

A COMPREHENSIVE REVIEW OF HERBAL SHAMPOOS: COMPOSITION, BENEFITS,  
AND MARKET TRENDSMubassir<sup>1\*</sup>, Naseem Ahmad<sup>2</sup>, KM. Deepti<sup>3</sup>, Narzia Begum<sup>4</sup>, Sarita Rani<sup>5</sup><sup>1</sup>Assistant Professor, Department of Pharmaceutical Chemistry, Bhagwant Institute of Pharmacy, Muzaffarnagar, 251315, Uttar Pradesh, India.<sup>2</sup>Assistant Professor, Department of Pharmaceutical Chemistry, S.D. College of Pharmacy and Vocational Studies, Muzaffarnagar, 251001, Uttar Pradesh, India.<sup>3</sup>Assistant Professor, Department of Pharmacognosy, Shri Gopichand college of Pharmacy, Ahera, Baghpat, 250609, Uttar Pradesh, India.<sup>4</sup>Assistant Professor, Department of Pharmacology, Bhagwant University, Ajmer, 305004, Rajasthan, India.<sup>5</sup>Assistant Professor, Department of Pharmacology, Bhagwant Institute of Pharmacy, Muzaffarnagar, 251315, Uttar Pradesh, India.

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XXX-XXX.**ABSTRACT**

The increasing demand for natural and chemical-free personal care products has led to a growing interest in herbal shampoos. These shampoos are formulated using plant-based ingredients known for their therapeutic and cleansing properties. Common herbal components such as aloe vera, neem, amla, hibiscus, and reetha offer benefits ranging from scalp nourishment to dandruff reduction and hair strengthening. Unlike synthetic shampoos, herbal alternatives are less likely to cause irritation or long-term damage to the scalp and hair. This review explores the composition of herbal shampoos, highlighting the role of each ingredient in promoting hair health. It also examines the comparative advantages of herbal versus synthetic formulations, current market trends, and the challenges faced by manufacturers, including regulatory concerns and formulation stability. Recent innovations and research in the development of herbal hair care products are also discussed. The review concludes with an outlook on the future potential of herbal shampoos in the global cosmetic industry.

**KEYWORDS:** Herbal shampoo, Natural ingredients, Hair care, Aloe vera, Neem, Amla.**1. INTRODUCTION**

Herbal shampoo is a hair cleansing product formulated primarily with natural, plant-based ingredients such as leaves, roots, flowers, seeds, and essential oils known for their therapeutic properties. Unlike conventional shampoos, which often contain synthetic surfactants, preservatives, and artificial fragrances, herbal shampoos utilize bioactive compounds derived from herbs that cleanse, nourish, and protect the scalp and hair without causing significant side effects (Kadam et al., 2011).

Using herbs for hair care is deeply rooted in traditional medicine systems, especially Ayurveda and Traditional Chinese Medicine. Ancient Indian texts such as the *Charaka Samhita* describe the use of herbs like reetha (*Sapindus mukorossi*), amla (*Phyllanthus emblica*), and bhringraj (*Eclipta alba*) for cleansing and maintaining healthy hair. These herbal preparations were often handmade and used in various forms such as pastes, oils,

and decoctions, reflecting a holistic approach to personal care that emphasized balance and natural wellness (Mukherjee et al., 2010).

In recent years, there has been a significant shift in consumer preference toward natural and organic products, driven by increasing awareness of the harmful effects of synthetic chemicals on human health and the environment. This trend is evident in the global personal care market, where herbal and plant-based cosmetics have witnessed substantial growth. Consumers are now seeking safer, eco-friendly alternatives, positioning herbal shampoos as a viable and attractive choice in both emerging and developed markets (Grand View Research, 2023).

The objective of this review is to provide a comprehensive analysis of herbal shampoos by exploring their formulation, key herbal ingredients, benefits, and

challenges in comparison to synthetic alternatives. The paper also discusses current market trends, consumer perceptions, recent scientific developments, and future prospects in the herbal hair care industry.

## 2. Composition of Herbal Shampoos

Herbal shampoos are made from plant-derived ingredients that have been traditionally and scientifically recognized for their benefits in hair and scalp care. These formulations avoid harsh chemicals like sulfates, parabens, and synthetic fragrances, making them suitable for sensitive skin and long-term use. The following are the most commonly used herbs in herbal shampoos, each contributing unique properties to enhance hair health.

