



Formulation And Evaluation Of Herbal Hair Mask

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Abstract: Hair care categories are well growing and consumers are always keen to try better and better alternatives in everyday life. There are different segments in category shelves for different usages. Now these are segmenting further in organic, natural origin. The best thing of the herbal cosmetics is that it is purely made by the herbs and shrubs. The natural content in the herbs does not have any side effects on the human body; instead enrich the body with nutrients and other useful minerals. Common formulations of herbal hair care are, Hair Shampoos, Hair Conditioners, 2 in 1 Hair Shampoo and conditioner, Hair Masks.

This research aims to create an herbal hair mask. Hair Mask are treatments that you apply to your hair for a certain amount of time before rinsing them out. They add moisture and nutrients to your hair that help hydrate dry strands, increase shine, prevent frizz, hair loss and damage.

For the purpose of creating a hair mask, the powdered forms of *Fragaria ananas*, *Narcocorymbium amans*, *Bacopa Monnieri*, *Calcium bentonite*, *Cucurbiturbita reflex*, *Persia americana*, *Trigonella frenum-graecum* were collected and all these fine ingredients were mixed thoroughly by mixer to form a homogenous fine powder and powdered herbs were tested for conformation of their chemical constituents. The hair mask provides various benefits to hair without having any negative effects on the skin or hair because all of the ingredients are natural and is easy to use.

Keywords- Herbal products, Hair problems, Hair Growth, Medicinal Plant.

INTRODUCTION:

Hair promotes well-being in people and also protects the scalp from solar radiation and mechanical abrasion. The development of hair care formulations is important for the treatment and protection of the hair fiber from daily external hair aggressions. The primary functions of hair care formulations improve the physical properties of the hair fiber, such as texture, strength, and combability. The secondary functions are the improvement of sensory properties, such as brightness, frizz reduction and hair film formation.¹

The goal of this study is to develop a natural, biodegradable, and safe herbal hair mask in the form of a fine powder, which is more convenient to apply, which comes in the form of powder and requires the addition of water to use.

The specific herbs used in an herbal hair mask can vary, depending on the desired benefits.

Hair:

Hair is a protein filament that grows from follicles found in the dermis. Hair is one of the defining characteristics of mammals. The human body, apart from areas of glabrous skin, is covered in follicles which produce thick terminal and fine vellus hair. Most common interest in hair is focused on hair growth, hair types, and hair care, but hair is also an important biomaterial primarily composed of protein, notably alpha-keratin.²

Physiology of Hair:

Hair growth cycle: Hair development is a continuous cyclic process and all mature follicles go through a growth cycle consisting of growth (anagen), regression (catagen), rest (telogen) and shedding (exogen) phases. The duration of the phase's changes based on the location of the hair and also personal nutritional and hormonal status and age.

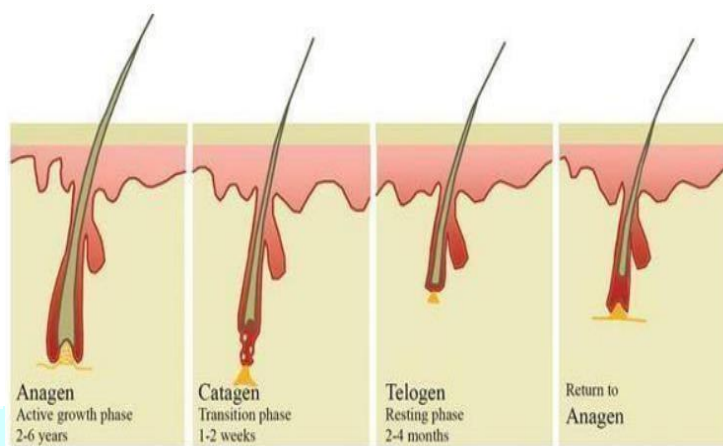


Fig.1: Hair Life Cycle

OBJECTIVES:

- To prepare the herbal hair mask with natural powdered ingredients.
- To formulate non-toxic, natural, effective herbal hair mask with numerous activities like promoting hair growth, Conditioning, Nourishment, etc.
- To evaluate the performance of formulated herbal hair mask.
- To prepare an easy to use hair mask.
- To overcome the safety issues of synthetic hair care products.

