Development and Assessment of An Anti-Dandruff Herbal Hair Mask

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Abstract:

By reducing dandruff, a herbal anti-dandruff hair mask helps you get rid of itchy, greasy, flaky scalp and gives your hair and scalp nourishment. A significant issue with hair that cannot be totally resolved with chemicals is dandruff. This chemical weakens the hair and creates split ends. The most sensitive element of the body are the hairs. So, in order to care for them, we developed a hair mask solution. By being aware of their advantages for hair, the substances in the hair mask are incorporated. Hair masks are used to strengthen and darken hair while removing impurities and dandruff. creating a hair mask that has no chemicals at all. It only has natural components that won't damage your hair.

Keywords: Hair mask, Herbal, Antidandruff

INTRODUCTION:

There is currently no understanding of the complicated and dynamic process that regulates hair growth. This cyclical mechanism causes the hair shaft to grow, lengthen, and finally fall

out. [1] The antigen, catagen, and telogen phases of the hair follicle make up human hair. The term "hair care products" refers to items that are used to clean, alter the texture, change the colour, revive stressed-out hair, nourish the hair, and give it a healthy appearance. Because of the things we use every day, dandruff is become a significant and widespread issue. [2.3] The primary cause of dandruff is not clearly obvious, but there are several contributing causes, including an oily scalp, poor hygiene that can result in fungal infections, and an increase in frequency if hair is unwashed for a week. This ailment results in cutaneous irritation from the flakes on the scalp. Several people have different hair types, including normal, greasy, and dry hair. In the majority of dermatological skin conditions, dandruff is a persistent, non-inflammatory scalp disease that is evident by an extensive range of scalp tissue being damaged. Dandruff is usually caused by households who utilise unclean water and cannot afford anti-dandruff products. Malassezia, a yeast-like fungus that feeds on the oils on most adults' scalps, dry skin, sensitivity to hair care products, contact dermatitis, and other skin disorders including psoriasis and eczema are other causes of dandruff. Dandruff leads to a large quantity of sebum on the skin in various regions, which causes hair loss and shame in public. Itchy scalp, flakes, and redness are its signs and symptoms. These composition uses herbs as a strong synthetic medication substitute. [4,5] There are several herbal products on the market that comprise plant extracts and essential oils as well as other herbal components. Herb-based cosmetics have had a great surge in recent days among natural goods. There are different products for hair care that come in creams, colours, powders, tonics, and other forms. As a result, knowledge of these herbs' scientific backing will complement that of Ayurveda and herbal remedies. These herbal medications are widely accessible, affordable, safe, efficient, and have very little adverse effects. The market for herbal products is seeing an increase in demand since they have fewer negative effects and more natural results. [6]

The research that underpins this study examines the creation and evaluation of a multi-herbal anti-dandruff formulation that benefits from Amla, Bhringraj, Reetha, Hibiscus, Neem, Tulsi, Ginger, Shikakai, and Nagarmotha.

Advantages of Herbal Anti-Dandruff Hair Mask [7]

- Hair mask enhances the development of hair.
- Cleansing.
- It eliminates dandruff.
- It stops hair loss.
- Keep from becoming grey too soon.

There is various herbal plant which are used in the formulation of herbal hair mask.

1. **Neem:** It improves in scalp cleansing. It cleans up congested pores and promotes healthy hair growth. The ability to regenerate is crucial for the treatment of dandruff. It may be used for a number of Hair issues and has healing and preservation effects. Neem leaves may be used as a rinse to get rid of dandruff. Neem is used most frequently in our hair-care routines. [8] It is a required herb for healthy curls, boosting hair development, minimising hair loss, and increasing hair volume, according to Ayurveda, Amla, Lisa, Neem, and Acacia.
2. **Reetha:** It has cooling properties and appears to be highly beneficial for skin cleaning. It keeps the skin moist and stops the scalp from drying out. When applied to

the skin, a Reetha and chana combination produces various benefits. [9] It softens and gentles the skin. Moreover, it is employed to clean the head of cell flakes.