### 1. Aloe Vera (*Aloe barbadensis* Miller)

#### Active Compounds

- Polysaccharides (e.g., acemannan)
- Vitamins A, C, E, and B12
- Enzymes (bradykinase)
- Amino acids and minerals

#### Role in Hair Care

Aloe vera is known for its powerful moisturizing and healing properties. It hydrates the scalp, reduces dandruff caused by dryness, and soothes irritation or itching. It also helps maintain the pH balance of the scalp and improves blood circulation, which stimulates hair follicles and encourages growth. Its enzymes can break down dead skin cells on the scalp, aiding in gentle exfoliation and cleanliness.



**Fig. 1** Aloe Vera (*Aloe barbadensis* Miller) for moisturizing and healing properties.

### 2. Neem (*Azadirachta indica*)

#### Active Compounds

- Azadirachtin
- Nimbin
- Nimbidin
- Quercetin
- Flavonoids

#### Role in Hair Care

Neem has powerful antibacterial, antifungal, and anti-inflammatory properties. It is often used in dandruff control shampoos due to its ability to eliminate scalp infections and reduce flakiness. Neem also promotes healthy hair growth by keeping the scalp clean and free

from pathogens. It strengthens hair from the roots, reduces hair fall, and is effective in managing scalp conditions like seborrheic dermatitis and psoriasis.



**Fig. 2:** Neem (*Azadirachta indica*) for antibacterial, antifungal Properties.

### 3. Hibiscus (*Hibiscus rosa-sinensis*)

#### Active Compounds

- Anthocyanins
- Flavonoids
- Mucilage
- Citric acid
- Ascorbic acid (Vitamin C)

#### Role in Hair Care

Hibiscus is widely used to stimulate hair growth and improve hair texture. It nourishes hair follicles, enhances blood circulation in the scalp, and conditions the hair, making it softer and shinier. The natural acids and mucilage in hibiscus help cleanse the scalp and maintain its oil balance. It is also believed to prevent premature graying and hair thinning.



**Fig. 3:** Hibiscus (*Hibiscus rosa-sinensis*) stimulate hair growth.

### 4. Amla (*Phyllanthus emblica*)

#### Active Compounds

- Ascorbic acid (Vitamin C)
- Gallic acid
- Ellagic acid
- Flavonoids and polyphenols

#### Role in Hair Care

Amla is a rich source of vitamin C and antioxidants, which strengthen the hair shaft and support collagen

production, enhancing hair strength and thickness. It also has anti-inflammatory and antimicrobial properties that maintain a healthy scalp environment. Amla is widely used to prevent premature graying, stimulate hair growth, and improve overall hair health by nourishing the roots.



Fig. 4: Amla (*Phyllanthus emblica*) antimicrobial properties.

### 5. Reetha (*Sapindus mukorossi*)

#### Active Compounds

Table 1: Key of Herbal Ingredients with scientific Name.

Herb	Scientific Name	Key Active Compounds	Benefits in Hair Care
Aloe Vera	<i>Aloe barbadensis</i>	Polysaccharides, vitamins	Moisturizes, soothes scalp, promotes growth
Neem	<i>Azadirachta indica</i>	Azadirachtin, nimbin, quercetin	Antifungal, antibacterial, reduces dandruff
Hibiscus	<i>Hibiscus rosa-sinensis</i>	Anthocyanins, mucilage	Strengthens roots, prevents graying, conditions hair
Amla	<i>Phyllanthus emblica</i>	Vitamin C, tannins, flavonoids	Strengthens hair, prevents graying, stimulates growth
Reetha	<i>Sapindus mukorossi</i>	Saponins	Natural cleanser, mild foaming, anti-dandruff

### 3. Formulation of Herbal Shampoo: Step-by-Step Process

Formulating a herbal shampoo requires careful selection of natural ingredients, proper blending techniques, and quality control to ensure a product that is safe, effective, and cosmetically appealing. Below is a detailed guide on the typical steps involved.

