

# A Review on Formulation and Evolution of Polyherbal Anti-Dandruff Shampoo

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**Abstract:** Dandruff is a common scalp problem that causes itching, dryness, irritation, and flaking of the scalp. The present study was carried out to formulate and evaluate a polyherbal anti-dandruff shampoo using natural herbal ingredients such as Neem, Hibiscus, Aloe vera, and lemon. These herbs are known for their antimicrobial, antifungal, cleansing, conditioning, and hair nourishing properties. The shampoo was prepared by mixing herbal extracts with suitable shampoo base ingredients to obtain a stable formulation. The prepared formulation was evaluated for different parameters such as appearance, color, odor, pH, viscosity, foamability, The results showed that the shampoo had good cleansing action, acceptable foam production, proper consistency, and a skin-friendly ph. The formulated polyherbal shampoo was found to be effective in reducing dandruff and maintaining healthy hair and scalp. Compared to synthetic shampoos, the herbal formulation showed fewer chances of side effects and provided natural conditioning effects. Therefore, developed polyherbal anti-dandruff shampoo can be considered a safe, effective, and economical herbal preparation for hair care and dandruff control.

**Keywords:** Polyherbal shampoo, Anti-dandruff, Neem, Hibiscus, Aloe vera, Lemon, Herbal formulation, Scalp health

## I. INTRODUCTION

Dandruff is a skin condition or illness that can lead to humiliation and a poor social image but does not present a significant health concern. It is undeniable that synthetic shampoo provides immediate shine, lusture occasionally aids in the removal of dandruff after washing, but the control and clinical cure are not fully addressed, recurrence is observed, and hair becomes dry after prolonged use along with numerous other scalp issues. (1) Dandruff is a widespread scalp disorder that affects about half of the population. It is caused by the fungus of Malassezia. (2) The phrase "herbal shampoo" refers to any hair cleansing solution that contains extracts from Ayurvedic flowers and herbs. Herbal shampoo is a sort of cosmetic preparation that uses natural ingredients from the plant. It can also be described as a thick liquid hair care solution that cleans and removes oil and debris from hair. (3) The current study aims to prevent the use of commercially accessible chemical or synthetic medicines. (4) A number of herbal components with antidandruff qualities were utilized, which softens and shines hair and encourages hair growth. (5) Crucially, these preparations are reasonably priced. Numerous plants, including neem, tulsi, reetha, bhringraj, shikakai, and hibiscus, are employed in the composition. (6)

As a part of the integumentary system, hair descends into the dermal layer and resides in hair follicles. (7) Excessive shedding of dead skin cells from the scalp is the cause of dandruff. Males are more likely than females to have dandruff, which affects 5% of the population and often manifests after puberty, between the ages of 20 and 30. (8)



Excessive stress, scalp infections, low vitamin levels, hormonal imbalances, minerals, diet, and heavy, prolonged usage of chemical shampoo can all contribute to hair issues. (9) A natural oil found in the scalp, serves as the microorganisms that produce dandruff with food and fuel. Oleic acid is one of the byproducts that *Malassezia* produces after consuming these oils. Dandruff begins with the production of oleic acid. (10) They are said to be able to enter the root shafts, activate the sebaceous glands, improve blood flow, and give the hair root and shaft more strength. They are also used to treat hair shaft roughness and breaking, alopecia, thinning, clubbing, and graying of the hair. Numerous botanicals are utilized in shampoos and have positive effects on hair. (11) There are a number of chemical-containing shampoos and scalp preparations on the market to combat dandruff, some of which may have negative side effects.

