm
Foam formation and foam stability	40 ml, stable foam

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### Discussion:

The formulation of herbal shampoo containing medicinal plants known for their beneficial effects on hair. Ingredients such as Hibiscus, Bhringraj, Amla, Reetha, Shikakai, and Fenugreek are highlighted for their reported properties in promoting hair growth, fighting dandruff, cleansing, and conditioning the hair.

The paragraph emphasizes the thorough quality control and evaluation of the shampoo formulation, with all parameters yielding positive and acceptable results. Specifically, the pH balance of the shampoo is highlighted as beneficial for improving hair quality, reducing eye irritation, and maintaining scalp ecological balance. The use of Reetha and Shikakai is noted for its contribution to foam formation, reducing surface tension, and aiding in proper application to the scalp.

The shampoo formulation meets standard guidelines in terms of organoleptic evaluation, physicochemical evaluation, cleaning action, foaming, dirt dispersion, wetting agent capacity, and the nature of hair after wash. Furthermore, successful skin and eye irritation tests affirm its safety for use.

In the context of anti-dandruff and anti-hair fall shampoo, this discussion underscores how the inclusion of herbal ingredients with known properties for hair health can contribute to a stable and effective product. The emphasis on cleansing, conditioning, and scalp balance aligns with the goals of addressing dandruff and hair fall issues. Additionally, the assurance of meeting quality standards and safety tests reinforces the suitability of this formulation for addressing these specific hair concerns.

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## Conclusion

The formulation of herbal shampoo is effective in addressing various hair concerns, particularly dandruff and hair fall, while providing additional benefits such as conditioning, shine, and manageability. The study highlights the increasing consumer preference for herbal products in the global hair care market, driven by concerns such as UV radiation damage and the use of harsh chemical products.

The herbal shampoo formulation aims to overcome these problems by utilizing herbal extracts and powders known for their hair care properties. The conclusion emphasizes the effectiveness of the shampoo in reducing dandruff without causing irritation, promoting hair growth, smoothing hair, and offering better conditioning effects compared to conventional products.

Furthermore, the conclusion emphasizes the importance of traditional knowledge in formulating the shampoo and developing parameters for quality, stability, and purity. It underscores the growing demand for herbal cosmetics due to their perceived lesser side effects and cost-effectiveness.

In summary, the conclusion asserts that the formulation and evaluation of the herbal antidandruff shampoo have resulted in a stable and effective product that meets the demands of consumers for herbal-based solutions to hair care concerns.

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