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Review Article

Review on Formulation and Evaluation of Herbal Shampoo

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ABSTRACT

Herbal shampoos are natural hair care products composed of plant-derived substances, including reetha, shikakai, amla, hibiscus, neem, aloe vera, and many medicinal plants. They are safer and more environmentally friendly than synthetic shampoos because they don't include harsh chemicals, sulfates, or parabens. These formulas efficiently cleanse the scalp, eliminate surplus oil, lessen dandruff, encourage hair development, and preserve the strength and luster of hair. Other medicinal advantages like antibacterial, antioxidant, and conditioning properties are provided by the phytoconstituents found in plants. The demand for herbal shampoos has grown in both domestic and international markets due to consumers' growing preference for natural and sustainable products. Herbal shampoo, which blends historic knowledge with contemporary formulation techniques, thus represents a viable approach in the pharmaceutical and cosmetic industries Herbal shampoos have gained significant attention as safe and eco-friendly alternatives to synthetic formulations due to their minimal side effects, biodegradability, and therapeutic benefits. They are generally prepared using natural ingredients such as plant extracts, essential oils, saponins, and natural thickeners, which not only cleanse the scalp but also provide additional pharmacological activities like antimicrobial, antioxidant, and anti-dandruff effects.

INTRODUCTION

Shampoo is one of the most widely used cosmetic formulations designed primarily for cleaning the scalp and hair by removing dirt, oil, sebum, and environmental pollutants. In addition to cleansing, shampoos are expected to improve hair manageability, provide a pleasant fragrance, and maintain scalp health. Traditionally, synthetic shampoos containing surfactants such as sodium lauryl sulfate (SLS), parabens, silicones, and other synthetic additives have dominated the cosmetic market due to their strong foaming and cleansing ability. However, prolonged use of these products has been linked to several adverse effects

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including scalp irritation, dryness, hair follicle damage, and even hair fall.

In recent years, increasing consumer awareness and preference for natural and safe products have shifted the focus toward herbal shampoos. Unlike synthetic counterparts, herbal shampoos are formulated using plant-derived ingredients that act as natural cleansers, conditioners, and therapeutic agents. Herbal ingredients such as Sapindus mukorossi (Reetha), Acacia concinna (Shikakai), Emblica officinalis (Amla), Aloe vera, Azadirachta indica (Neem), and various essential oils are commonly used due to their cleansing, antimicrobial, antioxidant, and hair-nourishing properties. These natural components not only cleanse effectively but also provide added benefits such as preventing dandruff, reducing hair fall, stimulating hair growth, and maintaining scalp pH balance.

The formulation of herbal shampoo Involves careful selection of herbal extracts, natural surfactants, viscosity enhancers, preservatives, and fragrances to achieve desired physicochemical and therapeutic properties. Since herbal extracts are sensitive to environmental conditions, proper formulation strategies and evaluation parameters such as pH, foaming capacity, viscosity, conditioning effect, and stability studies are essential to ensure quality and efficacy.

Thus, the development of herbal shampoos combines traditional knowledge of medicinal plants with modern pharmaceutical formulation techniques, making them a promising, sustainable, and consumer-friendly alternative in hair care products. This review focuses on the formulation strategies, evaluation methods, advantages, challenges, and future prospects of herbal shampoos.

The desire for natural and chemical-free personal care products has grown dramatically in recent years. In place of synthetic shampoos, herbal shampoos made with plant-based components have become increasingly popular. The botanical extracts included in these shampoos, including Aloe vera, Neem, Amla, Reetha, Shikakai, and Hibiscus, have long been utilized in Ayurvedic and folk medicine for their hair and scalp-benefiting properties. Herbal shampoos are safer for long-term use because they don't contain harsh chemicals like parabens, sulfates, or artificial perfumes. In addition to providing an efficient hair wash, they also feed the scalp, lessen dandruff, stop hair loss, and encourage the growth of healthy hair. Unlike conventional shampoos that could strip the scalp of its natural oils, herbal shampoos maintain the natural balance between the hair and scalp.Herbal shampoos, which are mild and environmentally friendly, are regarded as a holistic and sustainable hair care solution that fits in with the expanding green and organic movement. It promotes hair growth by strengthening and darkening hair and eliminating dandruff, oil, and filth.Additionally, it gives the hair shiness, smoothness, and softness. Shampoo is a cosmetic product made with a variety of medications. These medications have a number of adverse effects, including headache, nausea, pain, increased scaling, hair loss, and scratching. As a result, an effort is undertaken to create a herbal shampoo that has no negative effects.

