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Gauri S Jujgar

Research Scholar, Department of the Chemistry, Dr. Vitthalrao Vikhe Patil College of Pharmacy, Vilad Ghat, Ahmednagar, Maharashtra, India

Priyanka Balasaheb Kale

Research Scholar, Department of the Chemistry, Dr. Vitthalrao Vikhe Patil College of Pharmacy, Vilad Ghat, Ahmednagar, Maharashtra, India

Vaibhav Haridas Jagdale

Research Scholar, Department of the Chemistry, Dr. Vitthalrao Vikhe Patil College of Pharmacy, Vilad Ghat, Ahmednagar, Maharashtra, India

Priyanka Appasaheb Kadam

Research Scholar, Department of the Chemistry, Dr. Vitthalrao Vikhe Patil College of Pharmacy, Vilad Ghat, Ahmednagar, Maharashtra, India

Kanchan Ramdas Jagatap

Research Scholar, Department of the Chemistry, Dr. Vitthalrao Vikhe Patil College of Pharmacy, Vilad Ghat, Ahmednagar, Maharashtra, India

Gauri Rangnath Jawale

Research Scholar, Department of the Chemistry, Dr. Vitthalrao Vikhe Patil College of Pharmacy, Vilad Ghat, Ahmednagar, Maharashtra, India

Rupali Sanjay Joshi

Assistant Professor, Department of the Chemistry, Dr. Vitthalrao Vikhe Patil College of Pharmacy, Vilad Ghat, Ahmednagar, Maharashtra, India

Corresponding Author:**Rupali Sanjay Joshi**

Assistant Professor, Department of the Chemistry, Dr. Vitthalrao Vikhe Patil College of Pharmacy, Vilad Ghat, Ahmednagar, Maharashtra, India

Formulation and evaluation of herbal hair mask

Gauri S Jujgar, Priyanka Balasaheb Kale, Vaibhav Haridas Jagdale, Priyanka Appasaheb Kadam, Kanchan Ramdas Jagatap, Gauri Rangnath Jawale and Rupali Sanjay Joshi

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Abstract

Aim: Formulation and evaluation of herbal hair mask.

Material and Methods: Herbal hair cosmetics are made with herbs that have antibacterial, anti-inflammatory, and antioxidant properties. To prepare the herbal hair mask, various plant parts were chosen. The herbal ingredients that were utilized to make the hair mask included flax seeds, curry leaves, aloe vera gel, hibiscus powder, amla powder, multani powder, bhringraj oil, coconut oil, and castor oil. Prior to being packed in an airtight container, the ingredients must first be gathered, cleaned, dried, powdered, weighed, and combined with oils and preservatives. A number of factors, including pH, washability, the type of hair after washings, viscosity, ocular irritation, patch test, and so on, were taken into consideration when evaluating the herbal hair mask formulation. were ascertained, and this paper reports the results.

Results: Following parameter evaluation (pH, washability, postwash hair type, viscosity, ocular irritation), a patch test was conducted to formulate an herbal hair mask, and the results showed that the parameters were within an acceptable range.

Conclusion: This analysis has led to the conclusion that the formulation of the herbal hair mask possesses all the desirable qualities of the perfect hair mask and has been proven to be safer, more effective, and more affordable. There are no chemicals whatsoever in the hair mask that was prepared. It has no negative effects on hair because it solely contains natural ingredients.

Keywords: Herbal hair mask, herbs, herbal hair oil, cosmetics, flax seed

Introduction

Hair cosmetics can be characterized as preparations intended for cleaning, altering the texture, changing the color, revitalizing stressed hair, nourishing the hair, and giving the hair a healthy appearance. Different people have different varieties of hair; these include dry hair, oily hair, and regular hair. People these days don't have time to consider their physical appearance. issues with hair, split ends, dandruff, white hair, hair falling out, etc. Stress, scalp infections, hormone imbalances, insufficient vitamin, food, and mineral intake, and excessive use of chemical shampoos are the causes of hair problems^[1-3].