### Literature Review of Herbal Anti-Dandruff Shampoo

- Sharma et al. (2019) prepared a neem-based herbal shampoo and found good anti-dandruff activity.
- Patel and Jain (2020) developed a shampoo with hibiscus and reetha showing good cleansing effect.
- Kumar et al. (2018) reported that neem extract helps reduce dandruff and scalp infection.
- Singh and Verma (2021) formulated aloe vera and lemon shampoo for dandruff control.
- Reddy et al. (2017) studied tulsi herbal shampoo with good foam stability and scalp protection.
- Joshi et al. (2020) found tea tree oil effective against dandruff-causing fungi.
- Mehta and Shah (2019) reviewed herbal ingredients like neem and hibiscus for scalp care.
- Gupta et al. (2018) prepared polyherbal shampoo with amla and shikakai for healthy hair.
- Kaur and Arora (2021) observed reduced itching using neem and fenugreek shampoo.
- Patil et al. (2019) developed lemon and aloe vera shampoo with good cleansing action.
- Chaudhary et al. (2020) reported hibiscus shampoo improves hair texture and reduces dandruff.
- Nair et al. (2018) prepared curry leaf herbal shampoo with antimicrobial activity.
- Deshmukh and Kale (2021) formulated reetha shampoo showing satisfactory foam retention.
- Roy et al. (2019) studied aloe vera shampoo for scalp soothing and smooth hair.
- Bansal et al. (2020) concluded that herbal shampoos are safer with fewer side effects.
- Agarwal et al. (2019) prepared herbal shampoo containing brahmi and neem which improved scalp health.
- Mishra and Soni (2020) studied herbal formulations with lemon peel extract showing good anti-dandruff activity.
- Yadav et al. (2021) formulated hibiscus and aloe vera shampoo with good conditioning properties.
- Thakur et al. (2018) evaluated shikakai-based shampoo and reported effective cleansing action.
- Pandey and Gupta (2020) developed polyherbal shampoo with neem and tulsi for reducing scalp infection.

### PLANT PROFILE:

*Neem:*



Figure 1: *Neem* Powder

*Neem* is a well-known medicinal plant that is frequently used in traditional herbal remedies, particularly for the treatment of the scalp and hair. Because of its potent antibacterial, antifungal, and anti-inflammatory qualities, it has



been prized in Ayurveda for generations. Dandruff is frequently brought on by fungal infections and inflammation of the scalp. Neem functions as a natural cleansing and purifying agent in herbal anti-dandruff shampoo formulations, removing excess oil and impurities from the scalp without drying it out. By limiting the growth of bacteria that cause dandruff, it also contributes to the maintenance of a healthy scalp environment. Additionally, by feeding the scalp and enhancing blood circulation, neem encourages stronger, healthier hair. *Neem* is regarded as a crucial component in the creation of polyherbal anti-dandruff shampoos because of its efficacy, safety, and environmental friendliness.

**Common name of *neem*:**

Margosa tree or Indian lilac.

*Azadirachta indica* is the scientific name.

*Azadirachta indica* (neem)

**Taxonomical Classification**

**Table1:** Taxonomical Classification of *Neem*

| Taxonomical Rank | Classification            |
|------------------|---------------------------|
| Kingdom          | Plantae                   |
| Subkingdom       | Teacheobionta             |
| Division         | Magnoliophyta             |
| Class            | Magnoliopsida             |
| Order            | Sapindales                |
| Family           | Meliaceae                 |
| Genus            | <i>Azadirachta</i>        |
| Scientific Name  | <i>Azadirachta Indica</i> |

Uses of *Neem*

1. Reduces dandruff and scalp infection
2. Prevents hair fall
3. Promotes healthy hair growth
4. Controls itchy scalp

***Hibiscus***



*Hibiscus rosa-sinensis*, commonly known as hibiscus or China rose, is a medicinal flowering plant belonging to the family Malvaceae. It is widely grown in tropical and subtropical regions and is known for its large, colorful flowers. Hibiscus is commonly used in herbal preparations because of its medicinal and cosmetic benefits.

The flowers and leaves of *hibiscus* contain natural compounds such as flavonoids, vitamins, antioxidants, and amino acids that help nourish the scalp and hair. In herbal anti-dandruff shampoo formulations, hibiscus is used for promoting



hair growth, reducing dandruff, conditioning hair, and preventing hair fall. It also helps maintain scalp moisture and gives softness and shine to the hair.

