International Journal of Pharmaceutical Drug Design (IJPDD)
Website: https://ijpdd.org/
ISSN: 2584-2897
Vol. 2, Issue 5, May, 2025
Page No.: 162-168

Review

Formulation and Evaluation of Herbal Dry Shampoo

Vishal Rana[1], Abhishek Karan[2*], Mohit Gupta[3]

[1,2]Scholar, School of Pharmacy and Research, DBUU, Dehradun

[3]Associate professor, school of Pharmacy and Research, DBUU, Dehradun

Corresponding Author:
Abhishek Karan

Email:
abhishekkaran1111@gmail.com

DOI: *10.62896/ijpdd.2.5.18*

Conflict of interest: *NIL*

Article History
Received: 12/04/2025
Accepted: 04/05/2025
Published: 26/05/2025

Abstract:
Herbal Dry Shampoo is the answer to an innovative hair-care product that cleans and refreshes hair without water application. Unlike the usual shampoo, it takes care of absorbing unnecessary grease, removing impurities, and improving hair structure with natural active ingredients of plant origin between two washes. it is either a scalp soother or a nourishment provider to hair or a dandruff controller. This earth-friendly alternative will be just right for people who prefer natural, chemical-free hair care to promote better hair and scalp, sans the harshness of sulfates, parabens, and artificial fragrances. The herbal elements clean but also contribute to overall health to the scalp, and that makes the herbal dry shampoo right for sensitive skin or for those who want to save water. In that vein, plant-based dry shampoos started to get popular due to consumer interesting sustainable beauty products that make lives easier and are good for the environment, adoptinga minimalist approach toward hair care. Other studies have also been done on herbal dry shampoo preparations to enhance their effectiveness, odor retention, compatibility with hair types, and adherence to natural and organic ingredients. Herbal shampoo: The stability parameters based on the nature of ingredients used may be simple or simple, antiseptic or antidandruff. In the present work, a hair shampoo powder was prepared using traditional hair care medicines. It used Shikakai, Heena, Reetha, Tulsi, and Neem for formulation.
Preparation was then evaluated for organoleptic properties, powder characteristics, foam test, and physical evaluation. Some ingredients of vegetable origin allowed to get a very effective dry shampoo. Laboratory-scale formulation was conducted and evaluated for a number of parameters in order to ensure its safety and efficacy.

Keywords: Herbal shampoo, shikakai, evaluation, effectiveness.

INRODUCTION

Hair is an important component of human beauty. Human beings have used herbs to clean, beautify and manage hair since ancient times. During the course of time, agents synthetic took most of the share, but today people are aware of their injurious effects on hair, skin and eyes. It is these regions that attract the community towards vegetable products, which is affordable and has negligible side effects. Clean hair or shampoo not just for cleaning purposes but to give that shine to the hair also and to preserve its own maneuverability along with its fat. Shampoo powder, shampoo transparent liquid, shampoo liquid, shampoo in lotion, shampoo in solid gel, shampoo medication, shampoo vegetable juice etc.

Regarding herbal shampoo, the stability criteria are as follows: second the nature of ingredients,it can be simple shampoo or not, anti-dandruff antiseptic or gel preparations.The consistency of the preparation depends on the inclusion of traditional soaps saturated with diglycerides and natural or synthetic fatty alcohols or thickening agents (eg. gum, resin and PEG).

Indian Women use medicinal plants such as shikkakai and reetha, which are natural cleansing agents without harmful effects. The hair is one of the barometers of external conditions on the inside of the body. Shampoo is the most common hair treatment. The main function of shampoo is to clean hair because of accumulation of Serum, dust, loss of head etc. Various shampoo formulas in terms of hair quality hair care habits, nonspecific problems like oily hair treatment, dandruff and androgenic alopecia. The shampoos are prepared liquids, creamy or frozen. The consistency of Preparation

depends on the inclusion of traditional soaps, saturated glycerides, and fatty alcohols, natural or synthetics or agents thickeners (eg rubber, resin, and PEG).Indian women use medicinal plants as well as shikkakai and geetha, which are agents of natural cleaner without harmful effects. shampoo is a preparation of a surfactant in a suitable form-liquid, solid or powder-which, when used in specific conditions, will eliminate the surface fat, soil, and debris skin of the hairs.

People have used herbs to clean, decorate, and manage hair since Antiquity. Over time, synthetic agents took a significant share of the market, but today people are increasingly aware of their harmful effects on hair, skin, and eyes. These regions attracted community.