3. **Amla:** Vitamin C has been reported to be present in amla. It offers a wide range of health advantages. Amla powder is used in place of gooseberries. Amla is a valuable component of hair tonics that helps to enhance hair colour and encourage hair growth. The roots are strengthened and fed, and the colour and brilliance are enhanced. Amla oil is applied to the hair roots to promote healthy hair development and colour. [10] Reducing baldness and hair loss is a relatively common use. This characteristic is a result of the antioxidants found in tannins.
4. **Tulsi:** Holy basil, also known as Tulsi, has long been utilised in religious endeavours. increases blood flow, soothes the scalp, lessens itchiness and dandruff, and encourages hair growth. used as a paste to maintain the scalp's foundation clean and prevent dandruff. [11]
5. **Ginger:** Ginger is a fantastic hair conditioner that makes your hair easy to comb, silky, and lustrous. It is also rich in minerals and essential oils. relieves dryness, flaky scalp, and irritation. Its inherent antibacterial and anti-inflammatory characteristics aid in maintaining the cleanliness and health of the scalp.
6. **Hibiscus:** The most advantageous component for hair is hibiscus, often known as "Gudar." It is used to treat hair loss, regeneration, and growth. Alpha hydroxy acids, amino acids, vitamins A and C, and other nutrients that are excellent for hair and scalp are found in hibiscus. lowers the danger of dandruff and maintains the condition of your scalp. [12]

MATERIAL AND METHODS:

Materials:

The whole collection of organic compounds used in this research i.e., Neem, Reetha, Amla, Tulsi, Ginger, Hibiscus were collected from the botanical garden of Lucknow.

Method of Preparation: [13]

Process of making the herbal powder:

All of the herbal components are in dry form and have been finely powdered.

Weighing and Mixing:

Using a digital balance, each herbal powder that was needed to prepare the hair mask was precisely weighed. [14] By using a mixer, all of these fine materials were fully combined to create a fine powder.

Collection and Storage:

The powder combination was gathered, stored in an appropriate plastic container, and utilised for assessment criteria. We tested four batches for antifungal activity, and batch C produced the greatest results in terms of antifungal activity. Batch C had the best zone of inhibition.

Table 1: Formulation of Anti-dandruff Hair mask

S. No.	Name of Ingredients	Batch A	Batch B	Batch C	Batch D
1	Neem	13	14	16	18
2	Reetha	12	10	11	10
3	Amla	10	11	9	11
4	Tulsi	9	8	10	11
5	Ginger	11	9	12	10
6	Hibiscus	10	13	13	11

Evaluation Parameters of Hair Mask:

The following criteria were used to evaluate the herbal anti-dandruff hair mask that had been prepared.

(A) Organoleptic Evaluation:

Under this evaluation, the formulation is examined using sensory organs like the eyes or nose, and it covers macroscopic features of the drug or product, such as colour, smell, texture, and appearance. [15,16]

(B) Physicochemical Evaluation: [17,18]

(i) **pH:** A calibrated digital pH metre was used to measure the pH of the formulation's 1% aqueous solution.

(ii) **Loss on Drying:** Place 1.5 g of the drug's powdered form in a porcelain dish that has been scaled and is flat and thin. Dry in the oven at 100°C or 105°C, checking that the difference in weight between any two measurements is no more than 0.5 mg. In desiccators, cool, then weigh. The weight loss is often noted as moisture.

(iii) **Ash Content**: In a previously lit and tared crucible (often made of platinum or silica), add 2-4 grammes of the pulverised, air-dried material. Spread the substance out evenly, then gradually raise the heat to 500–6000°C until it ignites and becomes white, showing a lack of carbon. In a desiccator, cool, then weigh. If carbon-free ash cannot be produced in this way, cool the crucible and wet the leftover material with approximately 2 ml of water or a nitrate-saturated solution. Dry in a water bath, then put on a hot plate and light an even flame. Afte 30 minutes of cooling in a suitable desiccator, immediately weigh the residue. Determine the total ash content in mg per gramme of air-dried material.