***Hibiscus rosa-sinensis* is commonly known as:**

1. China rose
2. Shoe flower
3. Chinese hibiscus

**Taxonomical Classification**

Table 2: Taxonomical Classification of *Hibiscus Flower*

| Taxonomical Rank | Classification         |
|------------------|------------------------|
| Kingdom          | Plantae                |
| Subkingdom       | Tracheobionta          |
| Division         | Magnoliophyta          |
| Class            | Magnoliopsida          |
| Order            | Malvales               |
| Family           | Malvaceae              |
| Genus            | Hibiscus               |
| Scientific Name  | Hibiscus-rosa-sinensis |

Uses of *Hibiscus*

1. Promotes hair growth
2. Reduces dandruff and scalp irritation
3. Prevents hair fall
4. Conditions and softens hair

**ALOE VERA:**

A popular medical plant with calming, hydrating, and restorative qualities, is a great component of herbal anti-dandruff shampoos. Bioactive substances like vitamins A, C, and E, enzymes, amino acids, and polysaccharides that support and shield the scalp are abundant in the gel made from its leaves. Dandruff can be effectively controlled by the natural antifungal and antibacterial qualities of aloe vera. Aloe vera also functions as a natural conditioner, enhancing the texture of hair and encouraging shine and smoothness. One of the main causes of dandruff is dryness, which is prevented by its moisturizing qualities. By fortifying hair roots and minimizing flakiness, regular use of aloe vera in shampoo formulas can promote healthy hair development. It is frequently used in polyherbal anti-dandruff formulations because of its mild and non-toxic properties, which make it appropriate for all hair types.

**Common Names:**

- Indian Aloe Ghritkumari (in Hindi)
- Genuine Aloe
- Burn plant (because it's frequently used to treat burns)

**Taxonomical Classification**

Table 3. Taxonomical classification Of Aloe vera

| Taxonomical Rank | Classification |
|------------------|----------------|
| Kingdom          | Plantae        |
| Subkingdom       | Tracheobionta  |
| Division         | Magnoliophyta  |



|                 |                  |
|-----------------|------------------|
| Class           | Liliopsida       |
| Order           | Asparagales      |
| Family          | Asphodelaceae    |
| Genus           | Aloe             |
| Scientific Name | Aloe barbadensis |

**Uses of *Aloe vera***

1. Reduces dandruff and scalp irritation
2. Moisturizes dry scalp and hair
3. Promotes healthy hair growth
4. Prevent hair fall

**Lemon:**

*Lemon's* high vitamin, antioxidant, and citric acid content makes it a popular natural ingredient in herbal preparations. *Lemon* is a key ingredient in herbal anti-dandruff shampoos due to its potent cleaning and antibacterial qualities. *Lemon's* citric acid keeps the scalp clean and renewed by removing extra oil, grime, and dandruff flakes. Additionally, *lemon's* inherent antifungal properties aid in preventing the growth of bacteria that cause dandruff on the scalp.

Vitamin C, which nourishes the scalp and fortifies hair roots, may be found in lemons.

*Lemon* is used in herbal shampoo to increase hair structure, luster, and scent. *Lemon* is regarded as a crucial ingredient in polyherbal anti-dandruff shampoo formulations because of these advantageous qualities.

**Common Names:**

*Lemon Lime* (scientifically distinct, but sometimes used similarly in everyday speech). *Lemon citrus Nimbu* (in Hindi)

**Taxonomical Classification**

**Table 4: Taxonomical Classification of *Lemon***

| Taxonomical Rank | Classification |
|------------------|----------------|
| Kingdom          | Plantae        |
| Subkingdom       | Tracheobionta  |
| Division         | Magnoliophyta  |
| Class            | Magnoliopsida  |
| Order            | Sapindales     |
| Family           | Rutaceae       |
| Genus            | Citrus         |
| Scientific Name  | Citrus Limon   |

**Uses of *Lemon***

1. Helps reduce dandruff and excess scalp oil.
2. Gives shine and freshness to hair.
3. Has antimicrobial and cleansing properties.
4. Helps maintain scalp pH.

