

# Preparation And Evaluation of Poly-Herbal Shampoo

Girdhar Prasad Chakradhari<sup>1</sup>, Tilotma Sahu<sup>2</sup>, Devid Patel<sup>1</sup>, Kamlesh Kushwaha<sup>1</sup>

<sup>1</sup>Rungta Institute of Pharmaceutical Sciences and Research, Bhilai, India.

<sup>2</sup>Rungta Institute of Pharmaceutical Sciences, Bhilai, India.

Corresponding Author: [tilu06sahu@gmail.com](mailto:tilu06sahu@gmail.com)

**Abstract**— Polyherbal shampoos, formulated with a blend of diverse botanical extracts, have gained prominence in the realm of hair care. Shampoos are mostly used as cosmetic products; they are hair care products that are used for cleaning, beautifying, and managing hair in our daily lives. There are many plants or herbal ingredients utilized for shampoo, like Neem leaves, ritha, shikakai, amla, lauryl glucoside, aloe vera, lemon juice, rice water and gelatin etc. Shampoos are classified according to their activities, such as based on appearance, which includes powder shampoo, liquid shampoo, etc., and based on function, which includes conditioning shampoo, anti-dandruff shampoo, etc. Shampoos are viscous solutions of detergents containing suitable additives, preservatives, and active ingredients. Some plants show their activities, such as *Salvia hispanica*, which is used to reduce hair fall and enhance new hair growth; *Prunus dulcis*, which provides strength to hair and stimulates follicles; and *Centella Asiatica L.*, which boosts hair growth. The purpose of this study is to formulate and evaluate pure herbal shampoo because synthetic shampoo may have various harmful effects on the hair and scalp. The benefits of herbal cosmetics, which have negligible side effects, reduce allergic reactions, and have no more chemicals added.

**Index Terms**— Poly-herbal shampoo, anti-dandruff, TLC, *Salvia hispanica*.

## 1. Introduction

Shampoos are most probably used as cosmetics. It is a hair care product that is used for cleaning scalp and hair in our daily life. Shampoos are most likely utilized as beautifying agents and are a viscous solution of detergents containing suitable additives, preservatives and active ingredients. It is usually applied on wet hair, massaging into the hair, and cleansed by rinsing with water. The purpose of using shampoo is to remove dirt that is build up on the hair without stripping out much of the sebum. Many synthetic shampoos are present in the current market both medicated and non-medicated, however, herbal shampoo popularized due to natural origin which is safer, increases consumer demand and free from side effects.

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. Alternative to synthetic shampoo we can use shampoos containing natural herbals. However, formulating cosmetic products containing only natural substances are very difficult. 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. These medicinal plants may be used in extracts form, their powdered form, crude form, or their derivatives. To develop a shampoo containing an only one natural substance which would be safer with milder effect, then the synthetic shampoo is difficult and also it should possess good foaming, detergency, and solid content as such synthetic shampoo. Hence, we considered in detailing an unadulterated natural cleanser utilizing conventional technique using regularly utilized plant material for hair washing.

A shampoo is basically a solution of a detergent containing suitable additives for other benefits such as hair conditioning enhancement, lubrication, medication etc. Now-a-days many synthetic, herbal, medicated and non-medicated shampoos are available in the market but popularity of herbal shampoo among consumers is on rise because of their belief that these products being of natural origin are safe and free from side effects. Synthetic surfactants are added to shampoo primarily for the foaming and cleansing action but their regular use leads to dryness of hairs, hair loss, irritation to scalp and eyes. Herbal formulations are considered as alternative to synthetic shampoo but formulating cosmetics using completely natural raw material is a difficult task. There are large numbers of medicinal plants which are reported to have beneficial effects on hair and are commonly used in formulation of shampoo. These plant products may be used in their powdered form, crude form, purified extracts, or derivative form. It is extremely difficult to prepare a herbal shampoo using a single natural material that would be milder and safer than the synthetic ones, and at the same time would compete favorably with its foaming, detergency and solid content. We, therefore, considered to formulate a pure herbal shampoo using traditionally and commonly used plant materials for hair washing in India and gulf region especially.

The Greek word cosmetics, meaning “cosmesis” or “beautifying substance,” is where the word cosmetic originates.