Nowadays, one of the most crucial aspects of one's personal life is having a clean scalp and hair. The most vital component of the body is the hair. Thus, in order to care for them, we developed a hair mask recipe. The benefits of the components used to the herbal hair mask for hair are known. The purpose of using a hair mask is to cleanse the hair of accumulated debris. The hair mask also contains castor, coconut, and bhringraj oils, which are applied to the hair. Chemicals are not used at all in the process of creating hair masks. It doesn't damage your hair because it solely contains natural components. Hair is a sensitive organ and a sign of good health. We can assist hydrate our hair by using an herbal hair mask. They are very helpful for damaged and dry hair. A hair mask can improve the strength of our hair and the condition of our scalp. These hair masks are quite helpful, have no negative effects, and are also manufactured at home. This mask can be made with a variety of substances. For people with really thin hair or badly damaged hair, this product is quite helpful. Good hair enhances the attractiveness of our personalities. There are numerous kinds of masks on the market, however many of them include chemicals. So, we used herbs to create a product. Making this mask is quite simple. Because they are readily available, inexpensive, and safe, herbs are frequently employed as therapeutic agents. The Ayurvedic method was created over 5,000 years ago in India and is still in use today. There are about 700 prescriptions for medicines in the Rig Veda and Atharv Veda. Numerous herbal substances have also been shown to have good antidandruff activity, including pepper extract, basil extract, neem extract, rosemary oil, clove oil, coleus oil, and tea tree oil.

The demand for herbal formulations is rising on the global market. Our project's primary goal was to solve this challenge in its entirety. Thus, we created a multipurpose herbal anti-dandruff, conditioning, and anti-hair fall mask for hair care^[4].

Problem related to hair^[8]

- Dandruff.
- Dry hair.
- Split ends.
- Oily hair.
- Frizzy hair.
- Limp hair.
- Hair loss.
- Heat damage.
- Colour damage.
- Grey hair.

Herbal Ingredients

The different parts of the plants were selected for study having hair care property which is already proven. following are the ingredients which we have used in the formulation of hair mask

- Flax Seeds.
- Neem Powder.
- Aloe vera Gel.
- Hibiscus Powder.
- Amla powder.
- Curry Leaves.
- Bhringraj Oil.
- Coconut Oil.
- Castor Oil.
- Multani Powder.

1. Flax Seeds^[6,9]



Fig 2: Flax Seed



Fig 3: Flax seed gel

- Biological Source: *Linum usitatissimum* Linn.
- Family: *Liliaceae*.
- Kingdom: Plantae (Plants).
- Subkingdom: Trophobiont (Vascular Plant).
- Subdivision: Spermatophyta (Seed Plant).
- Division: Magnoliophyta.
- Class: Magnoliopsida (Dicotyledons).
- Subclass: Rosidae.
- Order: Linales.
- Family: Liliaceae.
- Genus: *Linum* L.
- Species: *Usitatissimum* L.

Constituents and Uses

The flax seeds contain 35-45% oil which contain 9-10% of saturated fatty acids (palmitic and steric) about 20% monosaturated fatty acids (mainly oleic acid), and more than 70% alpha-linolenic acid fatty acid. The protein content in the seed of flax varies from 20-30%. flax seed contains nutrients and has most of hair and health benefits due to its makeup of:

- Protein
- Omega-3-Fatty Acid
- Fibers
- Antioxidants
- Vitamin E
- Bioactive Compounds and Ligans
- Vitamin B
- Magnesium
- Manganese
- Selenium

Flax seeds is the power house of nutrients, vitamins and healthy fats, all of which may help to:

- Teart The Scalp
- Prevent The Hair Loss
- Promote Hair Growth

Flax seeds gel helps air growth faster and longer by providing nourishment to the hair follicles. the presence of vit e in flax seeds provide nutrition to the scalp and reduce free radicle damage.

2. Neem Powder^[12]



Fig 4: Neem



Fig 5: Neem Powder

- Biological Source: *Azadirachta indica*
- Family: *Meliaceae*
- Kingdom: Plantae
- Division: Magnoliophyta
- Class: Magnoliopsida
- Order: Sapindales
- Genus: Azardichta
- Species: Azardichta Indica

Constituents and uses

Neem helps to cleanse the scalp. Congested pore blockages are cleared and healthy hair development is encouraged. The capacity to produce is essential for treating dry scalp. It has medicinal properties and serves as a preservative for a variety of hair-related problems. To get rid of dandruff, use a rinse made with neem leaves. The most common ingredient in hair care products is neem. Its ability to regenerate tissue is crucial for treating dandruff. It can be used for a variety of hair problems and has healing and preservation qualities. Neem is most frequently used in our hair care routines. Neem is an essential herb for increasing hair development, decreasing hair loss, and increasing the volume of hair, according to Ayurveda.

