



# A COMPREHENSIVE REVIEW ON: HERBAL ANTI-DANDRUFF SHAMPOO

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## Abstract

Objective of this review article is to provide information about various herbs used in dandruff treatment along with causes and remedies of dandruff formation. This article also highlights the benefits of herbal shampoo over synthetic shampoos. The hair is an integral part of the way to feel about the self-appearance, and when the hairs are lost, it can be damaging to self-esteem and self-confidence. One common reason is dandruff; a very common scalp disorder with high prevalence in population is caused by numerous host factors in simultaneously with *Malassezia furfur*. Most of the commercially available anti-dandruff hair shampoos contain some form of antifungal agents that appear to reduce the incidence of the disease. Synthetic product has poor efficacies, more side effects, and gives scope for recurrence of symptoms. As the scalp is one of the most porous parts of the body, products applied to the scalp go directly to the blood, without being filtered in any way. Hence, it is very main to know and understand the effect of ingredient used in the shampoo formulation.

**Keywords:-** Dandruff, evaluation of shampoo, herbal shampoo, shampoo formulation

## Introduction

Shampoos are probably the most widely used cosmetic products for cleansing hairs and scalp in our daily life<sup>[1]</sup>. Herbal shampoos are the cosmetic preparations that with the use of traditional ayurvedic herbs are meant for cleansing the hair and scalp just like the regular shampoo. They are used for removal of oils, dandruff, dirt, environmental pollutions etc. Herbal shampoo is a type of cosmetic preparation that uses herbs from plants as an alternative to the synthetic shampoo available in the market. The herbal shampoo is important, as people nowadays prefer herbal products than chemical ones for they proved to enhance health. The awareness and need for cosmetics with herbs are on the rise, primarily because it is believed that these products are safe and free from side effects<sup>[2]</sup>.

In synthetic shampoos, surfactants (synthetic) are added mainly for their cleansing and foaming property, but the continuous use of these surfactants leads to serious effects such as eye irritation, scalp irritation, loss of hair, and dryness of hairs<sup>[3]</sup>. Alternative to synthetic shampoo we can use shampoos containing natural herbals. However, formulating cosmetics product containing only natural substances are very difficult<sup>[4]</sup>. There are a number of medicinal plants with potential effects on hair used traditionally over years around the world and are incorporated in shampoo formulation<sup>[5]</sup>. These medicinal plants may be used in extracts form, their powdered form, crude form, or their derivatives<sup>[6]</sup>.

## Hair

Hair is a protein filament that grows from hair follicles in the dermis of the skin. Hair is a defining characteristic of mammals and is found on almost every part of the human body, except for the lips, palms, soles, and urogenital areas.

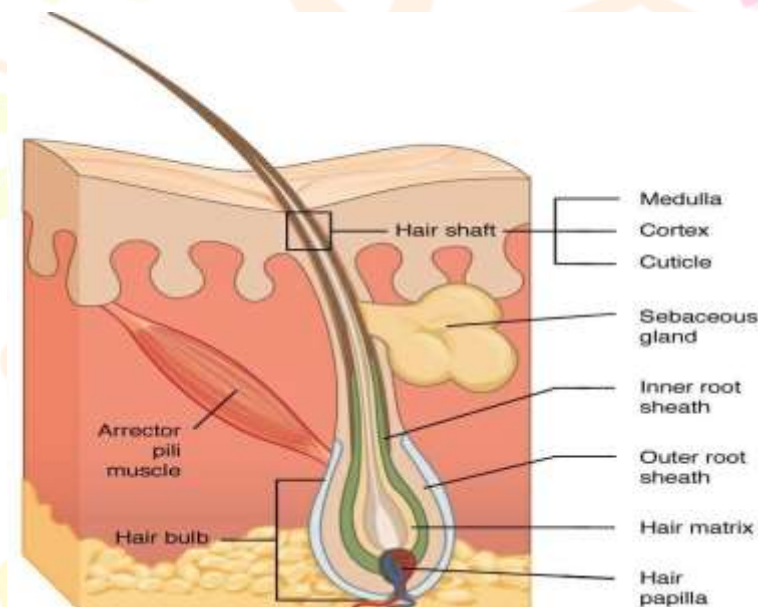
### Parts of the hair



**Hair shaft:**-The visible part of the hair that sticks out of the skin. The hair shaft is made up of three layers: the cuticle, cortex, and medulla.

**Hair root:**-The part of the hair that extends down into the deeper layers of the skin. The hair root widens into a round hair bulb at the base of the hair.

**Hair follicle:**-A sheath of skin and connective tissue that surrounds the hair root. The hair follicle is connected to a sebaceous gland and a tiny muscle called the arrector pili, which can make the hair stand up.