ESSENTIAL CHARACTERSTICS OF SHAMPOO

- Must effectively eliminate dust and excess sebum.
- Must cleanse the hair thoroughly.
- Must generate a substantial amount of foam.
- Must rinse out easily with water.
- Must leave hair soft, lustrous, and manageable without any dryness.
- Must impart a pleasing fragrance to the hair.
- Must not cause roughness or chapping to the hands.
- Must be free from any side effects or irritation to the skin and eyes.

TYPES OF SHAMPOO:

Shampoos are of following types :

- Powder shampoo
- Liquid shampoo
- Lotion shampoo
- Cream shampoo
- Jelly shampoo
- Aerosol shampoo

PLANT PROFILE:

SHIKAKAI:

Shikakai also known as Acacia concinna, a resilient thorny shrub or tree, is known for its ability to spread and entwine with other plants. Its striking light gray bark adds to its unique appearance. The leaves of this remarkable plant are oblong, ranging from 4 to 10 mm in length, and feature 7 to 11 pairs of branches, each adorned with 17 to 37 pairs of leaflets.

On the other hand, Senegalia rugata has been a treasured secret for hair care in the Indian subcontinent for centuries. Esteemed in Ayurveda, this plant is celebrated for its medicinal properties. Shikakai, widely found across India, has long been revered as a natural hair cleanser. Many people fondly remember the rich brown paste their grandmothers would use, transforming hair care into a cherished ritual. This time-honored remedy provides a plethora of incredible benefits, making it an essential addition to any hair care regimen. Embrace these traditional practices and discover the secret to beautiful, healthy hair!

Biological Source- Dried pods of acacia concinna

Family- Mimosacwae

Uses- Foam base and Anti-dandruff

Chemical Constituents- Lupeol, spinasterol, acacic acid, lactone, and the natural sugars glucose, arabinose.

Shikakai

Shikakai's advantages include:

-Providing long-lasting color, and strengthening and fortifying hairs.

Avoid irritating the skin or scalp

- Avoid drying out; manage hair loss; and encourage quicker hair growth.

AMLA:

In Ayurveda, Indian gooseberry (Amla) holds a significant position. In ancient India, ambrosia, or divine nectar, was believed to encompass all races and grant immortality. Amla, along with Hareetaki, embodies the five rasas (tastes), reinforcing its status. As a "Rasayana," Amla is regarded for its anti-aging properties. Extensive research has confirmed almost all of its well-known benefits. Amla has demonstrated

strong anti-stress, immunomodulatory, and antioxidant properties. In addition to its medicinal uses, it also plays a vital role in traditional formulations for skin and hair care. Its cytoprotective functions have been thoroughly studied. According to Ayurveda, Amla is considered a natural blessing.

Synonym- Indian gooseberry, emblic myrobalans,
Biological Source- Dried ripe fruits of Embelica Officinalis
Chemical constituent- Ellagic Acid ,emblicanine A, emblacani,Gallic acid,Phyllatine.
Uses- Hair growth promoter

Amla advantages include:

- Amla protects the hair from external damage.
- Amla can lessen the loss of hair.
- A flaky scalp can be balanced with amla.
- Amla can increase the growth of hair.

Amla

NEEM:

Neem leaves offer numerous benefits, including strengthening hair follicles and reducing hair loss. As a result, you can achieve lustrous, strong, and healthy hair. By regularly using a neem hair mask or oil, you can attain long and thick hair with minimal effort.

Neem is a well-known medicinal herb appreciated for its antibacterial, anti-inflammatory, antioxidant, and restorative properties. This remarkable herb is rich in fatty acids, vitamins, and minerals essential for maintaining healthy skin and hair. Its key components—nimbidin, nimbolide, and azadirachtin—possess impressive therapeutic qualities that can help address various skin and hair issues.

Biological Source- Dried ripe fruits of Embelica officinalis
Chemical constituent- The active ingredients are Azadirachtin,salannin,Meliantriol
Uses- Hair growth promoter.
Been it is a antifungal properties that may within the help treatment of dandruff.

Benifits of neem:

- Neem are its ability to prevent premature graying.
- Heal dandruff and itchy scalps and encourage hair growth.

Neem

Heena :

Henna has also proven effective against early hair graying due to its content of tannins-a plant substance in teas which helps give them color. Henna is also very high in vitamin E, which makes it good for emolliency. It also contains protein as well as a variety of antioxidants beneficial for hair health.

Biological source-Dried leaves of Lawsonia inermis
Chemical constituent-The leaves contain soluble matter lawsone.