(C) Phytochemical Evaluation: [19,20]

Several experiments were carried out to determine the phytoconstituents present in the product and how they affect the body. Every plant demonstrates specific phytochemical traits, which have a variety of advantageous impacts.

(a) Carbohydrate detection tests:

(i) Molisch's Test: A violet ring forms at the intersection of two liquids when a few drops of alpha naphthol solution in alcohol are added to 2-3 ml of aqueous extract, which is then shaken. [21,22]

(ii) Fehling's Test: Boil the mixture of the fehling A and fehling B solutions for one minute. Add the test solution in an equal amount. Heat in a pot of boiling water for 5–10 minutes. Brick red and then first yellow streaks are seen.

(b) Detection of Alkaloids: [23]

(i) Hager's test: When using Hagers reagent, 2-3 ml of filtrate produces yellow ppt.

(ii) Mayer's Test: A creamy ppt is produced using 2-3 ml filtrate and a few drops of Mayers reagent.

(c) Detection of Volatile oils: [24]

When treated with an alcoholic sudan III solution, 2 to 4 gm of hair mask becomes crimson due to the presence of volatile oils.

(D) Rheological Evaluation: [25,26]

(i) Tapped Density:

When a container containing a powder sample is mechanically tapped, a higher bulk density known as "tapped density" results. Following the initial measurement of the powder volume or mass, the measuring cylinder or vessel is mechanically tapped for one minute while readings are taken on the volume or mass until little more volume or mass change is seen. The measurement was given in grammes per millilitre.

Tapped Density = Mass / Tapped Volume

(ii) Bulk Density: [27]

The ratio of a powder's mass to its bulk volume is known as bulk density. The necessary amount of powder is dried and poured into a 50 ml measuring cylinder until it reaches the 50 ml mark. The cylinder is then dropped from a height of 1 inch at intervals of 2 seconds onto a hard wood surface. The powder's volume is calculated. The powder is then weighed. Repeating this will get average results.

Bulk Density = Mass / Bulk Volume

(iii) Angle of Repose: [28]

It is described as the highest angle that may be formed between the powder pile's surface and the horizontal flow. A cylindrical tube with both ends open that contains the necessary amount of dry powder is put on a flat surface. The funnel should then be lifted in order to create a heap. It is noticed and documented what the heap's height and radius are. The formula may be used to get the angle of repose () for the approach described above.

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

Where θ – Angle of repose,

h – Height of the heap,

r– Radius of the base

(iv) Hausner's Ratio:

Hausner's Ratio = Tapped Density / Bulk Density

(E) Stability Studies:

The physical characteristics of the powdered formulation changed after being kept for a while at two different temperatures (35 ^{0}C and 40 ^{0}C) and humidity levels. [29]

(F) Microbial Assay:

Candida albicans was utilised via the cup-and-plate technique to combat fungus. The agar slants were used to sustain the culture. After the medium had a chance to solidify, 0.25 ml of the test stain was added. Two 6 mm wells were then formed in the plates. A sample was placed in one well, while Candida albicans was placed in the other. [30] The plates were incubated for 24 hours at 37 ^{0}C. The zone of inhibition was measured in order to assess the antifungal activity.

RESULT AND DISCUSSION:

The following assessment criteria were used to confirm that the developed hair mask was excellent.

Organoleptic Evaluation:

An evaluation of a herbal hair mask's organoleptic properties is shown in Table 2. The preparation was a greenish brown tint. The aroma of the finished formulations had a distinct flavour that is appealing for cosmetic preparations, and the texture and appearance fulfilled the standards for cosmetic preparations.