Figure; Part of Hair

### Ideal properties of Herbal Shampoo-

1. It should effectively and completely remove dust or soil, excessive sebum or other fatty substances and loose corneal cells from the hair.
2. It should produce a good amount of foam to satisfy the psychological requirements of user.
3. It should be easily removed on rinsing with water.
4. It should leave the hair non-dry, soft, lustrous with good manageability.

5. should impart a pleasant fragrance to the hair
6. It should not cause any side-effects / irritation to skin or eye.
7. It should not make the hand rough and chapped<sup>[7,8]</sup>

### Causes and symptoms

Those shiny white flakes that you often brush off your collar and shoulders are probably because of a skin condition called Dandruff. It looks harmless but dandruff causes itch and condition that is responsible for the constant flaking of scalp skin<sup>[9]</sup>.

1. Irritated and oily skin
2. Not maintaining clean hygiene and not shampooing enough, as it causes skin cells to accumulate and create flakes and itching.
3. A reaction of our immune system to a type of yeast that lives on the skin called a *Malassezia globosa*.
4. Hormonal issues may be involved because dandruff is most found after puberty in young adults.
5. Sensitivity to hair care products (contact dermatitis).
6. The signs and symptoms may be more severe if you are stressed, and they tend to flare in cold, dry seasons.
7. A red rash due to the itching can also be seen around the scalp, forehead, and ears or forehead that if you are suffering from dandruff<sup>[10,11]</sup>

### Advantages

Herbal shampoo is formulated by pure and organic ingredients with no synthetic additives or surfactants are free of any side effects<sup>[13,14]</sup>.

1. Herbal shampoos are biodegradable and earth friendly.
2. It doesn't cause irritation to the eyes.
3. It is cost friendly, not much expensive.
4. Regular usage of herbal shampoo can do wonders for hair.
5. A perfect oil balance is achieved by using herbal shampoo.
6. They consist of natural essential disinfectant properties that protect hair and scalp from the harsh UV rays of the sun and prevent skin infections<sup>[15]</sup>.
7. Treatment for hair loss

### Disadvantages:-

Side effects-These can include skin irritation, dry skin, oily or dry hair or scalp, and temporary hair loss. Some shampoos contain ingredients that can cause serious side effects, such as coal tar, which can be carcinogenic and make the skin more sensitive to sunlight<sup>[16]</sup>.

1. Hair damage-Anti-dandruff shampoos can strip the scalp of its natural oils, which can lead to hair brittleness, breakage, split ends, and frizz over time<sup>[17]</sup>.
2. Environmental harm-Some ingredients in anti-dandruff shampoos can be toxic to waterways.
- 4-pH-The pH

of a shampoo can affect hair, and a pH higher than 5.5 can irritate the scalp.

3. 5-Allergic reactions-Some people can have serious allergic reactions to anti-dandruff shampoos, including rash, itching, swelling, severe dizziness, and trouble breathing<sup>[18]</sup>.

### Various herbs used in anti-dandruff shampoo

#### 1) Hibiscus:



*Figure- Hibiscus flower*

**Botanical name:-** Hibiscus rosa sinensis

**Biological source:-** It is obtained from plant of Hibiscus Rosa sinensis or China rose

**Family:-** Malvaceae.

**Microscopical characters :-**

**Color:-** Flower containing orange, yellow, red, pink, and multicolor

**Odour:-** smell like pure air, and some other varieties of hibiscus have mild smells like sweet, tropical, floral, and tart fragrance

**Taste:-** cranberry-like and sweet, with earthy notes in overall taste.

**Size:-** 8-to-16 feet tall and 5-to-10 feet wide,

**Shape:-** The flowers are large, conspicuous, trumpet-shaped

**Chemical constituents:-** Tannins, Anthraquinones, Quinines, Phenols, Flavonoides, Alkaloids, Quercetin, Isoquercitrin,

**Uses:-** Hair growth, prevent hair loss, natural hair color, anti dandruff, hair smoothing, Hair volume, hair shine.

#### 2) Shikakkai:-



*Figure- Shikakkai*

**Botanical name:-**Acacia Concinna

**Biological source:-** It is the dried gummy exudation of stem and branches of Acacia Arabica.

**Family-** Leguminosae. **Microscopic**

**characters:- Color-** dark brow

**Taste-** Bitter taste and a pungent flavor when digested.

**Chemical constituents-** Lupeol, spinasterol, acacic acid, lactone, and the natural sugars glucose, arabinose and rhamnose. It also contains hexacosanol, spinasterone, oxalic acid, tartaric acid, citric acid, succinic acid, ascorbic acid, and the alkaloids calyctomine and nicotine.