#### Step 1: Selection of Herbal Ingredients

- Choose herbs based on the desired shampoo benefits (e.g., cleansing, anti-dandruff, hair strengthening).
- Common herbs include aloe vera (*Aloe barbadensis*), neem (*Azadirachta indica*), amla (*Phyllanthus emblica*), hibiscus (*Hibiscus rosa-sinensis*), and reetha (*Sapindus mukorossi*).
- Obtain extracts in forms such as powders, oils, or liquid extracts. Ensure they are pure, standardized, and free from contaminants.

#### Step 2: Preparation of Herbal Extracts

- Decoction or Infusion:** Boil or soak herbs in water to extract water-soluble compounds.
- Cold or Hot Extraction:** Use solvents like water, glycerin, or alcohol to extract active ingredients, depending on solubility.

- Saponins (natural foaming agents)
- Sugars
- Triterpenoids

#### Role in Hair Care

Reetha, or soapnut, is known for its natural cleansing action. The saponins in reetha create a gentle foam that effectively removes dirt and excess oil without stripping the scalp of its natural oils. It is particularly suitable for sensitive scalps and is often used in combination with other herbs to enhance its effects. Reetha also adds natural shine to the hair and helps control dandruff.



Fig. 5: Reetha (*Sapindus mukorossi*) helps control dandruff.

- Filter the extracts to remove solid residues, ensuring a clear solution for formulation.

#### Step 3: Selection of Surfactants

- Use mild, natural surfactants such as saponins from reetha or soapnut, decyl glucoside, or cocamidopropyl betaine.
- Surfactants provide cleansing and foaming without harsh effects associated with synthetic detergents like SLS.
- The choice affects the shampoo's foam quality, cleansing ability, and skin compatibility.

#### Step 4: Formulation Base Preparation

- Mix the herbal extracts with surfactants in appropriate ratios.
- Add water as the main solvent to adjust consistency.
- Include natural thickeners like xanthan gum or guar gum to achieve desired viscosity.
- Add humectants such as glycerin to maintain moisture and improve texture.

#### Step 5: Incorporation of Additional Functional Ingredients



- Add natural preservatives like rosemary extract, phenoxyethanol (plant-derived), or vitamin E to extend shelf life.
- Include essential oils (e.g., lavender, tea tree) for fragrance and additional therapeutic effects.
- Incorporate conditioning agents such as hydrolyzed proteins (wheat, keratin) or panthenol (pro-vitamin B5) to improve hair manageability and shine.

#### Step 6: pH Adjustment

- Measure the shampoo's pH, aiming for a slightly acidic range (pH 5.0–6.0) that matches scalp's natural pH.
- Use citric acid or lactic acid to adjust pH if necessary.
- Proper pH ensures scalp comfort, maintains hair cuticle integrity, and enhances product stability.

#### Step 7: Mixing and Homogenization

- Blend all ingredients thoroughly using mechanical stirrers or homogenizers to achieve a uniform and stable formulation.
- Homogenization improves texture, prevents ingredient separation, and enhances product shelf life.

#### Step 8: Quality Testing

Table 2: Herbal Shampoo Formulation Components.

Ingredient Category	Examples	Purpose
Herbal Extracts	Aloe vera, neem, amla, hibiscus	Therapeutic and conditioning agents
Natural Surfactants	Reetha saponins, decyl glucoside	Cleansing and foaming
Thickeners	Xanthan gum, guar gum	Viscosity control
Humectants	Glycerin	Moisture retention
Preservatives	Rosemary extract, vitamin E	Microbial protection
Conditioning Agents	Hydrolyzed wheat protein, panthenol	Hair softness and shine
pH Adjusters	Citric acid, lactic acid	Maintain scalp-friendly pH
Fragrances	Essential oils (lavender, tea tree)	Aroma and added benefits

### 4. Benefits of Herbal Shampoos: Evidence-Based Insights

Herbal shampoos have gained widespread popularity because of their multifaceted benefits, supported by scientific research and consumer preferences. Below is a detailed review of their key benefits with relevant data.

#### 1. Hair Strengthening

Studies have shown that herbal ingredients such as amla (*Phyllanthus emblica*), hibiscus (*Hibiscus rosa-sinensis*), and bhringraj (*Eclipta alba*) contain bioactive compounds like vitamin C, flavonoids, and essential fatty acids that actively promote hair strength and growth. Amla is particularly rich in ascorbic acid, which enhances collagen production, crucial for hair follicle health (Baliga & Dsouza, 2011). Clinical trials have demonstrated that regular use of herbal shampoos fortified with these extracts improves hair tensile strength by up to 20% over synthetic shampoos, reducing breakage and split ends significantly (Patel *et al.*, 2019).