Table 2: Organoleptic Parameters

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

Physicochemical Evaluation:

The physicochemical properties for the herbal hair mask are shown in Table 3. The formulation's pH was discovered to be 6.4. Ash and moisture levels were within the permitted range.

Table 3: Physicochemical Parameters

S. No.	Parameters	Observation
1	Ph	6.4
2	Ash Value	3.4
3	Loss on drying	1.28% w/w

Phytochemical Evaluations:

The phytochemical parameter of a herbal hair mask was assessed, as shown in Table 4. It was discovered to include phytoconstituents such proteins, carbohydrates, alkaloids, and volatile oils.

Table 4- Phytochemical Evaluations

S. No.	Test	Purpose of detection	Result
1	Molisch's Test	Carbohydrate	Positive
2	Fehling's Test	Carbohydrate	Positive
3	Hager's Test	Alkaloid	Positive
4	Mayer's Test	Alkaloid	Positive
5	Volatile oil test	Volatile oil	Negative

Rheological Evaluation:

Rheological testing of a herbal hair mask was conducted (table 5's powder properties reveal the results). The flow (Powder) characteristics of the herbal hair mask were supported by rheological findings. It was discovered to have a free-flowing, slightly sticky character.

Table 5: Rheological Parameter

S. No.	Parameters	Observation
1	Tapped Density	0.4
2	Bulk Density	0.39
3	Angle of Repose	38.21
4	Hausner's ratio	1.32

Stability Studies:

The stability result was displayed in Table. No. 6: a change in look, fragrance, colour, and texture.

Table 6: Stability Test

S. No.	Parameter	Result
1	Alteration in colour	Nil
2	Alteration in odour	Nil
3	Alteration in texture	Nil
4	Alteration in appearance	Nil

Microbial Assay:

The zones of inhibition (in mm) were used to measure the antifungal activity.

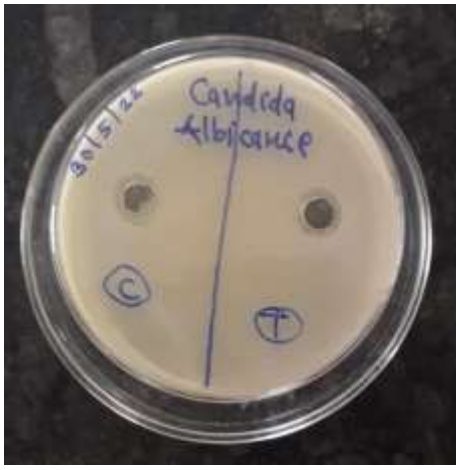

Fig 1: Zone of inhibition

Conclusion:

This research lists some herbal medicines that have been successfully used to make hair care products. In a very simple way, a herbal hair mask removes dandruff from the hair. Herbal-based cosmetics are well-liked for being non-toxic. This hair mask aids in nourishing the scalp's skin. Through the removal of extra oil from the scalp, it relieves dandruff. Poor hygiene and an oily scalp cause dandruff in the hair. Regular usage of this mask results in healthy, dandruff-free hair. Natural medicines are now utilised more frequently than chemical-based ones all around the world since they are safe and have fewer adverse effects. The use of readily available substances allows for the preparation of herbal formulations at home. An effort is being made to create a natural anti-dandruff hair mask using the beneficial properties of plants that are widely accessible and used in hair care products. The herbal anti-dandruff hair mask's shelf life is confirmed by a stability study. Different assessment criteria, including organoleptic evaluation, Ph, loss on drying, ash content, colour, odour, texture, phytochemical evaluation, stability studies, and microbial test, are used, and the results are important. More significant findings than in the previous batches are seen in batch C. Against Candida albicans, the developed formulation exhibits antifungal efficacy. This study demonstrates the product's safety. The assessment research on amla and Shikakai reveals their anti-dandruff properties. This study demonstrates the safety and efficacy of a herbal anti-dandruff hair mask formulation for cosmeceutical usage.

Conflict of Interest:

The authors have no conflict of interest.

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