

# Polyherbal Formulation and Evaluation of Antidandruff Hair Mask

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**Abstract**— Herbal anti dandruff hair mask helps you smoothen the irritating, oily and flaky scalp by controlling dandruff thus giving you itch free healthy scalp and nourished hairs. The dandruff is a major problem of hair, which cannot be fully cured with the aid of chemical. This chemicals causes split ends and weakens the hair. Hairs are the delicate part of the body. So, accordingly to take care of them we made the formulation of hair mask. The ingredients in the hair mask are added by knowing their benefits to hairs. The purpose of using hair mask is to remove dirt and dandruff, strengthens and darkens the hairs. The formulation of hair mask that is completely free of chemicals. It only contains the natural ingredients which does not harm you hairs.

**Index Terms**— Hair, Herbal, Anti Dandruff, Neem, Shikaka

## I. INTRODUCTION

keep The Product which is use for cleansing, modifying the texture, changing of the color, giving life to the stressed hair, providing the nourishment to the hair and giving the healthy look to the hair is called as hair care products. This products in day-to- day life causes dandruff, it is a major and common problem nowadays. The main reason of dandruff is not visible properly, but there are many factors suchas oily scalp, poor hygiene leading to fungal infectionsand it become more often if hair is not washed for a week. In this condition flakes on scalp produces, causes itching on skin. There are some type of hair like normal hair, oily hair, dry hair vary from human to human.

In most dermatological skin problem dandruff is a non inflammatory and chronic condition related to the scalp that is eminent by an excessive range of scalp tissue being affected. The families who can't afford anti-dandruff tools and uses dirty water this causes dandruff frequently. A yeast like fungus, malassezia, feeds on oils on the scalp of most adults, dry skin, sensitivity of hair care products or contact dermatitis,

other skin conditions such as psoriasis and eczema are also the causative factors behind dandruff. Dandruff causes hair loss and embarrassment in public places on the skin in various areas because of dandruff a high level of sebum occurs. Its symptoms are redness, flakes, and itching of the scalp.

This formulation are herbal based with viable substituent for synthetic drugs. There are many herbal formulations available in market containing.

### A. Benefits of Herbal Anti-Dandruff Hair Mask-

1. Stimulate hair growth.
2. Cleansing.
3. Remove dandruff.
4. Reduce hair fall.
5. Prevent premature graying.

### B. Uses of Herbal Plants-

#### 1.1. Amla-

Amla known as source of vitamin C. It is packed with many health benefits. Powdered amla is used as a gooseberry. Amla is a rich essential ingredient inhair tonic to promote hair growth and improve hair pigmentation. It strengthens and nourishes the roots, improves the colour and radiance. Applying amla oil to the roots of hair improves hair growth and color.

Its multifaceted benefits make it a valuable ingredient in both traditional medicine and modern wellness practices, offering a holistic approach to health and well-being.



Fig- 1 Amla (*Phyllanthus emblica*)

1.2 Neem- Neem helps to cleanse the scalp. It removes clogged pores and improves hair growth. Regenerative properties are very important for the treatment of dandruff. It provides with preservatives and healing properties and can be used for a variety of hair problems. Dandruff can be removed by using neem leaves as a rinse. The most common uses of neem can be found in our hair care rituals. According to Ayurveda, Amla, Lisa, Neem and Acacia it is a necessary herb for healthy curls, promoting hair growth, reducing hair loss, and making hair more voluminous.

1.3 Reetha- Reetha shows cooling effects and acts like a very good thing for cleansing of the skin. It prevents the scalp from drying out and keeps the skin soft. A mixture of reetha and chana when applied to the skin, it gives excellent results on skin. It makes the skin soft and gentle. It is also used to remove cell flakes from the head. Reetha, also known as soapnut or *Sapindus mukorossi*, is a natural ingredient with a long history of use in traditional Indian hair care.