Following advantages of Heena:

- Heena encourages hair development.
- It combats flakiness and dandruff, and provides a natural fade.

Heena

BHRINGRAJ:

Haritaki, an ingredient in Bhringraj, helps restore the natural color of the hair and prevents the graying of hair. Bhringraj, which literally means "the ruler of hair," is an herbal medicine that is a rich reservoir of proteins, vitamins, and antioxidants to keep the body immune from various infections. Bhringraj oil is good for minimizing greying of hair and stimulating hair growth.

Synonym- Keshranjana, Keshraja, Markava, Bhunga
Family- Asteraceae
Biological source- It is obtained from entire herb Ecilipta- alba

Chemical Constituents- The principal constituents of Eclipta alba are Coumes Tan derivatives like wedoloacetone, demethylwedoloacetone.
Uses- Increasing haemoglobin level reducing.

Following advantages of Bhringraj:

- It encourages the growth of hair.
- It stops hair from turning gray too early.
- It enhances hair's shine.
- It can feed hair with nutrients and antioxidants.

Bhringraj

TULSI:

Tulsi, which is widely known as basil, is treated as a sacred plant in India: in fact, the name tulsi in Sanskrit means "the incomparable one." For centuries, tulsi has been looked upon as by far the most beneficial, holy, and amazing ayurvedic herb. Because of its remarkable medicinal qualities, tulsi is used in Ayurvedic remedies for the holistic treatment of the human body-from skin and beauty to health. It is an important medicinal plant in traditional medicine, particularly of India and Southeast Asia. First, let us get some facts about basil before considering its aesthetic charm and health benefits.
Basil varies in size and kinds. The groveling varieties found in India include Rama, Krishna, and Vana. Other kinds include Mediterranean basil, Thai sweet basil, cinnamon basil, lemon basil, etc. With 35 species growing around the world, it is a sacred herb for providing therapeutic assistance in over 300 diseases, which may explain its therapeutic qualities.

Biological source-Dried leaves of ocimum santu
Chemical constituents- rosmarinic acid, apigenin, myretenal, luteolin, β-sitosterol, and carnosic acid

Benefits of Tulsi:

- Tulsi is an ingredient in Thofa herbal shampoo that fights hair loss by strengthening and revitalizing hair follicles.
- Another useful remedy for dandruff is tulsi.
- It lessens dryness in the scalp and helps keep it hydrated.
- Tulsi promotes hair development by increasing blood flow.
- Tulsi is abundant in vitamins, minerals, electrolytes, and phytonutrients.

Tulsi

REETHA:

The plant known as Reetha, or soapnuts, is also referred to as Arishtak in Ayurveda and as the "soapnut tree" in India. It is widely used as a hair cleanser and plays a significant role in natural hair care products because it promotes lustrous, healthy, and shiny hair. Reetha can be used daily to nourish the scalp and encourage hair growth. To help control dandruff and eliminate lice due to its insecticidal properties, Reetha powder can be mixed with warm water to create a paste that can be massaged into the scalp.

Biological source-Dried fruits of Sapindusmukorossi
Uses - Detergent and antidandruff.
Chemical constituents-Present in Reetha are saponins,sugars and mucilage.

Benefits of Reetha include:

preventing dryness, promoting hair development, reducing dandruff, and giving hair a glossy, silky finish.

PREPARATION PROCEDURE OF HERBAL SHAMPOO POWDER

Following steps are followed in sequential manner for formulation of herbal shampoo powder:

Drying: All the herbal powders are in dry form and have been ground.

Weighing : Each required herbal powder for shampoo preparation was weighed individually.
Size reduction: The crude ingredients were collected and individually processed using a hand-driven mixer to reduce their size.
Mixing: All the fine ingredients were thoroughly mixed together by a mixer to form a homogeneous fine powder.
Sieving: Then this fine powder was passed through sieve no :80, to get the sufficient quantity of fine powder.
Packing and labeling: Subsequently, it was expertly packed and labeled to ensure safe handling and easy identification.

EVALUATION OF HERBAL SHAMPOO POWDER

The shampoo were evaluated based on the following parameters**:**

(I) Organoleptic Evaluation:
An organoleptic evaluation was conducted to assess the parameters of color, odor, taste, and texture. Color and texture were evaluated through visual assessment and touch, respectively. For the evaluation of taste and odor, a team of five individuals with heightened sensitivity to these qualities was formed, and random sampling was performed.