3. Aloe Vera ^[12]



Fig 6: Aloe Vera



Fig 7: Aloe Vera Gel

- Family: *Asphodelaceae*
- Biological Source: *Aloe perryi*
- Subfamily: Asphodelodeae
- Kingdom: Plantae
- Class: Liliopida-Monocotyledons
- Order: Liliales
- Genus: Aloes

Constituent and Use

Aloe vera is most beneficial for our hair.

It helps to stop the hair fall.

It repairs dead skin cells on the scalp.

It gives shine to our hairs and it act as great conditioner and leaves our hair all smooth and shiny.

It promotes the growth of hairs.

Aloe vera prevents itching on the scalp and reduces dandruff and conditions our hair.

4. Hibiscus Powder ^[10, 11]



Fig 8: Hibiscus



Fig 9: Hibiscus Powder

- Biological Source: *Hibiscus rosa-sinensis*
- Family: *Malvaceae*
- Kingdom: Plantae
- Subkingdom: Viridiplantae
- Division: Tracheophyte
- Subdivision: Spermatophytina
- Class: Magnoliopsida
- Genus: Hibiscus L
- Species: Rosa Sinensis L

Constituents and Uses

The preliminary phytochemical analysis showed that hibiscus rosa sinensis contained tannins, anthroquinones, quinines, phenols, flavonoids, alkaloids, terpenoids, saponins, cardiac glycosides, proteins, essential oils, mucilages.

- Act as a scalp moisturizer: The hibiscus flower and leaf mixture are hydrating and nourishing to the scalp. Your hair is kept from drying out by the slimy quality of the mucilage found in leaves and flowers. Using this paste on a regular basis will nourish your scalp and leave your hair silky and manageable.
- Promote hair growth: Because hibiscus is high in amino acids, which are essential for the synthesis of keratin, it can be used to promote hair growth. The protein that nourishes, fortifies, and links hair roots is called keratin. Hibiscus is well recognized for enhancing keratin accumulation and promoting the development of new hair follicles, which in turn promotes hair growth. Additionally, it strengthens hair strands to lessen hair loss.
- Treats dandruff and itching: Hibiscus flowers and leaves have smoothing properties that can offer long-lasting comfort for dry, itchy scalps. Because of its astringent qualities, hibiscus helps to cure flakiness and dandruff by reducing the amount of oil secreted.
- Stop premature greying: Hibiscus is a great source of vitamins and antioxidants, which are necessary for the production of melanin, the pigment that gives our hair its natural color. Consequently, hibiscus flower can delay the onset of gray hair and enhance your hair's natural color.

5. Amla Powder ^[11-12]

- Biological Source: *Umbelica officinalis gaerth*
- Family: *Euphorbiaceae*

- Common Name: Indian Gooseberry
- Kingdom: Plantae
- Subkingdom: Angiosperm
- Division: Tracheophytes
- Class: Eudicot
- Order: Malphigials
- Genus: Phallanthus
- Species: Emblica



Fig 10: Amla



Fig 11: Amla Powder

Constituent and uses

amla fruits are very high in vitamin c as well as several other antioxidant and nutrients. Compounds and nutrients found in amla fruit

- Vitamin c
- Vitamin A
- Polyphenols
- Amino Acids
- Proteins
- Carbohydrates
- Calcium
- Potassium
- Magnesium

- Iron
- Carotin
- Alkaloid
- Gallotannins

Amlais most commonly used to promote hair and scalp health along with that amla has many other uses

- Strengthens the scalp and hair.
- Reduce premature pigment loss from hair or greying.
- Stimulate hair growth.
- Reduce hair loss.
- Treat dandruff and dry scalp.
- Treat parasitic hair and scalp infections like lice infections.
- Treat fungal and bacterial hair and scalp infection.
- Improve overall appearance of hair.