Table 1: Composition Of Herbal Hair Mask

Sr.No	Constituents Name	Biological Source / Family	Uses	Quantity (gm)
01	Strawberry Powder	<i>Fragaria ananassa</i>	Removes Excess Oil, Prevent Hair Loss	7gm
02	Jatamansi Powder	<i>NardostachysJatamansi</i>	Antioxidant, Promote Hair Growth	7gm
03	Brahmi Leaves Powder	<i>Bacopa Monneri</i>	Cleanser , Strengthen Colour, Hair Growth	7gm
04	Fuller's Earth Powder	<i>Calcium Bentonite</i>	Conditioning , Remove Excess Oil &Dirt	7gm
05	Fenugreek Seeds Powder	<i>Trigonella Foenumgraecum (Leguminosae)</i>	Antifungal, Fight Scalp Problem	7gm
06	Cuscuta Powder	<i>Cuscuta Campestris</i>	Promote Hair Growth, Relief from Dandruff	7gm
07	Avacado Powder	<i>Persea Americana</i>	Boost Shine , Nourishing	7gm

1. Strawberry:

Fragaria × ananas is the botanical name for cultivated strawberries. Strawberries are low- growing herbaceous plants that belong to the Rosaceae family.⁶

Strawberries are believed to have originated in Europe, with the first recorded cultivation of the fruit dating back to the 1300s in France.⁷

Today, strawberries are grown commercially in many countries around the world, with the top producers being the United States, Spain, and Mexico. Other major producers include Turkey, Egypt, South Korea, and China.⁸

Strawberries contain various beneficial chemical constituents for hair, including:

- i. **Vitamin C:** Strawberries are rich in vitamin C, which helps strengthen hair follicles and promote hair growth.⁹
- ii. **Antioxidants:** The antioxidants present in strawberries, such as ellagic acid and anthocyanins, help protect hair follicles from oxidative stress and damage caused by free radicals.¹⁰
- iii. **Biotin:** Strawberries contain biotin, a B-vitamin that plays a crucial role in maintaining healthy hair. Biotin deficiency can lead to hair loss and brittle hair.¹¹

- iv. **Silica:** Strawberries are a natural source of silica, a mineral that helps strengthen hair strands and improve their elasticity.¹²



Fig.2: Strawberry (*Fragaria ananas*)

2. Jatamansi:

The botanical source of Jatamansi is *Nardostachys jatamansi*, a flowering plant belonging to the family Valerianaceae. It is commonly known as Indian or Himalayan Spikenard. The plant is native to the Himalayan region, specifically found in India, Nepal, and Bhutan.

Jatamansi (*Nardostachys jatamansi*) contains various chemical constituents that contribute to its potential benefits for hair health. Here are some important chemical constituents found in Jatamansi and their potential benefits for hair:

- i. **Sesquiterpenes:** Jatamansi contains sesquiterpenes such as jatamansone, jatamansic acid, and valeranone. These compounds are believed to have antioxidant and anti-inflammatory properties, which may help promote scalp health and support hair growth.
- ii. **Essential oils:** Jatamansi essential oil is rich in volatile compounds, including bornyl acetate, valeranone, and patchouli alcohol. These compounds may help nourish the scalp, promote blood circulation, and provide a calming effect on the scalp.
- iii. **Coumarins:** Jatamansi contains coumarin derivatives like jatamansin and isojatamansin. Coumarins have been associated with potential anti-inflammatory effects and may help reduce scalp irritation and inflammation.
- iv. **Flavonoids:** Jatamansi contains flavonoids, including quercetin and luteolin, which have antioxidant and anti-inflammatory properties. These compounds may help protect the hair follicles and scalp from damage caused by oxidative stress.
- v. **Alkaloids:** Jatamansi contains alkaloids such as nardostachysin and nardosinone. These alkaloids may contribute to the overall health of the hair and scalp.^{13,14,15}



Fig.3: Jatamansi (*Nardostachys jatamansi*)

3. Brahmi:

Herbaceous crawling herbs called Brahmi (*Bacopa Monnier*, Family- Scrophulariaceae) grow along the banks of waterways. Brahmi can be found in the rainy, soggy, and damp regions of north India. Basic oils, sterols, flavanols, glycosides, and triterpenoid saponins are all present in Brahmi. It is classified as- Brahmi powder Ras Ayana in Ayurveda as well, and as such, has the ability to delay physical ageing symptoms like hair thinning.¹⁶

Brahmi, scientifically known as *Bacopa monnieri*, contains various chemical constituents that contribute to its potential benefits for hair health. Here are some important chemical constituents found in Brahmi and their potential benefits for hair:

- i. **Bacosides:** Bacosides are a group of active compounds found in Brahmi. They are believed to have antioxidant properties, which may help protect the hair follicles from damage caused by free radicals and oxidative stress
- ii. **Alkaloids:** Brahmi contains alkaloids such as brahmine and herpestine. These alkaloids may have a positive impact on hair growth by stimulating the hair follicles and promoting hair regeneration.
- iii. **Saponins:** Brahmi contains saponins, including bacosides and bacopa sides. Saponins have cleansing properties and may help maintain a healthy scalp by removing excess oil, dirt, and debris.
- iv. **Flavonoids:** Flavonoids present in Brahmi, such as apigenin and luteolin, have antioxidant and anti-inflammatory properties. They may help reduce scalp inflammation and promote a healthy scalp environment for optimal hair growth.
- v. **Essential oils:** Brahmi contains essential oils like monoterpenoids and sesquiterpenoids. These aromatic compounds contribute to the characteristic scent of Brahmi and may provide a soothing and calming effect on the scalp.¹⁷



Fig.4: Brahmi (*Bacopa Monnier*)

4. Fuller's Earth:

The botanical source of Fuller's earth powder is not derived from a specific plant. It is a type of clay mineral, specifically a form of sedimentary clay called montmorillonite. It is commonly found in deposits around the world and is often used for its absorbent and cleansing properties in skincare and haircare products.^{18,19}

It contains various minerals and compounds that contribute to its potential benefits for hair. Here are some important constituents found in Fuller's earth and their potential benefits for hair:

- i. **Aluminum silicates:** Fuller's earth is primarily composed of hydrated aluminum silicates, which provide its absorbent and cleansing properties. It can help remove excess oil, dirt, and impurities from the hair and scalp.
- ii. **Minerals:** Fuller's earth contains minerals like magnesium, calcium, and iron. These minerals can help

nourish and strengthen the hair, promoting overall hair health.

- iii. **Silica:** Silica is a mineral present in Fuller's earth and is known to improve hair texture and shine. It can help make the hair appear smoother and more lustrous.
- iv. **Absorbent properties:** Fuller's earth has excellent absorbent properties, which can help absorb excess oil from the scalp. This can be beneficial for individuals with oily hair or scalp concerns.
- v. **5.Scalp balancing:** Fuller's earth may help balance the scalp's pH level and reduce scalp irritation. It can provide a soothing effect and help alleviate itchiness or discomfort.^{20,21,22}



Fig.5: Fuller's Earth (*Calcium Bentonite*)

5. Fenugreek Seeds:

Fenugreek, (*Trigonella frenum-graecum*), also spelled fenugreek, fragrant herb of the pea family (Fabaceae) and its dried flavorful seeds used as a spice. Native to southern Europe and the Mediterranean region, fenugreek is cultivated in central and southeastern Europe, western Asia, India, and northern Africa.²³

Here are some important chemical constituents found in fenugreek and their potential benefits for hair:

- i **Saponins:** Fenugreek seeds contain saponins, including diosgenin. These compounds have been suggested to have anti-inflammatory and scalp-soothing properties, potentially aiding in the reduction of scalp irritation and itching.
- ii **Proteins:** Fenugreek seeds are rich in proteins, which may help nourish and strengthen the hair strands, promoting overall hair health.
- iii **Nicotinic acid:** Fenugreek seeds contain nicotinic acid (niacin), which is believed to improve blood circulation in the scalp. Enhanced blood flow can provide vital nutrients to the hair follicles, potentially promoting healthy hair growth.
- iv **Steroids:** Fenugreek seeds contain steroidal compounds like trigonelline and diosgenin. These compounds have been suggested to possess potential hair growth-stimulating properties.
- v **Minerals and vitamins:** Fenugreek seeds are a source of various minerals (e.g., iron, zinc, selenium) and vitamins (e.g., vitamin A, vitamin C, vitamin E). These nutrients are essential for maintaining healthy hair and scalp.^{24,25,26,27,28}



Fig.6: Fenugreek (*Trigonella Frenum-Graecum*)

6. Cuscuta :

Cuscuta reflexa, the giant dodder or ulan ulan, is one of 100-170 species in the genus *Cucuta*, and is common in the Indian subcontinent and the Greater Himalayas and as far south as Malaysia and Indonesia.²⁹

Phytochemicals isolated from *Cuscuta reflexa* are flavonoids, dulcitol, mannitol, sitosterol, lycopene, apigenin-7-B-rutinoside, 6-7 dimethoxy coumarin, quercetin, hyperoxide, propenamide, reflexin, lutein, carotene, amarbellin, palmitic, oleic, stearic, linolenic acids, leuteolin, cuscutin.³⁰

Cuscuta is a plant that has been used in traditional medicine for centuries to treat a variety of conditions, including hair loss. There is some scientific evidence to support the use of *Cuscuta* for hair loss.