(II) General Powder Characteristics:
The general characteristics of the powder involve evaluating various parameters that influence its external properties, including flow behavior, appearance, and packaging requirements. This section assesses characteristics such as powder form, particle size, angle of repose, and bulk density. Samples for all these evaluations were collected from three different levels: the top, middle, and bottom.

1. Particle Size -
Particle size plays a crucial role in determining key properties like spreadability and grittiness. In this investigation, we utilized the sieving method with I.P. standard sieves, applying mechanical shaking for 10 minutes to accurately measure particle size. Understanding these measurements is essential for optimizing product performance.

2. Angle of Repose -
The angle of repose represents the steepest angle at which a pile of powder remains stable, forming a clear relationship with the horizontal plane. This measurement is vital for assessing the flowability and handling properties of powders, making it an essential consideration in product formulation and processing.

Funnel Method:
To determine the angle of repose, begin by placing a funnel at a height of 6 cm above a horizontal surface. Add the required quantity of dried powder into the funnel and allow it to flow out, forming a heap on a sheet of paper on the horizontal plane. Once the heap is formed, measure and record the height and radius of the heap. The angle of repose (θ) can then be calculated using the appropriate formula.
In an alternative method, take a cylindrical tube that is open at both ends and place it on a horizontal surface. Fill the tube with the required amount of dried powder. As the funnel is raised, the powder will form a heap. Again, note and record the height and radius of the heap to calculate the angle of repose (θ) using the formula.

$$\theta = \tan^{-1}(h / r)$$

Where,
θ – Angle of repose, h – height of the heap,
r – Radius of the base

3. Bulk Density:
Bulk density is defined as the ratio of the mass of a powder to its bulk volume. To determine bulk density, a specific amount of powder is dried and then placed into a 50 ml measuring cylinder, filling it to the 50 ml mark. The cylinder is then dropped onto a hardwood surface from a height of 1 inch at 2-second intervals. After each drop, the volume of the powder is measured, and its mass is recorded. This process is repeated to obtain average values. The bulk density is then calculated using the formula provided below.

Bulk density = mass of the herbal shampoo poweder/volume of the herbal powder shampoo

4. Tapped Density:
Tapped density refers to the bulk density of a powder sample that is achieved through mechanical tapping of a container. Initially, the volume or mass of the powder is measured. The measuring cylinder or vessel is then tapped mechanically for one minute, and the volume or mass is recorded at intervals until minimal further change is observed. Tapped density is expressed in grams per cubic centimeter (g/cm^3).

(III) Physicochemical evaluation:

1. Ph: The evaluation of a 10% shampoo solution in distilled water revealed its pH level at a comfortable room temperature of 25°C. This measurement was precisely conducted using a digital pH meter, ensuring accuracy and reliability in our findings. Understanding the pH of shampoo is crucial, as it

directly influences the product's effectiveness and compatibility with different hair types.

2. Washability:- Formulation was applied on the skin then ease and extend of washing with water were checked manually.

3. Solubility: Solubility is defined as the ability of a substance to dissolve in a solvent. To test solubility, accurately weigh 1 gram of the powder and transfer it into a beaker containing 100 ml of water. Shake the mixture well and warm it to enhance solubility. After warming, allow the mixture to cool and then filter it. Weigh the residue obtained and record the result.

4. Loss of Drying: Loss of drying refers to the loss of mass expressed as a percentage (% m/m). To determine this, two grams of powder were accurately weighed and transferred into a dry Petri dish. The dish was then placed in a desiccator containing calcium chloride crystals for two days. After this period, the powder was removed and weighed again to calculate the weight loss that occurred during the drying process.

(IV) Ash value:

Total Ash Content: The ash value is determined to assess the inorganic content that is characteristic of a particular herb. Approximately 2 grams of the powdered herb are placed in a pre-weighed, previously ignited silicon dish. The temperature is gradually increased without exceeding a glowing red color. Once the burning process is complete, the ash is allowed to cool and is then weighed.

(V) Dirt Dispersion:

In a large test tube containing 10 ml of distilled water, two drops of 1% shampoo powder were added. Then, one drop of Indian ink was introduced. The test tube was sealed and shaken ten times. The amount of ink present in the foam was assessed and categorized as None, Light, Moderate, or Heavy.

(VI) Moisture Content Determination:

A 10 g sample of each herbal shampoo powder was weighed and placed in a tare evaporating dish, then placed in a hot air oven set at 105°C. The drying process was repeated until a constant weight was achieved, with measurements taken at 30-minute intervals. The moisture content for each sample was then calculated.