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Chemicals called cosmetics are applied to the human body to improve its look. Both developed and developing nations have high demand for cosmetics, which include skin-care creams, lotions, powders, perfumes, lipsticks, fingernail and toe nail polish, eye and facial makeup, permanent waves, colored contact lenses, hair colors, hair sprays and gels, deodorants, baby products, bath oils, bubble baths, bath salts, varieties of butter, and many other products. The global market for herbal cosmetics is expanding, and these products are a priceless gift from nature. You can fulfill your beauty regimen with a variety of herbal cosmetic products, and using herbal cosmetics is extremely safe for your skin and hair. The use of natural resources, including plants, has decreased with the advancement of science and technology, with the exception of food; vegetarians consume only plants. Humans have long used herbs for a variety of purposes, including food, medicine, and beatification. Nonetheless, the use of herbs as medications and cosmetics is on the rise.

The current study's goal is to create and assess a multipurpose herbal shampoo by removing all conventionally added synthetic components and using a variety of herbs. This shampoo strengthens, darkens, and encourages hair growth while getting rid of dandruff, sebum, and impurities. Additionally, it serves as a conditioning agent. All of these functions are carried out by this herbal shampoo powder without harming or compromising hair.

Herbal shampoos meet the consistency requirements and can be classified as nourishing, antimicrobial, or plain shampoo based on the makeup of the components. Including hydrolyzed proteins, vitamins, and amino acids. The potential of an ingredient to cleanse, nourish, and protect the skin while preventing damage to it is taken into consideration when choosing active ingredients for hair care powders. To improve the stability and safety of a shampoo's composition, some of these compounds must be added. Herbal shampoo is a form of skin cleanser; nonetheless, shampoo refers to a single category of preparations used for hair cleansing.

Hair is an external indicator of internal body conditions. It is an essential component of the human body. Several synthetic compounds, chemicals, dyes, and their derivatives have been shown to be harmful. People are becoming more aware of their effects on their hair, skin, and eyes. Because of these factors, the community is becoming more interested in herbal products due to their low cost and negligible side effects. Synthetic agents have taken a large share over time, but people are becoming more aware of their harmful effects on hair, skin, and eyes. Herbal products, which are less expensive and have negligible side effects, draw people from these areas to the community. The active ingredients used in hair care powders.

Many chemical compounds found in plants carry out biological tasks, such as defense against herbivorous animals, fungi, insects, and mammals. A common scalp condition that affects people of all ages, genders, and ethnicities in their post pubertal years is dandruff. It itch quite a bit. It is commonly known that during the development of dandruff, keratinocytes are essential for the expression and induction of immune

responses. Dandruff can vary in severity depending on the season, usually getting worse in the winter. Specialty shampoos are effective in treating the majority of dandruff cases, Dandruff sufferers. Discover that it can lead to social or self-esteem issues, indicating the need for treatment for both physiological and psychological issues.

## 2. Classification Of Shampoo

### A. Powder Shampoo:

Herbal shampoos are cosmetic preparations that involve the use of traditional Ayurveda herbs to clean the scalp and the hair. It is an excellent natural cleanser and conditioner and adds shine and softness to hair. It prevents hair loss, boosts hair growth, controls dandruff, soothes your head, and prevents a dry scalp. Gives you stronger, thicker hair.

### B. Liquid Shampoo:

This shampoo is a soapy liquid that you use to wash your hair. A shampoo is a hair care product used to clean the scalp and hair. It has a liquid consistency and is normally applied to wet scalps and hair. Liquid hair shampoo produces a lather when massaged into the scalp, which helps in the removal of dirt, oil, and product buildup from the hair.

### C. Gel Shampoo:

Gel shampoo is used to treat scaly, itchy skin conditions affecting the scalp, such as psoriasis, seborrheic dermatitis, or dandruff. Inactive ingredients: water, sodium laureth sulfate, polysorbate 20, cocamidopropylbetaine, DMDM, hydantoin tetrasodium EDTA, PEG-200 methyl glucose dioleate, cocamide MEA, citric acid, sodium chloride, and triethanolamine.

### D. Oil Shampoo:

Oil shampoo is a moisturizing shampoo with a rich, creamy lather and refreshing floral fragrance. Enriched with natural ingredients like aloe vera and argan oil, the shampoo boosts moisturization, shine, and reduces frizz. Oilbased shampoos and conditioners contain natural oils, such as argan oil, coconut oil, and olive oil, and other essential ingredients like vitamin E and antioxidants. These ingredients work together to nourish and hydrate your hair while strengthening and protecting it from damage.

### E. Conditioning Shampoo:

A conditioning shampoo retains all the features of a normal shampoo, which are to clean the hair by removing dust, dirt, and pollutants, but also has other ingredients of a conditioner that help to make hair softer and more manageable than one finds after using a normal shampoo. Along with gentle cleaning of the hair to remove dirt, based on appearance conditioning shampoos condition the hair to keep it shiny and flexible. Conditioning shampoos have proved to be extremely good for dry hair as they add to the natural oil supply and give dry hair shine as well as strength.