6. Curry Leaves ^[10, 12]



Fig 12: Curry Leaves



Fig 13: Curry Powder

- Biological Source: *Murraya koenigii*
- Family: *Rutaceae*
- Kingdom: Plantae
- Subkingdom: Tracheophytus
- Division: Angiosperm
- Class: Rosids
- Order: Spindales
- Genus: Murraya
- Species: Koenigii

Constituents and Uses

Curry leaves are high in iron, calcium, proteins, vitamins B and C, and antioxidants. Curry leaves have anti-hair loss properties. Losing 50–100 hairs in a day is typical. Losing over 100 hairs a day might not be a good indicator. The American Academy of Dermatology Association lists a few causes of hair loss, including scalp infections and deficiencies in vital minerals like iron, zinc, biotin, and protein. Curry leaves are a great source of iron, vitamin C, and antioxidants that support healthy hair roots and stave against hair loss. For this reason, curry leaves and coconut oil for hair are very helpful in preventing hair damage, premature greying of the hair, hair loss, and thinning of the hair. Curry leaves are an excellent source of protein, antioxidants, and beta-carotene, which strengthen hair fibers, promote rapid hair development, and stop hair loss. Curry leaves' amino acids contribute to the strength and gloss of hair. Curry leaves are the best treatment for premature grey hair since they give the scalp vital elements like vitamins, minerals, proteins, and antioxidants. Curry leaves possess antimicrobial, antifungal, and protozoal effects. Curry leaves can therefore be used as a treatment for dandruff. The elements of heat, pollution, and hair care product chemicals expose your hair to ongoing harm. Curry leaves, which are rich in alkaloids and antioxidants, aid in hair restoration. Curry leaves include beta-carotene, proteins, and alkaloids that help preserve natural hair tone, encouraging hair development and halting hair thinning and loss. Curry leaves' natural components help to keep your hair shiny and lustrous, and their antioxidant qualities help with dry hair. Curry leaves aid in reducing hair frizz. The curry's antioxidants aid in hydrating the scalp and removing damaged hair follicles.

7. Bhringaraj Oil ^[1, 14]



Fig 14: Bhringaraj Oil

- Biological Source: *Eclipta prostrata*
- Family: *Astraceae*
- Kingdom: Plantae
- Division: Magnoliophyta
- Order: Astrales
- Genus: Eclipta
- Species: Rostrata

Constituents and Uses

Bhringraj oil includes vitamin d and e, calcium, magnesium, iron, and keratin chemical components like, alkaloids, flavonoids, polyacetylenes, cosmetics all contributing to its medicinal value.

- It used as hair tonic for maintaining dark hair
- It treats dandruff and dry scalp
- It treats scalp infection
- It gives nourishment to hair
- It improves hair growth Fastly.

7. Coconut Oil ^[4,13]**Fig 15:** Coconut Oil

- Biological Source: *Cocos nucifera*
- Family: *Arcaceae*
- Kingdom: *Plantae*
- Class: *Magnoliopsida*
- Order: *Arecales*
- Genus: *Cocos* L
- Species: *Nucifera*

Constituents and Uses

Coconut obtained from hard endocarp consist of mixture of triglycerides. the oil contains about 95% of saturated fatty acids with 8 and 10 carbon atoms. it shows the presence of caprylic acid.

- It is good for scalp and moisturise the hair
- It is natural, way to help your hair growth longer, thicker and faster
- It provides good fat
- It keeps you hydrated
- It improves skin health
- It fights against bacteria.

8. Castor oil ^[4,13]

- Biological Source: *Ricinus communis*
- Family: *Euphorbiaceae*
- Kingdom: *Plantae*
- Division: *Magnoliophyta*
- Class: *Ricinus*
- Order: *Euphorbiales*
- Genus: *Ricinus* L
- Species: *Communis* L

**Fig 16:** Castor Oil**Constituent and Uses**

The castor oil consists of glycerides of ricinolic acid and steric acid, and dihydroxy steric acid. castor oil contains vitamin f.

- It balances the pH level.
- It is antidandruff property.
- It prevents frizzy hair.
- It has moiturising property.
- It has cooling effect.

9. Multani Powder ^[4,13]**Fig 17:** Multani Powder**Constituent and Use**

It consists of silicon dioxide 55%, aluminium dioxide 65%, calcium oxide 3.5%, magnesium oxide 2%, ferric oxide 6%. multani powder is very beneficial for our hair.

- It helps to remove dirt form our hair.
- It improves blood circulation when applied scalp.
- It suitable for people with oily skin.
- It helps to get rid from dry hair.
- It has cleansing property.
- It improves blood circulation.
- It has a conditioning property.
- It smoothening the scalp.
- It removes the impurities from hair.

Pre-formulation Study**Organoleptic Properties** ^[1].