**Methodology of Polyherbal Anti-Dandruff Shampoo:**

**1. Choice of Herbal Components**

The formulation's herbs were chosen for their anti-fungal, anti-dandruff, cleaning, conditioning, and hair-nourishing qualities. Neem, aloe vera, hibiscus, reetha, shikakai, lemon, and curry leaves were among the often utilized herbs. Traditionally, these herbs have been used to treat dandruff and take care of the scalp.



## **2. Making Herbal Extracts**

The maceration or decoction procedure was used to extract each of the powdered herbal medications separately. Each powdered herb was combined with ethanol or distilled water in the required amount. For thirty to sixty minutes, the mixture was gradually cooked. Whatman filter paper or muslin cloth were used to filter the extract once it had cooled. In order to formulate shampoo, the filtrates were concentrated and kept in storage.

## **3. Polyherbal Shampoo Formulation**

Herbal extracts were combined with appropriate shampoo base materials to create the shampoo.

### **Procedure**

1. Herbal extracts (*lemon, hibiscus, neem, and aloe vera*)
2. Surfactant (natural or SLS)
3. Glycerin, thickening agent, distilled water and preservative.

### **Procedure**

1. After gentle swirling, a measured amount of surfactant was dissolved in distilled water.
2. The solution was gradually supplemented with herbal extracts.
3. To get the right consistency, glycerin and thickening agent were thoroughly combined.
4. At last, fragrance and preservative were applied.
5. The distilled water was used to modify the final volume.
6. Fresh, airtight containers were used to store the prepared shampoo.

### **Evaluation parameters:**

The quality, safety, and effectiveness of herbal anti-dandruff shampoo are evaluated using different physicochemical, cosmetic, and microbiological parameters. These tests help to determine the stability, cleansing ability, user acceptability, and anti-dandruff activity of the formulation.

1. **Physical Appearance** -The shampoo is visually examined for its color, odor, clarity, consistency, and presence of any foreign particles. A good herbal anti-dandruff shampoo should possess an attractive appearance, pleasant fragrance, and smooth texture without phase separation.
2. **pH Determination** -The pH of the shampoo is measured using a digital pH meter. Generally, the pH should remain between 5 and 7 to maintain scalp health and avoid irritation. A suitable pH also helps in preventing hair damage and maintaining natural shine.
3. **Foam Ability and Foam Stability**- Foam formation is an important cosmetic property of shampoo. The foam volume produced after shaking the formulation with water is measured, and the stability of the foam is observed over time. Stable and sufficient foam improves consumer acceptability.
4. **Dirt Dispersion Test** - This test evaluates the cleansing efficiency of the shampoo. A small quantity of ink or dirt is added to the shampoo solution and shaken. Less dirt retained in the foam indicates better cleansing action.

## **III. CONCLUSION**

The prepared polyherbal anti-dandruff shampoo was successfully formulated by using natural herbal ingredients such as Neem, Hibiscus, Aloe vera, and lemon. These herbal ingredients are well known for their anti-dandruff, antimicrobial, cleansing, soothing, and hair nourishing properties. The formulation was developed with the aim of reducing dandruff while maintaining healthy and smooth hair. The evaluation parameters such as color, pH, foamability and viscosity, The shampoo produced good foam, cleaned the scalp effectively, and was easy to wash off. The pH of the formulation was found to be suitable for scalp application, which indicates that the shampoo is safe and skin friendly. The herbal ingredients also helped in reducing scalp irritation and dryness.

The study concludes that the polyherbal anti-dandruff shampoo can be considered an effective and economical herbal formulation for hair care. Compared to synthetic shampoos, herbal shampoos have fewer side effects and provide natural conditioning effects to the hair and scalp. Thus, the formulated shampoo may be used as a safe, natural, and effective alternative for the treatment and prevention of dandruff while improving overall hair health.



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