Using traditional Ayurvedic herbs, herbal shampoos— which fall under the category of cosmetic preparations—are primarily used to wash the hair and scalp. Commercially accessible synthetic shampoo derived from plant-based herbs can be replaced with herbal shampoo. Since chemicals have negative consequences and people are more aware of the need for natural cosmetics, herbal shampoo is important. Because customers

believe they are risk-free and have no adverse effects, herbs are growing in popularity. Making cosmetics with just natural ingredients can be challenging, but herbal shampoo recipes are recommended as a substitute for synthetic ones.In addition to visual inspection and quality control testing. The sodium lauryl sulphate Although the most widely used detergents are based, concentrations can vary greatly between brands even within a manufacturer's product line. The amount of detergent in cheap shampoos may be excessive. Even though high-end shampoos may include very small amounts of cheap detergent, It is possible for shampoos for oily and dry hair to have the same detergent in the same amount. The shampoo for oily hair may include less oil or conditioning ingredient, or the difference may only be in the packaging.

History of Herbal Shampoo :

Herbs have been used for hair treatment for thousands of years, especially in ancient cultures like Egypt, China, and India.

Sapindus is a tropical tree that is widely distributed throughout India and is often referred to as soapberries or soapnuts . Soapberry was mentioned by Guru Nanak, the founder and first Guru of Sikhism.

India (Ayurveda) :

Ayurvedic books like the Charaka Samhita and Sushruta Samhita from ancient India discussed the use of herbs like neem, amla, shikakai, and reetha for scalp and hair care. Hair strength and luster were reported to be enhanced by these natural cleansers, which also produced a gentle foam by several names, including soapnuts or soapberries, Sapindus is a tropical tree that grows widely throughout India. Ancient Indian literature mention saponins, a naturally occurring surfactant, found in fruit pulp. Soapberry extract produces a lather known as phenaka in Indian scriptures. The hair is left feeling pliable, silky, and manageable. Hibiscus blossoms, ritha (Sapindus mukorossi), arappu (Albizzia amara), and shikakai (Acacia concinna) were also used to clean hair. In the 16th century, Guru Nanak, the founder and first Guru of Sikhism, mentioned soap and the soapberry tree.

Modern Herbal Shampoo Development :

The term "shampoo" is derived from the Hindi word "chāmpo", which means to massage.In the early 20th century, commercial shampoos were developed, but many contained harsh chemicals.With rising awareness about the side effects of synthetic ingredients, the herbal cosmetic industry began growing in the late 20th century.Today, herbal shampoos are formulated combining traditional knowledge and modern cosmetic science, gaining global popularity as safer and eco-friendly alternative

Need of shampoo :

Shampoo is an essential hair care item that is primarily used to cleanse the scalp and hair.Sweat, excess sebum, dead skin cells, dust, pollutants, and styling product residue are all frequently accumulated on our scalp. This accumulation can cause hair issues including dandruff, irritation, infections, and hair loss if it is not properly cleaned.

Main Needs of Using Shampoo :

1. Cleaning the Scalp and Hair: This efficiently gets rid of pollutants, oil, and grime.
2. Preserving Scalp Health: Reduces dandruff and guards against bacterial or fungal diseases.

3. Enhancing Hair Appearance: Gives hair a more manageable, glossy, and youthful appearance.
4. Preparing Hair for Other Products: Oils, conditioners, and treatments are better absorbed by clean hair.
5. Guarding Against Hair Damage

Why Herbal Shampoo is Preferred :

1. Gentle on the scalp and hair.
2. Devoid of dangerous substances.
3. Enhanced with organic nutrients.
4. Fits all types of hair.
5. Safe for the environment.

Ideal properties :

Properties of herbal shampoo.

1. Non-irritating and mild Kind to the skin, eyes, and scalp.
2. Powerful Cleaning eliminates buildup, oil, and debris without compromising the integrity of natural hair oils.
3. Organic Components ought to include plant-based herbs such as reetha, shikakai, aloe vera, neem, etc.
4. The pH is balanced (4.5–5.5) to avoid irritation or dryness.
5. The Effect of Conditioning increases manageability, softens hair, and lessens tangling.
   Antimicrobial and anti-dandruff uses natural components to help combat
6. microbial infections, dandruff, and itching.
7. Ecologically friendly cruelty-free, biodegradable, and recyclable packaging.
8. Excellent Foaming and Simple Rinsing readily removes without leaving any residue and naturally generates a sufficient amount of lather.
9. A pleasing natural scent aroma of fresh, calming herbs or essential oils rather than synthetic fragrances.
10. Constant Shelf Life should be long-lasting and safe when employing natural preservatives like citric acid or vitamin E. \