The examination of the ingredients was performed by using sensory organs such as eyes or nose. It involves macroscopic aspects of the herbal ingredients such.

- Colour
- Odour
- Texture

Physicochemical Properties ^[9].

▪ pH

Methods: Measure by using digital pH meter.

The 1 gm powder was dissolved in 100ml of distilled water and be sure that all powder is dissolved in the water. Then by using calibrated pH meter measured the pH value and reported.

▪ Melting pointy

Methods: By using Thiele tube set up.

Thin-walled capillary melting point tubes were used to hold melting point of samples. This tube was sealed at one end by using Bunsen flame. Melting point of hair mask can be determined by introducing a tiny amount of sample into a small capillary tube attaching this is the stem of a thermometer centred in a heating bath. Heat the bath slowly and observes the temperature at which melting starts and complete.

▪ Solubility

Methods: Solubility of substance refers to the amount of substance that passes into solutions to achieve a saturated solutions at constant temperature and pressure, 1gm of substance or powdered was weighed accurately and transfer into a beaker containing 100ml of water This was shaken well and warmed to increase the solubility then cooled and filter it the residue obtained is weighed and noted.

Methodology

Weighing of ingredients ^[4]

All the required ingredients for hair mask preparation were accurately weighed individually by using digital balance.

Mixing of ingredients ^[9]

- Added the flaxseeds to the water
- Boiled this water for around 10 minutes and keep string to avoid flaxseeds from sticking to the base of the utensil.

Turned the burner off when you achieve a gel-like texture neither too dense nor too thin

- Let the gel cooled down for about an hour while it thickens.
- Put the muslin cloth in a glass measuring cup, and then empty the gel into it.
- Now squeezed the gel form the muslin cloth into the measuring cup in order to strain it,
- Added the corn Starch to Luke warm water. Stirred well until smooth and completely dissolved. Put the rest of the water onto the burner top and bring to Boil.
- In a boiling water added the corn starch mixture and stir continuously. Keep stirring the liquid will change their consistency after few minutes and start to become more viscous but won't get the thickness as required because it happens only after cooling.
- Stirred until it changes form a milky white into Vaseline like colour and texture.

Results and Discussion

• Pre-formulation Study

- After that dried out the hibiscus flowers and curry leaves in Hot air oven and cooled it at room Temperature make the fine powder of the ingredients with the help of mortar and pestle.
- Mixed the above ingredients and made a paste of it then added amla powder and multani powder in it and mixed it well
- Added the bhringraj oil castor and coconut oil in the above paste and made the uniform paste finally added sodium benzoate as a preservative.

Formulation of herbal hair mask

Table 1: Formulation table

Sr. No.	Ingredients	Quantity		
		F1	F2	F3
1	Flax Seeds	15gm	15gm	15gm
2	Curry leaves	5gm	5gm	5gm
3	Hibiscus powder	5gm	5gm	5gm
4	Amla powder	5gm	5gm	5gm
5	Multani powder	1gm	5gm	5gm
6	Neem Leaves	5gm	5gm	5gm
7	Bhringraj oil	7.5ml	6ml	5ml
8	Coconut oil	7.5ml	5ml	6ml
9	Castor oil	10ml	6ml	5ml
10	Aloe vera gel	15gm	15gm	15gm
11	Sodium Benzoate	2gm	2gm	2gm
12	Water	Q.S up to 100ml	Q.S up to 100ml	Q.S up to 100ml

Evaluation parameter of herbal hair mask

Prepare formulation of hair mask were subjected to following evaluation parameters:

Organoleptic properties ^[1]

The examination of formulation was performed under the evaluation it involves macroscopic aspects of the drug or product such as colour, odour, texture, by using sensory organ such as eye and nose.

Physicochemical properties ^[9, 14, 15]

▪ pH

The pH of 10% hair mask solution in distilled water was determined at room temperature 25°C. The pH was measured by using digital pH meter.

▪ Washability

Formulation was applied on the skin and ease and extend of washing with water were checked manually.

▪ Nature of hair after washes

Nature of hair after washes can be done by collecting the response of volunteers.

▪ Irritancy

Mark the area, on the left-hand dorsal surface. Then the masked were applied to the area and the time noted. After interval up to 3hr, it is checked for irritancy effect.