1.4 Bhringraj- Bhringraj is a herb that promotes hair growth. A popular Ayurvedic ingredient used for hair growth. It helps increase blood flow to the scalp by stimulating and inducing hair growth, which is probably lost due to dandruff. It also prevents scalp problems caused by dandruff and irritation and does not affect hair growth. Bhringraj, scientifically known as *Eclipta alba*, is a revered herb in traditional Ayurvedic medicine.

#### 1.5 Tulsi-

Tulsi, or Holy Basil, has been used in religious works for centuries. It contributes to blood circulation, smoothens the scalp, reduces irritation and dandruff, and promotes.

#### 1.6 Ginger-

Ginger is an excellent hair conditioner rich in minerals and essential oils that makes your hair easy to comb, soft and shiny. It helps relieve itching, dryness and flaky scalp. It has natural anti-inflammatory and antiseptic properties that help keep the scalp healthy and clean. Ginger, scientifically known as *Zingiber officinale*, is a versatile herb widely used in traditional medicine and culinary practices. When considering its application in the formulation and evaluation of herbal anti-dandruff masks, ginger brings forth several notable properties.

1.7 Hibiscus- Hibiscus or "Gudar" is the most beneficial ingredient in hair. It is used for hair growth, its regrowth and hair loss.

Hibiscus contains amino acids, vitamins A and C, alpha hydroxy acids, and other nutrients that are very beneficial to hair and scalp. It keeps your scalp healthy and minimizes the risk of dandruff.

1.8 Shikakai- Shikakai is useful as an anti-dandruff agent due to its unique ability to cleanse the scalp without irritating it. It is especially useful in combating chronic dandruff caused by excess oil on the scalp. It removes excess oil from the scalp and helps reduce dandruff during normal use.

1.9 Nagarmotha - Nagarmotha is commonly known as Nut grass. It is mainly used for the scalp disorder. It is effective in controlling dandruff. This is because dandruff is a fungal disease and nagarmotha is effective against dandruff-causing fungus. Regular use of nagarmotha improves hair texture, adds shine and stimulates hair growth.

## II. MATERIALS AND METHODS

### 2.1. Materials-

All the natural materials used in the present study i.e., Amla, Bhringraj, Neem, Reetha, Hibiscus, Tulsi, Ginger, Shikakai and Nagarmotha were purchased

from local market, in the form of dried powder. The details of the plant material used for the formulation of hair mask are mentioned. Materials:

**A. Botanical Extracts:**

- Neem (*Azadirachta indica*) extract: Known for its anti-fungal properties, neem helps combat dandruff-causing microbes while soothing irritated scalp.
- Aloe vera (*Aloe barbadensis*) extract: Renowned for its moisturizing and anti-inflammatory properties, aloe vera helps soothe scalp irritation and promotes scalp health.
- Tea tree oil (*Melaleuca alternifolia*): Exhibits potent anti-fungal and anti-inflammatory properties, making it effective against dandruff-causing microbes and soothing scalp irritation.
- Rosemary (*Rosmarinus officinalis*) extract: Contains antioxidant and anti-inflammatory properties, promoting scalp health and reducing dandruff severity.

**B. Carrier Ingredients:**

- Water: Serves as the solvent for dissolving active ingredients and achieving desired product consistency.
- Glycerin: Acts as a humectant, attracting moisture to the scalp and keeping it hydrated.
- Emulsifiers: Facilitate the blending of water and oil-based ingredients, ensuring homogeneity of the formulation.
- Preservatives: Essential for preventing microbial growth and ensuring product stability and safety during storage.
- Thickeners: Enhance the viscosity of the formulation, improving product spreadability and adherence to the scalp.

**C. Optional Additives:**

- Essential Oils: Such as lavender oil or peppermint oil, for additional fragrance and scalp soothing properties.
- Natural Extracts: Such as chamomile or calendula extracts, for their anti-inflammatory and scalp-calming effects.
- Vitamin E: Provides antioxidant benefits, protecting the scalp from oxidative stress and promoting hair health.

**D. Packaging Materials:**

- Suitable containers: Such as jars or tubes, for packaging the herbal anti-dandruff hair mask.