Advantages :

1. Herbal shampoo is made without artificial additives or surfactants, using only natural and organic ingredients.
2. Have no adverse effects.
3. Earth-friendly, herbal shampoos that are biodegradable.
4. It doesn't bother the eyes.
5. It is affordable and cost-effective.
6. Regular use of herbal shampoo might be very beneficial to your hair.
7. The optimal oil balance is achieved by using herbal hair products.
8. They have a national vital disinfectant that protects the hair and scalp from harmful UV rays and skin illnesses.

Disadvantages :

1. Less Lather: Some people might think their hair isn't sufficiently clean.
2. Slower Results: In contrast to chemical shampoos, benefits take longe to manifest..
3. Pricey: The shampoos use organic processing and natural material
4. Inconsistent Quality: Brands or batches may differ in their effectiveness.
5. Not Always Clinically Tested: Certain herbal shampoos, particularly homemade or regional products, might not have Undergone adequate dermatological testing or scientific validation.
6. Mild Fragrance: Some consumers could not enjoy their strong herbal scent or absence of a pleasant scent.

7. Short Shelf Life: Because natural products don't include potent preservatives, their shelf lives are shorter. Must be appropriately stored.

Function of herbal shampoo :

1. Making the hair smooth and shining.
2. Create a sufficient volume of foam.
3. Should not irritate the scalp, skin, or eyes.
4. The dirt should be fully and properly removed.
5. Add a lovely smell to hair.
6. It should remove dirt or soil efficiently and completely.
7. It should thoroughly clean the hair.
8. It should generate a sufficient amount of foam to satisfy the user.
9. Rinsing with water should suffice to eliminate it.
10. It should provide a pleasant smell to the hair.
11. There should be no negative effects or irritation to the skin or eyes.

Types of herbal shampoo :

1. Tulsi shampoo
2. Combo shampoo
3. The shampoo multani mitti
4. Bhringraj shampoo
5. Shampoo made for hibiscus

Tulsi shampoo :

Tulsi shampoo is a natural hair care product infused with the powerful properties of *Tulsi* (Holy Basil), a revered herb in Ayurveda known for its antibacterial, antifungal, and antioxidant benefits. This herbal shampoo helps cleanse the scalp gently, reduce dandruff, and soothe irritation while promoting hair growth and strengthening the roots. Often combined with other herbs like neem, amla, or henna, tulsi shampoo nourishes the scalp, prevents hair fall, and enhances hair shine. It is especially suitable for people with sensitive scalps or those looking for chemical-free alternatives to maintain healthy, soft, and manageable hair. Regular use of tulsi shampoo ensures a clean, refreshed scalp and naturally beautiful hair.

Combo shampoo :

Combining the benefits of several natural or herbal constituents into a single composition, combo shampoo is a multipurpose hair care product. Combination shampoos, as opposed to standard shampoos, are made to treat several hair issues at once, including dandruff, hair loss, dryness, and dullness. Tulsi, neem, amla, reetha, shikakai, aloe vera, and bhringraj are common constituents that each have special qualities like antibacterial action, purifying the scalp, nourishing the hair, and strengthening it. Combination shampoos, which are appropriate for all hair types, provide a comprehensive approach to hair care by combining these herbs. With consistent usage, they not only gently cleanse the scalp and hair but also bring back the hair's natural luster, guard against damage, and enhance general hair health.

The shampoo multani mitti :

Multani Mitti (Fuller's Earth), a mineral-rich clay that is frequently used in traditional Indian beauty care, is the basis for this natural and herbal hair cleanser. Without using harsh chemicals, this shampoo deeply cleanses the scalp by absorbing excess oil, dirt, and impurities, making it particularly effective for people with oily scalps. It helps clear up clogged hair follicles, lessen dandruff, and relieve irritation or itching, leaving the scalp feeling clean and renewed. In addition to cleansing the scalp, Multani Mitti shampoo, which is frequently combined with aloe vera, neem, tulsi, or reetha, encourages healthier, glossier, and easier-to-manage hair. But because of its potent

oil-absorbing qualities, it works best on oily to normal hair types, and it might be drying for people with sensitive or dry scalps.