#### 2. Anti-Dandruff Properties

- Test for physical properties such as viscosity, color, clarity, and foam stability.
- Conduct microbial testing to ensure the absence of contamination.
- Perform stability testing under different temperature and light conditions to confirm shelf life.
- Assess sensory attributes like scent, feel on hair, and rinse-off ease.

#### Step 9: Packaging

- Use appropriate packaging materials like PET or HDPE bottles that protect from light and air.
- Packaging should be user-friendly, hygienic, and maintain product integrity.
- Label clearly with ingredient list, usage instructions, and shelf life.

#### Step 10: Final Product Evaluation

- Conduct user trials or consumer testing to evaluate product acceptance, effectiveness, and any adverse reactions.
- Collect feedback for any reformulation needs.

Dandruff affects approximately 50% of the global population, and its management remains a challenge. Neem (*Azadirachta indica*) extract, standardized for azadirachtin content, has shown potent antifungal activity against *Malassezia* species, the primary dandruff-causing fungus (Biswas *et al.*, 2002). In comparative studies, herbal shampoos containing neem and tea tree oil reduced dandruff severity by 60-70% within four weeks, outperforming conventional antifungal shampoos which often cause scalp dryness as a side effect (Kumar & Verma, 2020).

#### 3. Scalp Health Improvement

Maintaining scalp integrity is essential for hair growth. Herbal shampoos with natural surfactants like saponins from reetha (*Sapindus mukorossi*) provide gentle cleansing without stripping sebum, preserving the scalp's natural moisture barrier. Aloe vera (*Aloe barbadensis*) supplementation in shampoos reduces scalp inflammation and promotes wound healing through its anti-inflammatory enzymes like bradykinase (Surjushe

*et al.*, 2008). Consumer surveys reveal that 85% of users reported reduced scalp irritation and improved scalp comfort after switching to herbal shampoos (**Global Cosmetics Survey, 2022**).

#### 4. Reduced Side Effects Compared to Synthetic Shampoos

Synthetic shampoos often rely on sulfates and parabens that can disrupt the scalp's natural pH, cause dryness,

and lead to allergic reactions. Herbal shampoos avoid these chemicals, offering a safer profile. Toxicological assessments indicate that herbal shampoos exhibit minimal irritation potential, making them suitable for sensitive scalps and frequent use (**Kadam et al., 2011**). Additionally, the biodegradability of herbal ingredients reduces environmental pollution compared to synthetic surfactants, aligning with global sustainability goals (**Environmental Protection Agency, 2021**).

**Table 3: Quantified Benefits of Herbal Shampoo.**

Benefit	Herbal Shampoo Effect	Reference
Hair strength increase	Up to 20% improved tensile strength	Patel et al., 2019
Dandruff reduction	60-70% reduction in dandruff severity	Kumar & Verma, 2020
Scalp irritation	85% users report reduced irritation	Global Cosmetics Survey, 2022
Side effects	Minimal irritation, hypoallergenic	Kadam et al., 2011

#### 5. Comparative Analysis of Herbal Shampoos and Synthetic Shampoos

With the rising demand for natural personal care products, it is essential to understand how herbal shampoos compare to their synthetic counterparts. This comparison involves evaluating their ingredient profiles, effectiveness, side effects, and environmental footprints.

##### 1. Ingredients

- **Herbal Shampoos:** These are formulated using plant-based ingredients such as aloe vera (*Aloe barbadensis*), neem (*Azadirachta indica*), hibiscus (*Hibiscus rosa-sinensis*), amla (*Phyllanthus emblica*), and reetha (*Sapindus mukorossi*). They contain natural surfactants like saponins and bioactive phytochemicals (flavonoids, tannins, vitamins) that provide therapeutic benefits while gently cleansing the hair and scalp. Herbal formulations avoid synthetic detergents, parabens, sulfates, silicones, and artificial fragrances, aiming to minimize chemical exposure (**Kadam et al., 2011**).
- **Synthetic Shampoos:** Synthetic shampoos typically contain surfactants such as sodium lauryl sulfate (SLS) or sodium laureth sulfate (SLES), which are potent foaming agents but can strip natural oils. They often include parabens, silicones, synthetic fragrances, preservatives, and chemical conditioners. While these ingredients provide immediate lather, cleansing, and cosmetic effects, they may irritate sensitive skin and scalp over time (**Kumar & Verma, 2020**).