(VII) Skin and Eye Irritation Test:

The skin and eye irritation tests demonstrated that the herbal shampoo powder has no harmful effects on either the skin or the eyes. This is attributed to the absence of synthetic surfactants, which often cause inflammation of the eyelid and corneal irritation. In this formulation of herbal shampoo powder, all ingredients are derived from natural sources. Therefore, it does not produce any harmful effects on the skin or eyes.

CONCLUSION:

Medicinal plants used in the formulation of herbal shampoos have been identified as a rich source of novel drugs. The plants studied include Bhringraj, Shikakai, Tulsi, Neem, Hibiscus flower, and Retha, all of which have been reported to promote hair growth and conditioning. Various quality control parameters were assessed, and all results were favorable.

The findings from this study indicate that the active ingredients in these plants, when incorporated into the shampoo, yield a more stable product with good aesthetic appeal. The pH of the shampoo is crucial as it enhances hair qualities, minimizes eye irritation, and helps maintain the ecological balance of the scalp. Currently, there is a trend towards promoting shampoos with lower pH levels to reduce damage to hair.

Despite being in dry form, the product demonstrates excellent wetting capacity, making it ideal for storage. Evaluation parameters such as organoleptic evaluation, general powder characteristics, physicochemical tests, cleaning action, foaming ability, wetting properties, and the condition of hair to be within the standard range.

Reference:-

1. Kokate C.K., Purohit A.P. and Gokhale S.B. “Pharmacognosy”, Nirali Prakashan, Pune, Sixteenth edition, 242-253,(2001)

2. T. Satyanarayana*, D. Nirmala kumari, Ch. Sai roshini, K. Dileep, K. Sai kiran, M. Akshitha, V. Sucharitha, M. Sagarika Department of Pharmaceutics, Mother Teresa Pharmacy College, Kothuru, Sathupally, Khammam -507303(TS) India.

3. Sutar Manisha, Deshmukh Swati, Chavan Manisha, Singh Sonia. Preparation and evaluation of polyherbal shampoo powder. International Journal of Pharmacy and Biological sciences 392); 2013: 151-159.

4. Gholamreza Dehghan Noudeh, Fariba Sharififar, Payam Khazaeli, Ehsan Mohajeri, Javad Jahanbakhsh. Formulation of herbal conditioner shampoo by using extract of fenugreek seeds and evaluation of its physicochemical parameters. African Journal of Pharmacy and Pharmacology 5(22); 2011: 2420-2427. ISSN 2320-5407 International Journal of Advanced Research (2015), Volume 3, Issue 3, 939-946

5. Sachin Dubey, Neelesh Nema, Nayak S. Preparation and evaluation of herbal shampoo powder. Ancient Science of Life 26(1); 2004: 38-44.
6. Sutar Manisha, Deshmukh Swati, Chavan Manisha, Singh Sonia. Preparation and evaluation of polyherbal shampoo powder. International Journal of Pharmacy and Biological sciences 392); 2013: 151-159.
7. Swati Deshmukh, Bindurani Kaushal, Shweta Ghode. Formulations and evaluation of herbal shampoo and comparative studies with herbal marketed shampoo. International Journal of Pharma and Bio Sciences 3(3); 2012: 638-645.
8. Naresh Gorantla, Sai Prasad K, Thimma Reddy VT, Ragadeepika J, Hajarabi T, Hindustan Abdul Ahad. Formulation and evaluation of herbal shampoo containing chamomile, rose and orange peel. Pharma Research Library: International Journal of Medicine and Pharmaceutical Research 1(2); 2013: 192-197.
9. Swati Deshmukh, Bindurani Kaushal, Shweta Ghode. Formulations and evaluation of herbal shampoo and comparative studies with herbal marketed shampoo. International Journal of Pharma and Bio Sciences 3(3); 2012: 638-645.
10 .Naresh Gorantla, Sai Prasad K, Thimma Reddy VT, Ragadeepika J, Hajarabi T, Hindustan Abdul Ahad. Formulation and evaluation of herbal shampoo containing chamomile, rose and orange peel. Pharma Research Library: International Journal of Medicine and Pharmaceutical Research 1(2); 2013: 192-197.
11. Ashok Kumar, Rakesh Roshan Mali. Evaluation of prepared shampoo formulations and to compare formulated shampoo with marketed shampoos. International Journal of Pharmaceutical sciences Review and Research 3(1); 2010: 120-127.
12. Kokate C.K., 'Practical phramacognosy", Vallabh Prakashan, New Delhi, Forth edition, 123, (1994).

*****