#### F. *Anti-dandruff Shampoo:*

Anti-dandruff shampoos work by killing the fungus that causes dandruff. They usually contain ingredients like ketoconazole, selenium sulfide, or zinc pyrithione, which are all antifungal agents. These ingredients work to kill the fungus and prevent it from coming back. Antidandruff shampoos.

Shampoos with antidandruff activity are commonly used to treat dandruff, a scalp disorder caused by the lipophilic *Malassezia* yeasts, which can be suppressed by different antidandruff agents, mostly pyrithione zinc.

#### G. *Body Shampoo:*

Total Body Shampoo is a protein-enriched, conditioning hair and body wash formulated to soothe and moisturize hair and skin. Its abundant lather and gentle cleansing action are gentle enough to use every day, and it gently cleanses to keep skin soft and smooth.

#### H. *Clarifying Shampoo:*

Clarifying shampoo is a hair care product that deeply cleanses the hair. It is formulated with unique ingredients designed to remove impurities, oil, dirt, product buildup, and other residues from the scalp and hair shaft.

#### I. *Ideal Properties of Poly-Herbal Shampoo*

- Dust or soil, too much sebum or other fatty substances, and loose corneal cells from the hair should all be fully and properly removed.
- It should generate a sufficient amount of foam to meet the user's psychological needs.
- It should leave the hair at the very least non-dry, soft, and shiny with good manageability. Fly off.
- It should give the hair a pleasant fragrance

#### J. *Advantages Of Poly-Herbal Shampoo*

- Cleansing properties, improving hair hygiene.
- Treating scalp conditions, Treatment for dry scalp.
- Treatment for hair loss.
- Relieves itch and irritation.
- Repairs damaged hair and keeps hair silky or smooth.
- Keeps your hair beautiful and blossomed.

#### K. *Properties Of Poly-Herbal Shampoo*

A healthy sheen, but when applied excessively, it gives the hair an unclean appearance. Should entirely and successfully remove the excess sebum and dust. It is important to wash hair properly.

- Should generate a substantial amount of foam.
- Rinsing with water should make it easy to remove the shampoo.
- Should result in non-dry, silky, shiny hair that is manageable.
- Should give the hair a pleasing scent.
- The hand shouldn't become rough or chapped.
- Shouldn't irritate the skin or eyes or cause any side effects.

- To give the hair a glossy, smooth finish.
- Create a sizable volume of foam.
- Must not irritate the skin, eyes, or scalp.
- Needs to eliminate dirt entirely and efficiently
- Give an attractive fragrance.

#### L. *Function Of Poly-Shampoo*

- The dirt or soil should be removed completely and effectively.
- The hair should be thoroughly cleaned.
- It must generate enough foam to meet the user's needs.
- Rinsing with water should be an easy way to get rid of it.
- It ought to give the hair a pleasing scent.
- It shouldn't irritate the skin or eyes or have any negative effects.
- It ought to remove dirt or soil completely and effectively.
- It ought to wash the hair thoroughly.

#### M. *Problems Related to Hairs:*

- Dandruff
- Dry hair
- Split ends
- Oily hair
- Hair loss
- Heat damage
- Colour damage

### 3. Plant Profile

#### A. *Amla:*

Biological source: -It is fresh or dried leaf of plant of *Phyllanthusemblica* L.

Family: -Euphorbiaceae

Uses: -Anti-oxidant, anti-fungal, and anti-bacterial properties that protect the scalp and hair from different microbial infections.



Fig.1. Amla

#### B. *Fenugreek seed:*

Biological source: -Fenugreek, (*Trigonellafoenum-graecum*), fragrant herb of the pea

Family: -Fabaceae.



Uses: - Improve the scalp's health, and encourage hair growth.



Fig.2. Fenugreek

*C. Rice water:*

Biological source: -Starch consists of polysaccharide granules obtained from the grains of *Oryza sativa* Linn f

Family: -solanaceae. Constituents: - Rice grain constitutes 12% water, 75%–80% starch and only 7% protein with a full complement of amino acids.

Uses: -Makes fine or dull hair stronger and shinier, while curly hair benefits from all the elasticity (bounce) it gives. And promote the hair growth.



Fig.3. Rice water

*D. Reetha*

Biological source: -It is dried fruit of plant of *Sapindus mukorossi*.

Family: -Sapindaceae.

Uses: -Reetha makes hair shiny, healthy and lustrous.