One study found that *Cuscuta* extract can help to promote hair growth in people with androgenetic alopecia, a common form of hair loss that is caused by genetics and hormones. The study found that *Cuscuta* extract was able to increase the number of hairs in the anagen phase, which is the growth phase of hair.

Another study found that *Cuscuta* extract can help to prevent hair loss caused by chemotherapy. The study found that *Cuscuta* extract was able to protect hair follicles from the damage caused by chemotherapy.



Fig.7: Cuscuta (*Cuscuta Reflexa*)

7. Avocado:

The avocado (*Persea americana*) is a medium-sized, evergreen tree in the laurel family (Lauraceae). It is native to the Americas and was first domesticated by Mesoamerican tribes more than 5,000 years ago.³¹

Avocado contains several beneficial chemical constituents for hair, including:

- i Fatty Acids:** Avocado is rich in monounsaturated fatty acids, such as oleic acid, which helps moisturize and nourish the hair, making it soft and shiny.
- ii Vitamins:** Avocado is a good source of vitamins, particularly vitamin E, which helps repair and protect

hair from damage caused by free radicals. It also contains vitamin B, which promotes hair growth and strengthens the hair strands.

iii Minerals: Avocado contains minerals like copper and magnesium, which are essential for maintaining healthy hair and preventing hair loss.

iv Antioxidants: Avocado contains antioxidants like polyphenols, which help reduce oxidative stress on the hair, protecting it from damage and promoting overall health.^{32,33,34,35}



Fig.8: Avocado (*Persea Americana*)

DIRECTION OF USE:

Take 1-2 tbsp of “Herbal Hair Mask” into a bowl, add required amount of water, mix it well (without lumps) to form a moderate thin paste and apply evenly to your hair from scalp to the ends. Leave it on for 30-40 minutes. Wash off with a mild hair cleanser and let it air dry. Do this for 1-2 times a week, and experience a healthy, strong & lustrous hair.

NATURAL HAIR MASKS OFFER MANY BENEFITS TO THE HAIR AND SCALP. HERE ARE SOME OF THE BENEFITS:

1. **Moisturizing:** Natural hair masks can help to moisturize and nourish the hair, which can help to prevent dryness and breakage. This is especially important for those with dry, brittle, or damaged hair.
2. **Strengthening:** Many natural ingredients used in hair masks, such as strawberries, avocado, and Brahmi contain proteins that can help to strengthen the hair strands, which can reduce breakage and promote healthy hair growth.
3. **Repairing:** Natural hair masks can also help to repair and restore damaged hair. For example, Atamans can help to repair split ends and improve the overall health of the hair.
4. **Soothing:** Some natural ingredients used in hair masks, such as fenugreek and Cucuta, have soothing properties that can help to reduce scalp irritation and inflammation
5. **Detoxifying:** Natural hair masks can help to remove buildup and impurities from the hair and scalp, which can improve the overall health of the hair and promote a healthy scalp.
6. **Enhancing shine:** Some natural ingredients used in hair masks, can help to enhance the natural shine of the hair, leaving it looking healthy and vibrant.

Overall, natural hair masks can provide a range of benefits to the hair and scalp, helping to promote healthy, strong, and beautiful hair.

FORMULATION OF HERBAL HAIR MASK :

Herbal ingredients in dry form that is jatamansi and dodder were grinded to make fine powder by using hand driven mixer.

1. Weighing:

All the required herbal powders for mask preparation were accurately weighed individually by using digital balance. The quantity and uses are listed in Table below.

2. Mixing:

All these fine ingredients were mixed thoroughly by mixer to form a homogenous fine powder.

3. Sieving:

Then this fine powder was passed through sieve no.120, to get the sufficient quantity of fine powder.

4. Collection and storage:

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

EVALUATION OF HERBAL HAIR MASK:

1. Organoleptic Evaluation:

- Color
- Odour
- Appearance

Organoleptic characteristics like color and odour of the prepared formulation was tested along with the other special features like appearance.

2. Physicochemical evaluation:

- pH of formulation
- Washability
- Solubility

3. General powder characteristics:

- Particle size
- Angle of repose
- Bulk density
- Tapped density

4. Stability and Patch Test:

This usually involves dabbing a small amount of the aqueous solution of hair dye behind the ear or on inner elbow

in an area of 1sq.cm and leaving it to dry. Signs of irritation or feeling of non-wellness is noted, if any. Measured and small quantities of prepared hair pack were applied to the specified area for a fixed time. Irritancy, redness, and swelling were checked and noticed at regular intervals up to 24 hours if any. The results of tests for the signs of irritation are displayed in Table

Stability testing of the prepared formulation was performed by storing it at different temperature conditions for the particular time period. The packed glass vials of formulation were stored at different temperature conditions viz., room temperature and 35°C and were evaluated for the physical parameters like colour, odour, pH, texture, and smoothness as highlighted in Table below.