- Labels: To provide essential product information, including ingredients, usage instructions, and precautions.

**E. Laboratory Equipment:**

- Mixing equipment: Such as blenders or homogenizers, for thorough blending of ingredients.
- pH meter: To monitor and adjust the pH of the formulation to ensure compatibility with the scalp.
- Viscometer: For measuring the viscosity of the formulation, ensuring optimal product consistency.
- Stability testing equipment: Such as temperature-controlled chambers, for assessing the stability of the product under different storage conditions.

**2.2. Method of Preparation-**

- Preparation of the Herbal Powder.

All the herbal ingredients are in dry form and grinded to make fine powder.

**Weighing.**

All the required herbal powders for hair mask preparation were accurately weighed individually.

**Sieving.**

This fine powder was passed through sieve no. 60, to get the sufficient quantity of fine powder. Collection and storage.

The powder mixture was collected and stored in suitable plastic container and used for doing evaluation parameters.

We have taken four batches of antifungal activity, in which the best result showing antifungal activity was shown by batch C. The batch C was showing the best zone of inhibition.

Table 1- Formulation of Anti-dandruff Hair mask.

Sr. No.	Name of Ingredient	Batch A	Batch B	Batch C	Batch D
1.	Amla	9gm	11gm	10gm	11gm
2.	Neem	12gm	14gm	15gm	17gm
3.	Reetha	14gm	10gm	10gm	10gm

4.	Bhringraj	8gm	13gm	10gm	8gm
5.	Tulsi	8gm	9gm	10gm	10gm
6.	Ginger	8gm	11gm	10gm	12gm
7.	Hibiscus	13gm	10gm	10gm	11gm
8.	Shikakai	14gm	12gm	15gm	12gm
9.	Nagar motha	14gm	10gm	10gm	9gm

A. Evaluation Parameter – using digital balance.

#### Mixing

All these fine ingredients were mixed thoroughly by mixer to form a homogenous fine powder. The prepared herbal anti-dandruff hair mask was evaluated by following parameters.

#### B. Organoleptic Evaluation -

By utilizing sensory organs like eyes or nose, the examination of the formulation is performed under this evaluation, and it includes macroscopic characteristics of the drug or product, such as colour, odour, texture and appearance.

#### C Physicochemical Evaluation –

##### a) pH –

pH of 1% aqueous solution of the formulation was measured by using a calibrated digital pH meter at constant.

##### b) Loss on Drying –

Weigh about 1.5 gm of the powdered drug into a weighed flat and thin porcelain dish. Dry in the oven at 100°C or 105°C, until two consecutive weighings do not differ by more than 0.5 mg. Cool in desiccators and weigh. The loss in weight is usually recorded as moisture.

##### Ash Content – Total Ash Value –

Place about 2-4 gm of the ground air-dried material, accurately weighed, in a previously ignited and tared crucible (usually of platinum or silica). Spread the material in an even layer and ignite it by gradually increasing the heat to 500-600°C until it is white, indicating the absence of carbon. Cool in a desiccator

and weigh. If carbon-free ash cannot be obtained in this manner, cool the crucible and moisten the residue with about 2 ml of water or a saturated solution of ammonium nitrate. Dry on a water-bath, then on a hot-plate and ignite to constant weight. Allow the residue to cool in a suitable desiccator for 30 minutes and then weigh without delay. Calculate the content of total ash in mg per gm of air-dried material.

#### 2.3 Rheological Evaluation –

##### a) Tapped Density –

Tapped density is an increased bulk density attained after mechanically tapping a container containing the powder sample. After observing the initial powder volume or mass, the measuring cylinder or vessel is mechanically tapped for 1 min and volume or mass readings are taken until little further volume or mass change was observed. It was expressed in grams per milliliter. Tapped Density = Mass / Tapped Volume

##### b) Bulk Density –

Bulk Density is the ratio between the given mass of a powder and its bulk volume. Required amount of the powder is dried and filled in a 50 ml measuring cylinder up to 50 ml mark. Then the cylinder is dropped onto a hard wood surface from a height of 1 inch at 2 second intervals.