##### 2. Effectiveness

- **Herbal Shampoos:** Herbal shampoos clean the scalp and hair effectively while providing added benefits like hair strengthening, dandruff control, and scalp nourishment. Studies show that herbal extracts improve hair tensile strength by up to 20% and reduce dandruff severity by 60-70% when used regularly (**Patel et al., 2019; Kumar & Verma, 2020**). However, herbal shampoos may produce less foam compared to synthetic ones, which some

consumers perceive as less effective, although foam quantity does not correlate with cleansing ability.

- **Synthetic Shampoos:** Synthetic shampoos deliver rapid cleansing due to strong surfactants and produce rich lather, which is often preferred by consumers. They provide immediate removal of dirt, oil, and product buildup. However, frequent use of strong detergents can damage hair proteins and disrupt scalp barrier function, leading to dryness and irritation over time (**Environmental Protection Agency, 2021**).

##### 3. Side Effects

- **Herbal Shampoos:** Due to their natural and gentle ingredients, herbal shampoos have a low incidence of side effects. They are less likely to cause scalp irritation, dryness, or allergic reactions, making them suitable for sensitive skin and daily use. Their anti-inflammatory and antimicrobial compounds also help soothe scalp conditions (**Surjushe et al., 2008**). However, in rare cases, some people may be allergic to specific herbs.
- **Synthetic Shampoos:** Synthetic shampoos, particularly those containing sulfates and parabens, have been associated with scalp irritation, dryness, itchiness, and even allergic contact dermatitis in susceptible individuals (**Kadam et al., 2011**). Long-term use can lead to protein damage in hair, causing brittleness and split ends.

##### 4. Environmental Impact

- **Herbal Shampoos:** Herbal shampoos are generally more biodegradable due to their natural surfactants and absence of harmful chemicals. This reduces environmental pollution in water bodies. Their ingredients are renewable and sourced sustainably, which aligns with global efforts toward green chemistry and sustainability (**Environmental Protection Agency, 2021**).
- **Synthetic Shampoos:** Many synthetic shampoo ingredients, especially sulfates and some preservatives, are less biodegradable and may accumulate in aquatic ecosystems, potentially

harming aquatic life and contributing to pollution (EPA, 2021). Manufacturing synthetic ingredients

often involves petrochemicals, increasing the carbon footprint.

**Table 4: Herbal vs. Synthetic Shampoos.**

Aspect	Herbal Shampoos	Synthetic Shampoos
Ingredients	Plant-based, natural surfactants, bioactives	Chemical surfactants (SLS, SLES), parabens, silicones
Effectiveness	Gentle cleansing, hair strengthening, anti-dandruff	Strong cleansing, rich lather, quick dirt removal
Side Effects	Low irritation, anti-inflammatory, fewer allergies	Possible irritation, dryness, allergic reactions
Environmental Impact	Biodegradable, eco-friendly, renewable sources	Less biodegradable, potential water pollution, higher carbon footprint

## 6. CONCLUSION

Herbal shampoos represent a harmonious blend of nature and science, offering a gentle yet effective alternative to conventional synthetic products. Enriched with potent plant-based ingredients like aloe vera, neem, amla, and hibiscus, these shampoos not only cleanse but also nourish the hair and scalp, promoting overall hair health. Their natural composition minimizes side effects such as irritation and dryness, making them suitable for sensitive scalps and long-term use. Furthermore, the environmental benefits of biodegradable ingredients and sustainable sourcing align herbal shampoos with the growing global emphasis on eco-friendly personal care. As consumer awareness about chemical sensitivities and environmental impact rises, herbal shampoos are poised to gain even greater popularity. Continued research and innovation will further enhance their efficacy, texture, and sensory appeal, bridging traditional wisdom with modern cosmetic science. Embracing herbal shampoos is not just a trend but a conscious step toward healthier hair care and a greener planet.

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