RESULT AND DISCUSSION:

All the observation data for evaluation of Hair Mask presented as following table :

Table 3: Phytochemical Evaluation Result

Sr No.	Phytoconstituents	Strawberry	Jatamansi	Brahmi	Fuller 's earth	Fenugreek	Cuscuta	Avocado
1	Carbohydrate	+	-	-	-	+	-	-
2	Saponins	-	+	+	-	+	-	-
3	Terpenoids	-	+	+	-	-	-	-
4	Alkaloids	-	+	+	-	-	+	-
5	Tannins and phenolic	+	-	+	-	-	-	+
6	Amino acids and proteins	-	-	-	-	+	-	-

- To determine whether phytochemicals were present in all of the powdered herbs, phytochemical screening was conducted. Only strawberry, Fenugreek contains carbohydrates, according to Fehling's test, which was used to detect their presence.
- Only Brahmi, Jatamansi and Fenugreek had saponins, according to the results of the honeycomb test used to identify the saponins. Terpenoids were detected in the herbs using the Salkowski test, which reveals that the Brahmi, Jatamansi contain terpenoids.
- According to Dragendorff's alkaloids test, alkaloids can be found in Jatamansi, Brahmi, Cuscuta. Strawberry, Brahmi, Avocado tested positive for tannins and phenolic compounds using ferric chloride. Only fenugreek exhibit the existence of proteins and amino acids.

1. Organoleptic Evaluation:

The physical characteristics of prepared formulation are mentioned in Table no. 2

Table 4: Organoleptic Evaluation

Sr. No.	Parameters	Result
1.	Color	Brownish
2.	Odour	Characteristic
3.	Apperance	Powder

3. Physico-chemical Evaluation:

The physical and chemical features of the herbal hair mask were evaluated to determine the pH, its Washability and its solubility for the purpose of stability, compatibility. Table 3 reflects the above findings.

Table 5: Physico-Chemical Evaluation

Sr No.	Parameter	Results
1.	pH	6.7
2.	Washability	Easily washable
3.	Solubility	Soluble

4. Rheological Evaluation:

The physical properties of the powdered formulation are examined in rheological examination, as indicated in table 4. The flowability of powder by bulk density, tapped density, angle of repose are assessed using powder rheology.

Table 6: Rheological Evaluation

Sr No.	Parameter	Results
1.	Bulk Density	0.5
2.	Tapped Density	0.34
3.	Angle of Repose	34.66

5. Patch Test:

The effects of the formulation on irritancy and itching have been noticed.

Table 7: Patch Test

Sr No.	Parameter	Results
1.	Swelling	Negative
2.	Redness	Negative
3.	Irritation	Negative

6. Stability Test:

The powdered formulation was kept at different temperatures (35°C and 40°C) and humidity levels for a period of time. The change in physical attributes was detected under various situations.

Table 8: Stability Test

Sr No.	Parameter	Results
1.	Change in colour	No Change
2.	Change in odour	No Change
3.	Change in pH	No Change
4.	Change in texture	No Change

CONCLUSION:

The result of this study suggest that a herbal hair mask in the form of a powder can be made which is diluted with required amount of water and then applied to hair by hands and rinsed off in half hour to make hair strong, lustrous, and whatnot by adding natural herbs. Since all of the substances are natural, there are no known side effects for the skin or hair. Also, this composition is stable at room temperature and all of the ingredients are 100 percent biodegradable.

Since, alopecia or hair loss has become most common now a days due to various factors like altered metabolism, lack of nutrients and antioxidants, pollution, exposure to sun rays, dust, age, sleep, general health condition, emotional well-being, physical impairment, disease, etc.

Therefore, In addition to strengthening hair, the formulation has a variety of other advantages for hair, including antioxidant (jatamansi), conditioning (fuller's earth), avoiding alopecia (Cuscuta), nourishment (avocado), minimising hair loss (strawberry), Antifungal (fenugreek) and strengthening color (brahmi). Thus, we get multiple benefits from single hair mask.

We found that effective property of herbal hair mask and further studies are needed to be performed to explore more benefits of this herbal hair mask and further changes that can be made in this formulation.

Consequently, it can be said that this formulation is wonderful for satisfying the needs of the worldwide market, safe to use, and easier to apply. This study can be helpful for upcoming researchers in developing a herbal hair mask and its evaluation which can be claimed for their efficacy with scientific data.

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