**Uses:-** Restrains Hair Loss - By preventing infections, lice, dandruff, follicle clogging, and itching, Shikakai restores the scalp health and boosts hair growth. Shikakai has cooling properties that help to ease an irritated scalp. Also, Shikakai encourages sebum production, which can help to moisturize a dry scalp.

**3) Aloe vera:-**



*Figure- Aloe vera*

**Botanical name:-** Aloe Barbadensis

**Biological source:-** Aloe is the dried juice collected by incision, from the bases of the leaves of various species of Aloe. Aloe perryi Baker, Aloe vera Linn or Aloe barbadensis Mil and Aloe ferox Miller.

**Family:-**Liliaceae. Microscopic

characters:-

**Color-** depends upon variety dark brown, brownish black or black.

**Odour-** characteristic

**Taste-** Intensely bitter and nauseating.

**Size-** Masses of various size.

**Chemical constituents:-** Small quantities of aloe-emodin are sometimes present in aloes, and Cape aloes also contains aloinosides A and B, which are O-glycosides of barbaloin. In South African spp. (e.g. *A. ferox*) aloesin (now often referred to as aloeresin B) was identified. Other isolated from Cape aloes include aloeresin A and C. Aloenin A was isolated from *A. arborescens* leaves. Aloenin B has now been obtained from Kenya aloes.

**Uses:-** Reduces Dandruff: Aloe vera has properties that can reduce dandruff, keeping your scalp clean and healthy. Strengthens Hair: Using aloe vera regularly can make your hair stronger and less likely to break. Balances pH Levels: Aloe vera helps to balance the pH levels of your scalp, which is important for healthy hair.

**4) Henna:-**



*Figure- Henna*

**Botanical name:-** Lawsonia inermis.



**Biological source:-**henna tree,(*Lawsonia inermis*),tropical shrub or small tree of the loosestrife native to northern Africa, Asia, and Australia.

**Family:-** Lythraceae **Microscopic**

**character:- Color-** Green

**Odour-** bitter and chracteristic **Shape-** oblong

lanceolate **Taste-** Lavana, Kashaya

**Chemical constituents:-** Henna leaves are rich in a naphthoquinone compound, a dyemolecule, lawsone, in addition to gallic acid, mucilage, and traces of alkaloids.

**Uses:-** Henna promotes hair growth, Fixes damaged hair, Deep cleans, deep conditions, Fights dandruff and flakiness, Ideal for allergy sufferers, pH balancing.

**5) Neem:-**



*Figure- Neem*

**Botanical name:-** *Azadirachta Indica*.

**Biological source:-** Neem consists of fresh or dried leaves and seed oil of *Azadirachta Indica*.

**Family:-** Meliaceae.

**Macroscopical character:- Color-** Yellow

**Odour-** characteristic

**Taste-** Bitter and sour

**Chemical constituents:-** Various parts of plant is used for various therapeutic and commercial purposes due to presence of different types of chemicals in different parts of this plant. Some of them being:

- leaves: quercetin, nimbosterol, nimbin.
- Flowers: nimbosterol, kaempferol, melicitrin.
- Bark: nimbin, nimbidin, nimbosterol, margosine.

- Seed: azadirachtin, azadiradione, nimbin, vepinin, vilasinin, fraxinellone.

**Uses:-** Washing hair with neem water, applying a neem leaf pack to your scalp, Massaging your scalp with neem oil, mixing neem powder with yogurt and applying it to your hair, using neem in hair juices, pastes, and rinse extracts, using neem in shampoos.

### Material and Method

**Plant materials:** Six medicinal plants were selected for antidandruff studies namely *Albizia amara* (Mimosaceae), *Achyranthes aspera* (Amaranthaceae), *Cassia fistula* (Caesalpiniaceae), *Cassia auriculata* (Caesalpiniaceae), *Datura stramonium* (Solonaceae) and *Azadirachta indica* (Meliaceae). The plant specimen were Collected from medicinal garden of Anna University of Technology and authenticated and identified by Botanical Survey of India, Coimbatore<sup>[19]</sup>.

**Isolation of culture:** In the clinical study the organism was isolated from scalp of person suffering from Dandruff and maintained on Sabouraud's media (which is a defined selective media for medically significant fungi and inhibits growth of normal flora) slants and stored in refrigerator at 40°C for one month<sup>[20,21]</sup>.