Bhringraj shampoo :

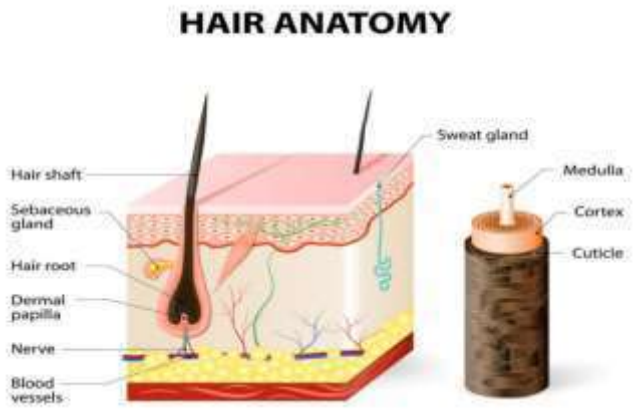
Bhringraj (Eclipta alba), a potent Ayurvedic herb referred to as the "King of Herbs" for hair, is included to this natural hair care product. It is frequently used to treat problems relating to the scalp, stop hair loss, and encourage hair growth. Bhringraj strengthens hair follicles, promotes the growth of thicker, healthier hair, and increases blood flow to the scalp. This shampoo is particularly helpful for people who have weak, thinning hair, dandruff, or premature greying. Bhringraj shampoo, which is frequently combined with other herbs like amla, brahmi, and shikakai, softly cleanses hair while providing the scalp with deep nourishment. Frequent usage improves hair texture, lessens breakage, and restores natural shine, making it the perfect option for people looking for a natural, chemical-free remedy for common hair issues.

Shampoo made for hibiscus :

Known in Ayurveda for its potent hair-nourishing qualities, hibiscus shampoo is a herbal hair cleanser produced from the flowers and leaves of the Hibiscus plant (Hibiscus rosa-sinensis). Hibiscus, which is high in vitamin C, amino acids, and antioxidants, helps to promote hair development, strengthen hair roots, and lessen hair loss. It also makes hair pliable, lustrous, and silky by acting as a natural conditioner. For those with dry, damaged, or frizzy hair, hibiscus shampoo is perfect since it gently washes the scalp without removing natural oils. It reducesirritation of the scalp, stops dandruff, and gives lifeless hair volume and bounce. Frequent usage of hibiscus shampoo promotes thick, healthy, and gorgeous hair without the negative side effects of chemicals.

Anatomy of hair :

Hair is a filamentous, usually colored growth that emerges from the skin and is only seen in animals. All skin parts have hair, with the exception of the lips, labia minora, palms, soles, glans penis, and fingertips. These delicate strands are produced by hair follicles (epidermis) in the dermis, the skin's deeper layer. Dead cells and keratin protein make up the majority of each fiber. Hair follicles are located in the fatty layer of the scalp. As contrast to what is commonly believed, hair really grows as "follicular units," which are collections of one to four hairs, rather than as individual strands. A hair bulb, which houses the tools required to create new hair, is located at the base of each hair follicle.The apparatus for producing new hair is housed in the hair bulb at the base of each hair follicle. The blood arteries in the dermis provide nourishment to the hair follicles. The hair shaft is formed by the division and development of cells.



Structure of hair :

The hair shaft and the hair root are the two primary components that make up the structure of hair (in paragraph form). The term "hair shaft" refers to the visible part of the hair that extends above the skin. Comprising dead, keratinized cells, it has three distinct layers. The outermost layer of hair, known as the cuticle, is made up of overlapping cells that shield the underlying layers and give hair its gloss. The cortex, the thickest layer beneath the cuticle, gives strength, texture, and flexibility and includes melanin, which gives hair its color. The medulla, the innermost layer and the central core of soft cells, may not be present in fine hair. The hair follicle, a tube-like structure in the dermis, contains the hair root, which is located under the skin's surface. The hair shaft is formed by the division and growth of live cells in the hair bulb, which is located at the base of the follicle. Blood vessels that provide the nutrients and oxygen needed for hair growth are found in the dermal papilla, which is part of the bulb. Sebaceous glands, which surround the follicle, generate sebum, a naturally occurring oil that lubricates the scalp and hair.

This complex structure not only encourages hair growth but also improves the hair's strength, color, and overall condition.