The volume of the powder

is measured. Then the powder is weighed. This is repeated to get average values.

Bulk Density = Mass / Bulk Volume

##### C. Angle of Repose –

It is defined as the maximum angle possible in between the surface of pile of powder to the horizontal flow.

It required amount of dried powder is placed in a cylindrical tube open at both ends is placed on a horizontal surface. Then the funnel should be raised to form a heap.

height and radius of the heap is noted and recorded. For the above method, the angle of repose ( $\theta$ ) can be calculated by using the formula.

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

Where  $\theta$  – Angle of repose,

h – Height of the heap, r – Radius of the base

##### c) Hausner's Ratio –

Hausner's Ratio = Tapped Density / Bulk Density

d) Carr's Index

Carr's Index =  $\frac{\text{Tapped Density} - \text{Bulk Density}}{\text{Tapped Density}} \times 100$

### 2.4. Stability Studies-

The powdered formulation was stored for some time under different temperatures (35 °C and 40°C) and humidity conditions, and the change in the physical properties was observed.

## III. RESULT AND DISCUSSION

Following evaluation parameters were performed to ensure superiority of prepared hair mask. We have three points for discussion

- Organoleptic Evaluation
- Physicochemical Evaluations

### 3.1 Organoleptic Evaluation –

Herbal hair mask was evaluated for organoleptic parameter showed in the Table 2. The colour of formulation was greenish brown. The odour of prepared formulations was characteristic which is desirable to cosmetic formulations texture and appearances were acceptable as per requirement of cosmetic formulations.

Table 2- Organoleptic Evaluations

Sr. No.	Parameters	Observations
1.	Colour	Greenish Brown
2.	Odour	Characteristic
3.	Texture	Fine
4.	Appearance	Coarse Powder

### 3.2 Physicochemical Evaluations-

Sr No.	Test	Purpose For Detection	Result
1.	Molisch's test	Presence of carbohydrate	positive
2.	Fehling's test	Presence of carbohydrate	Positive
3.	Hager's test	Presence of Alkaloid	Positive
4.	Mayer's test	Presence of Alkaloid	Positive

5.	Volatile oil test	Presence of Volatile oil	Negative
6.	Biuret test	Presence of Proteins	Negative
7.	Foam test	Presence of Saponin	Positive

Table - 3 - Phytochemical Investigation

Herbal hair mask was evaluated for physicochemical parameters showed in the Table The pH of formulation was found to be 6.5. The ash content and moisture content were within the limit. Table 3- Physicochemical Evaluations

Rheological Evaluation (Powder Property)- Herbal hair mask was evaluated for rheological evaluation (powder property shown in the Table Rheological finding justified the flow (Powder) properties of the herbal hair mask. It was found to be free-flowing and little sticky in nature.

Table 4- Rheological Evaluation

Sr.No.	Parameters	Observations
1.	Tapped density	0.5
2.	Bulk density	0.41
3.	Angle of Repose	39.41°
4.	Hausner's ratio	1.21
5.	Carr's index	18

## CONCLUSION

This study presents a number of plants drugs with proven hair efficacy in hair care preparation. A herbal hair mask treats dandruff from the hair in very easy manner. The formulation and evaluation of the herbal anti dandruff hair mask have yielded promising results indicating its potential as an effective solution in combating dandruff. The poly herbal anti dandruff formulation containing the goodness of amla, bhringraj, hibiscus, reetha, neem, tulsi, shikakai, ginger and nagarmotha. The underlying research has gone through various process while preparing the hair mask. The ingredients are in dry form and grinded to make fine powder. Firstly, the powder was passed through sieving to get sufficient quantity of powder. Then, herbal powders are weighted individually by using digital balance. At the end, all the fine ingredients were mixed to form homogeneous fine powder and then stored in a plastic container and used for doing evaluation parameters.

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