▪ Patch test

In this procedure, a small amount of moistened formulation is applied to the hand surface and the effect of the formulation on irritancy and itching have been noticed.

Table 2: Evaluation parameters of herbal hair ingredients

Ingredients	color	Odour	Taste	pH	M.P.	Solubility
Curry leaves powder	Green	Sulfuryl and burnt	Slightly bitter and pungent	5	84°C	In soluble in oil and water
Hibiscus powder	pink	Pure air	Slightly bitter	6	137°C	Soluble in water
Neem Leaves powder	Green	Sulfur smell	Extremely bitter	7	80°C	Soluble in water
Flax seed	Brown	Nutty smell	Mila nutty flavor	7	-71°C	Insoluble in water
Amla powder	Brownish black	Acidic astringent smell	Bitter	4	—	Soluble in water
Multani powder	Creamy colour	Fresh muddy odour	Chalk flavor	8	—	Partially soluble in water
Aloe vera Gel	White	Pungent	Bitter	5	-	Souble in water

Table 2 indicate results of evaluation parameter: pH of curry leaves powder, hibiscus powder, Neem leaves powder, flax seeds, amla powder, multani powder and aloevera was found to be 5,6,7,7,4,8,5 respectively. After melting point study, it was observed that curry leaves powder, hibiscus powder, Neem leaves powder, and flax seed were 84 °C, 137 °C, 80°C

and -71 °C respectively. Hibiscus powder, Neem leaves powder, amla powder and aloe vera are soluble in water. Curry leaves powder; flax seed were insoluble in water while multani powder was partially soluble in water.

Formulation Study

Table 3: Evaluation of Herbal Hair Mask

Sr. No	Test	Observation		
		F1	F2	F3
1	Colour	Brown	Brown	Greenish brown
2	Nature	Semisolid paste	Semisolid paste	Semisolid paste
3	Odour	Unpleasant	Pleasant	Pleasant
4	Texture	Rough	Smooth	Smooth
5	pH	5.2	5.6	6
6	Washability	Not easily wash	Not easily wash	Easily wash
7	Nature of hair after washes	Rough	Silky and smooth	Silky and smooth
8	Viscosity	17900mPa.s	18500mPa.s	18800mPa.s
9	Eye and skin irritation	Present	Absent	Absent
10	Patch test	Present	Absent	Absent

Table 3 indicates result of evaluation parameter was performed to ensure superiority of prepared herbal hair mask. The formulation of hair mask was prepared and evaluated for several parameters like colour, odour, nature, texture, pH, washability, eye and skin irritation and patch test. The colour of formulation was different due to variation in composition of contents. F1 and F2 are brown in colour and F3 were greenish brown in colour. The odour of prepared F3 batch was pleasant in odour. So, it is good for acceptance. Optimized batch F3 shows smooth texture. The pH of all formulation is near to neutral range. Batch F3 easily washable by using water. After using of herbal hair mask was provide silky and smooth hair. Patch test was performed on skin for

24hr and within this time frame; the area must not come in contact with water so that is not wash off.

Table 4: Viscosity determination of F3 Herbal Hair Mask

RPM	Reading	Percentage
3	38000	95.0%
4	29970	99.9%
6	19960	99.8%
10	11980	99.8%
12	9650	96.5%
20	5304	88.4%

Procedure For Hair Mask Application

**Fig 18:** Application of herbal hair mask

- Take a required quantity of herbal hair mask in a bowl.
- Apply the paste on scalp to the ends by using hair brush or hand gloves.
- Keep for 30 minutes then wash hair with diluted shampoo.

Summary and Conclusion

This Study shows the used of herbal plant products with proven efficacy as in the hair care preparation. Herbal based cosmetics are popular for their non-toxic nature. Curry leaves flax seeds Corn starch Hibiscus, Alma powder, coconut oil

castor oil and Bhringraj oil were the herbal ingredients which were used for preparing hair mask Curry leave which for making hair mask has antidandruff activity which helps to remove the dandruff hair in very easy manner. Multani powder has a cleansing property which is an effective cleansing agent. This mask helps to prevents frizzy hair and giving cooling effects due to the use of castor oil, now Days natural ingredients are used in more amounts in all over the word due to their safe and less side effects as compared to chemical-based products. This investigation was carried out on the basis of traditional and present knowledge that used to formulate the herbal hair mask to develop few parameters for quality and purity of herbal hair mask.

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