**Agar Cup Method:** Agar Cup method was performed to check the antifungal activities of shampoos. Dixon's media was used to prepare plates. Two days prior inoculated culture of *Malassezia* species in Dixon's broth was maintained to be used for this assay. 500 µL of culture suspension was spread on the petri plates. Each plate contained a well of 0.6 cm in diameter in which 100 µL of 100% concentrations of different shampoos, natural extracts, oils and lotion were added using a micro-pipette. Experiments were done in duplicates with suitable controls<sup>[21,22]</sup>

**Minimum Inhibitory Concentration (MIC):** MIC was performed in Dixon's agar plates by agar cup method. 24 h active culture of the test organisms were used for this study. The culture of *Malassezia* in Dixon's broth was used for inoculation and incubated at 30°C for 24 h. The same protocol was followed as mentioned above. The concentrations to check the MIC for a given sample used were 2.5%, 5%, 10%, 15%, 20%, 25%, 50%, 75% and 100% (v/v). The dilutions were done using sterile distilled water. Experiments were performed in duplicates with suitable controls<sup>[23,24]</sup>.

### Evaluation Parameters

**Appearance:-** The prepared product's clarity, colour, odour, and foaming capacity were assess.

**Foaming stability:-** After shaking for one minute, the total volume of foam was measured. The foam's volume is merely calculated. The amount of foam shake was measured immediately after shaking and every minute thereafter for four minutes.

**PH:-** Take some PH paper, and set it down on a white tile. Using a clean pipette, drop a sample onto the PH paper. Pay attention to the PH paper's colour. now Make a note of the PH value and compare the colour obtained on the PH paper to another shade of the standard colour PH card.

**Percentage of solids:-** A clean, dry evaporating dish containing 4 grammes of shampoo was used for the experiment. To ensure the precise weight of the shampoos, they were weighed once again. The liquid part of the shampoo was evaporated in an evaporating dish on a hot plate. The weight percentage was then calculated.

**Skin irritation:-** Applying a small bit of shampoo to the skin can reveal whether or not irritates the skin. Check for any localised inflammation or irritation after a short while.

**Visual examination and physical appearance:-** Clarity, colour, and odour of developed formulations were assessed. There were reports and discussions of every evaluation. Ph measurement A 10% concentration sample was prepared by diluting the developed formulation with distilled water. A digital pH metre was used to measure the pH of the prepared sample at 302°C room temperature. Calculating the percentage of solids contained Weighing a piece of dry, clean China, we added 4 grammes of shampoo. The shampoo-filled dish was weighed.

The shampoo's precise weight was determined. Until the liquid component of the shampoo had evaporated, the China dish with shampoo was placed on the hot plate. After drying, the weight was calculated.

**Calculating the percentage of solids contained:-**Weighing a piece of dry, clean China, we added 4 grammes of shampoo. The shampoo-filled dish was weighed. The shampoo's precise weight was determined. Until the liquid component of the shampoo had evaporated, the China dish with shampoo was placed on the hot plate. After drying, the weight was calculated.

**Viscosity measurement:-**Using the Brookfield Viscometer LVDV Prime-I, the viscosity of the shampoo was ascertained. At room temperature, or 30°C, the viscosity of shampoo was measured using various rpm and torque.

**Measurement of surface tension:-**Shampoo should be diluted with distilled water to a 10% concentration. Stalagmometer was used to take measurements. Stalagmometer's flat end should be dipped into a beaker of samples.

**Surface tension calculation:-**Shampoo should be diluted with distilled water to a 10% concentration. Stalagmometer was used to take measurements. Dip Suck developed shampoo samples into a beaker using the flattened end of the stalagmometer until the level reaches the desired level mark. At the stand, correct it, and let the sample run slowly in the target. Count how many droplets were produced when the level of A to B is reached via fluids. Try it once more with distilled water. The following equation was used to calculate the data.

W1 is the beaker's empty weight. With distilled water, a beaker's weight is W2. Weight of beaker containing shampoo solution is W3.

N1 is the number of distilled water droplets.

**Stability of foam and its capacity to foam:-**For testing foaming ability, a slightly modified

version of the cylinder shake method was utilised. A 250 ml graduated measuring cylinder was filled with 50 ml of the 1% shampoo solution, and the cylinder was then hand-covered. For one minute, the measuring cylinder was shaken. The complete amount of After shaking for one minute, the foam's contents were noted. Five minutes of the procedure were spent in progress.

**Conclusion:-** This study states that it is necessary to develop a stable and effective herbal shampoo without the use of synthetic chemicals. The main purpose of this study was to develop a stable, functionally effective shampoo. The purpose of this study was to make an herbal shampoo that gives hair a smooth and smooth effect and is safer than chemical conditioning agents. In this review we are studied about the different herbs which are traditionally used in anti dandruff shampoo.

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