Fig.4. Reetha

*E. Shikakai*

Biological source: -Dried pod of *Acacia concinna*

Family: -Mimosaceae

Uses: -cleaning agent, foam base and anti-dandruff.



Fig.5. Shikakai

*F. Neem:*

Biological name: -*Azadirachta indica*

Family: -Meliaceae

Uses: - Cleanses and strengthens hair follicles, and promotes hair growth.



Fig.6. Neem

*G. Lemon Juice:*

Biological name: - *Citrus limon*

Family: -Rutaceae

Uses: - Remove excessive oil, eliminate unwanted build-up.



Fig.7. Lemon Juice

#### H. Onion Juice:

Biological name- Allium Cepa L.

Family- Amarylidaceae

Uses- Strong and thick hair, promoting hair growth.



Fig.8. Onion Juice

#### 4. Material And Methods

- Collection: -Collect the all required polyhedral plant from Surrounding and from local market. And part of the plant is dried and afterward crushed. The process of drying is carried out for 4 to 5 days.
- Drying: - Before drying process wash all the plant material. All the expected powder.
- Weighting: -All the required powder for the formulation were accurately weighted.
- Size Decrease: - The size decrease was finished by Likewise Handd blender. Likewise, Handd blender was utilized for more unbending fixings.
- Sieving: -Sieving is likewise essential move toward take out coarse particles. Sieve no 90 was utilized to get the necessary fine powder.

Table.1. Ingredients

S.no.	Ingredients	Quantity (ml)	Use
1.	Reetha Extract	20.5	Foaming agent
2.	Neem Extract	12.6	Antibacterial
3.	Aloevera extract	15	Moisturizing agent
4.	Lemon Juice	2.4	Preservative
5.	Shikakai Extract	4.8	Clean the scalp
6.	Rice water	Q.S	Strengthen the hair
7.	Gelatin	Q.S.	Smooth the hair
8.	De-ionized water	Q.S.	Vehicle
9.	Amla Extract	15.3	Nourishment to hair
10.	Perfume	Q.S.	Flavoring agent

#### A. Procedure:

- Weigh all the ingredients accurately.
- Decoction of rettha, neem, aloevera, shikakai, lemon juice, rice water.
- Mixed the above filtrate with constant stirring.
- Preservatives and perfumes were added at lastly.

#### 5. Result And Discussion

The current research aims to effectively create an herbal hair shampoo using traditional herbal extracts known for their hair cleansing properties in India. All the components utilized in crafting this herbal shampoo are deemed safer in comparison to commercially available products. The characterization of the herbal shampoo demonstrated favorable outcomes. Further investigations are needed to enhance the stringent quality assessment of the product, particularly through animal testing, and to evaluate its performance under various conditioning conditions. As seen from the results, it is possible to formulate synthetic additives, which are normally incorporated in such formulations. Numerous tests were conducted to assess the effectiveness of the prepared shampoo. The outcomes of the evaluation of the newly formulated shampoo indicated similar in terms of quality control assessment. However, additional scientific confirmation is required to verify its overall quality.

#### A. Evaluation Parameter of Shampoo:

##### 1) Determination of pH: -

At 27 degree temperature combine 01g of shampoo with 9 ml of water, then use a ph meter to measure the ph. It evaluated by means of ph analyzer at room temperature.

##### 2) Physical appearance:

The prepared formulations were assessed for fluidity, clarity, and capacity to produce foam.

##### 3) Determination Percentage of solid content:

Weighing an evaporating dish that was dry and clean, we added 4g of shampoo to it. Weighed were the dish and shampoo. Once the precise weight of the shampoo was determined, the liquid portion was allowed to evaporate by placing the evaporating dish containing the shampoo on a hot plate. After drying weight of the shampoo alone was determined.

##### 4) Rheological Evaluation:

A Brookfield viscometer was used to measure the shampoos viscosity. After dipping a spindle for approximately five minutes in a beaker containing ten millimeters of shampoo, readings are taken.

##### 5) Dirt Dispersion:

10 ml of distilled water were placed in a large test tube, and two drops of shampoo were added. After adding one drop of India ink, the test tube was stopped and shaken ten times None, light moderate, or heavy were the estimated amounts of ink in the foam.

##### 6) Cleansing action:

Crease was applied to 5gm of albino mouse, which was then submerged in 200 millimeters of water in a flask containing 1 gram of soap. The water's temperature was kept at 350 degree.

For four minutes, the flask was shaken fifty times per minute. After removing the solution, the sample was removed, dried and weighed. The following formula was used to determine the amount of grease removed DP is equal to  $100(1/T/C)$ . Where, T is the weight of sebum in the test sample, is the weight of sebum in the control sample, and DP is the percentage of detergency power.