Hair physiology :

The biological mechanisms underlying hair development, maintenance, and function are referred to as hair physiology. Three primary phases make up the continuous cycle of hair development: the anagen phase, which is the growth phase; the catagen phase, which is the transition phase; and the telogen phase, which is the resting and shedding phase. With the help of the dermal papilla's nutrient-rich blood supply, hair actively develops from the root during the anagen phase, which can last two to seven years. The follicle begins to shrink and hair creation stops during the catagen phase, which lasts for a few weeks.Ultimately, the hair rests and eventually falls out during the several-month-long telogen period, making room for new hair to develop in its place.Blood vessels provide vital resources including proteins, vitamins, and minerals to hair follicles, which are necessary for normal growth. Sebum, an oily substance secreted by sebaceous glands close to the follicles, keeps the scalp hydrated and shields the hair shaft from damage and dryness. Melanin, which is produced by melanocytes in the hair bulb, determines the color of hair and diminishes with age, resulting in gray hair. Hair serves defensive and sensory purposes in addition to its cosmetic appeal.It protects the scalp from UV radiation and other environmental contaminants, and nerve endings that surround its follicles can sense even minute motions, which facilitates touch. All things considered, the physiology of hair demonstrates how dynamic and complicated it is as a component of the integumentary system.

Formulation of herbal shampoo :

Sr. No	Ingredients	Quality
1	Neem	5 ml
2	Soapnut extract	10 ml
3	Amla extract	5 ml
4	Shikakai extract	5 ml
5	Hibiscus	5 ml
6	Bhringraj	5 ml
7	Aloe vera	10 ml
8	Gelatin	5 ml
9	Lemon juice	4 ml
10	Rose oil	5 drops
11	Glycerine	3 ml
12	Dist water	Upto 100 ml

Preparation :

1. In order to acquire a detergent solution directly from the manufacturer, the detergent must first be transformed into a solution form.
2. About half of the detergent solution should be transferred to a different container.
3. Add all of the secondary surfactant, or alkanolamide, to it. While stirring, dissolve the alkanolamide.
4. Gentle heat is also occasionally used.
5. Add the appropriate quantity of the fragrance agent to the other half of the detergent solution and dissolve it.
6. To the alkanolamide solution, the perfume solution is subsequently added.
7. Preservatives and color are added to the main solution after being individually dissolved in an adequate amount of water.
8. Gentle stirring thoroughly mixes the entire solution. Stirring too much can cause bubbles to appear.
9. Usually, clear sterile waste is added to the preparation to change its final volume.
10. Thus, clear liquid shampoo is produced.
11. Nevertheless, when lauryl alcohol ether sulphate is present in the preparation. Adjusting the shampoo's viscosity is necessary.

Evaluation Parameters of Herbal Shampoo :

1. Organoleptic Properties :

The physical characteristics such as color, odor, clarity, texture, and consistency are observed visually and by sensory analysis. These parameters are important for consumer appeal and acceptance.

2. pH Determination :

The pH of the shampoo is measured using a digital pH meter. An ideal shampoo should have a pH between 5.0 and 7.0, which is close to the natural pH of the scalp and hair. Maintaining an appropriate pH prevents scalp irritation and protects hair cuticles.

3. Foaming Ability and Foam Stability :

The cleansing efficiency of a shampoo depends on its ability to form foam. A known quantity of shampoo solution is shaken with water and the foam height is measured immediately and after a fixed time interval. Herbal shampoos generally produce less foam than synthetic ones, but stability of foam is more important than its volume.

4. Surface Tension Measurement

A good shampoo reduces the surface tension of water, allowing better wetting and spreading over hair. This is measured using a stalagmometer or tensiometer. Effective cleansing is usually associated with reduced surface tension values.

5. Viscosity Measurement :

The flow property of the shampoo is measured using a Brookfield viscometer. Viscosity affects the ease of application, spreadability, and stability of the product. A balanced viscosity is required to ensure proper handling and consumer preference.

6. Solid Content Determination :

A known amount of shampoo is evaporated to dryness to determine solid content. An ideal shampoo should have adequate solid content to avoid being too watery or too concentrated.

7. Stability Studies :

Herbal shampoos are subjected to stability testing under different storage conditions (temperature, humidity, and light). They are monitored for changes in color, odor, phase separation, microbial growth, and pH variation over time. Stability ensures shelf life and safety of the product.

CONCLUSION :

An alternative to synthetic shampoo formulas, herbal shampoos are both safe and effective. In addition to cleaning the hair and scalp, they also offer other health advantages like lowering dandruff, stopping hair loss, and encouraging hair growth. They minimize negative effects like dryness and irritation while preserving the natural texture, luster, and strength of hair because they don't contain harsh chemicals. Furthermore, their biodegradable and environmentally beneficial qualities make them long-term viable. Because herbal shampoos include cleansing, conditioning, and therapeutic properties in one composition, they provide a comprehensive approach to hair care.

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