7) *Surface tension measurement:*

A stalagmometer was used at room temperature to measure the surface tension of the shampoo that had been prepared in 10% w/v distilled water.

8) *Foaming ability and stability:*

The cylinder shake method was employed to assess foaming capacity. A 250ml graduated cylinder was filled with 50ml of the 1% shampoo solution, covered with a hand, and shaken ten times. Following a minute of shaking the total volumes of the foam contents were noted. Only the foam volume was computed. The volume of foam was shaken for four minutes, recording each minute after that.

9) *Stability studies:*

The cylinder shake method was utilized to ascertain the stability of the foam. A graduated 250ml cylinder was filled with approximately 50ml of the 1% solution for shampoo, and it was vigorously shaken ten times. By measuring the foam volume of the shake test after one minute and four minutes, respectively, foam stability was determined. The entire volume of foam was measured following a minute of shaking.

10) *Wetting time:*

By keeping track of how long it took the canvas paper to fully sink, the wetting time was computed. An inch diameter disc made of 0.42 g of canvas paper was cut into pieces. The canvas paper disc was placed over the shampoo surface, and the stopwatch was used to time how long it took the paper to sink.

11) *Skin irritation test:*

Arranged natural cleanser was applied on skin for 5 minutes after that was washed and tried for bothering or aggravation to the skin.

12) *Conditioning performance:*

An artificial hair tress of Indian women was received from a salon and divided into two swatches of length 10cm approximately, weighing 5g. The control swatch was the one without washing and the test swatch using the formulated shampoo was washed with. Each tress was added for 2 min to the combination of shampoo in water in the proportion 10:15 taken in a conical flask and washed using 50 ml of distilled water. Each tress was air dried at room temperature and the procedure was repeated for maximum of 10 times. The conditioning effected of the prepared shampoo in terms of softness and smoothness as determined using a blind touch test using volunteers of student 20 numbers selected randomly. All the students were blind folded and asked to touch and rate the four tresses for conditioning performance from score 1 to 4.

13) *Detergency ability:*

The Thompson method was used to evaluate the detergency ability of the samples.

Briefly, a crumple of hair was washed with a 5% laurel glucoside solution, then dried and divided into 3g weight groups. The samples were suspended in a hexane solution containing 10% artificial sebum and the mixture was shaken for 15 min at room temperature. Then samples were removed, the solvent was evaporated at room temperature and their sebum content determined. Finally, the percentage of detergency power was calculated using following equation  $DP=100(1/T/C)$  in which DP is the percentage of detergency power, C is the weight of sebum of the control sample and T is the weight of sebum in the test sample.

14) *Anti-Microbial Assay:*

Values are mean for four imitates Microbiological appraisal of Cleanser Assessment of the nature of the cleanser at microbiological level was finished to affirm the sufficiency of the non-expansion of additive to the cleanser to decide how long the cleanser tests would be really great for use according to a microbiological perspective, Francis and Boniface, (2017). Toward the finish of every week after week timespan accomplished for quite some time, there was no proof of microorganisms or parasites development on the way of life packs from the two examples. It very well may be inferred that the cleanser isn't auspicious to the development of growths and microorganisms.

## 6. Conclusion

Preparation and evaluation of poly-herbal shampoo is a complex process that requires careful consideration of various factors, such as the selection of plant or herbal ingredients required for formulation, their extraction method, and the evaluation of the end or final product for its safety and efficacy. The use of herbal ingredients or plants in shampoo formulation offers potential benefits such as improved hair health, reduced environmental impact, inhibited hair fall, and a boost to new hair growth. However, it is important to conduct testing and evaluation to ensure the safety and effectiveness of the product. Overall, the estimation and assessment of herbal shampoo is an important area for research that has the potential to offer consumers a more natural and sustainable hair care option.

The aim of the current study was to develop an herbal shampoo that improves the growth of hair while minimizing hair loss and combing it is safer than chemical conditioning agents. In addition to being safer than chemical conditioning agents, the shampoo formulation also significantly reduced hair loss during combing and strengthened hair growth. The pH of the shampoo was adjusted to maintained the acidic mental of the scalp, and a physiochemical approach was used for formulation preservation to avoid the risk posed by chemical preservatives. Poly-herbal shampoo will be more effective and safer than synthetic shampoo, and it will be well-liked by consumers. There are many plants or herbal ingredients utilized for shampoo, like Neem leaves, ritha, shikakai, amla, lauryl glucoside, aloe vera, lemon juice, rice water and gelatin etc. that to provide the conditioning benefits.



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