

Formulation and Evaluation of Hair Mask

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Abstract—In these Pollution, stress, microbial infections, and the overuse of chemical-based hair products are all common causes of hair damage, dandruff, scalp irritation, and hair loss. The current study focuses on the development and testing of an herbal hair mask made from natural ingredients such as neem extract, menthol, aloe vera gel, fenugreek powder, curry leaves powder, and phenoxyethanol as a preservative. Neem extract has antimicrobial and antifungal properties that help to prevent dandruff and scalp infections. Menthol has a cooling and soothing effect, improving scalp freshness and blood circulation. Aloe vera gel functions as a natural moisturizer and conditioner, improving scalp hydration and hair smoothness. Curry leaf powder promotes hair growth and prevents premature greying because of its antioxidant content, while fenugreek powder is high in proteins and nicotinic acid, which help strengthen hair roots and lessen hair loss. The formulation's stability and shelf life are improved by the addition of phenoxyethanol. The physical characteristics, pH, spread ability, consistency, washability, and stability of the prepared herbal hair mask were assessed. The formulation showed adequate conditioning qualities, good homogeneity, and a pH that was appropriate for scalp application. According to the study's findings, the herbal hair mask formulation provides a natural, safe, and efficient substitute for synthetic hair care products, with possible advantages for scalp health, hair nourishment, and hair strengthening.

Index Terms—Hair mask, Dandruff, Curry Leaves, Hair Care, Menthol, Scalp irritation, antimicrobial activity, Natural cosmetic, Hair growth.

I. INTRODUCTION

Keratin, a protein, makes up the majority of hair. The pigment cells called melanocytes that are found in the hair follicles determine the colour of hair. Hair serves as insulation, regulating body temperature, shielding

the skin from UV rays and other external factors, and enhancing sensory experience. The cycle of growth, rest, and shedding of hair is constant. Three phases make up this cycle: telogen (resting phase), catagen (transitional phase), and anagen (active growth). The length and quality of each phase are determined by a number of factors, including age, hormones, nutrition, and general health [1]. The term "hair care products" pertains to substances employed for cleansing, altering texture, modifying colour, revitalising stressed hair, nourishing hair, and enhancing its overall health. Dandruff has become a prevalent issue due to daily product usage [2]. The products, which is used for cleansing, modifying the texture, changing the colour, giving life to the stressed hair, providing nourishment to the hair and giving the healthy look to the hair is called as hair care products. These products in day-to-day life cause dandruff, which is a major and common problem nowadays [3].

The main reason of dandruff is not visible properly, but there are many factors such as oily scalp, poor hygiene leading to fungal infections and it became more often if hair is not washed for a week. In this condition flakes on scalp produces, causes itching on skin. 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. Hair care is essential for maintaining the health and appearance of hair. Hair masks and shampoos are crucial for nourishment and cleaning. Hair masks play a significant role in maintaining hair moisture, particularly beneficial for dry or damaged hair. These masks contribute to scalp health improvement and hair strengthening. it is imperative to provide our hair with

the necessary care and nourishment in a world where it is subjected to numerous environmental stress and chemical treatments. Using the strength of plant-based substances, herbal hair masks provide a natural treatment that will revive and repair your hair from root to tip [4].

Recent years have seen a significant increase in interest in the usage of herbal hair masks because of their alleged ability to improve the health and vibrancy of hair. A mixture of natural components, including oils, herbs, and other plant-based extracts with nourishing and revitalizing qualities, is usually used in herbal hair masks.

The present study deals with the formulation and evaluation of herbal anti-dandruff hair mask using Fenugreek powder, Curry leaves powder, Neem extract, Aloe vera gel, Menthol, Essential oil, Phenoxyethanol and Water. Fenugreek helps in strengthening hair roots and reducing dandruff. Curry leaves promote hair growth and help in nourishing the scalp. Neem extract possesses antifungal and antimicrobial activity useful in dandruff management. Aloe vera gel helps in moisturizing the scalp and reducing irritation. Menthol provides a cooling and refreshing effect while essential oil improves fragrance and scalp health. Phenoxyethanol is used as a preservative to improve the stability of the formulation.

The prepared herbal hair mask is expected to provide anti-dandruff activity, nourishment to hair follicles, reduction in hair fall, improvement in scalp health and enhancement of overall hair condition naturally with minimal side effects.

1.1 Hair

Hair is a unique and essential part of the human body, composed primarily of keratin—a fibrous protein also found in nails and skin. It grows from follicles embedded in the dermis and varies significantly in texture, color, and density among individuals. Beyond its protective role, hair contributes to thermoregulation and sensory input, while also serving as a marker of cultural identity, age, and health. The health of hair is influenced by genetic, hormonal, nutritional, and environmental factors. In recent years, increased attention has been given to hair care due to rising concerns over hair loss, damage, and scalp conditions. This paper aims to provide a comprehensive overview of the structure and function of human hair, examine

common hair problems, and evaluate current treatments and maintenance strategies [5].

1.2 Anatomy of hair

Human hair is composed of two primary anatomical components: the hair root and the hair shaft. Anatomy of hair is depicted in figure1. The hair root lies beneath the surface of the skin and is the living part of the hair. It is embedded in the hair follicle, a tunnel-like structure that extends into the epidermis and dermis. In contrast, the hair shaft is the visible, non-living part that protrudes above the skin's surface. It consists of keratinized dead cells and does not engage in any biochemical activity [6]

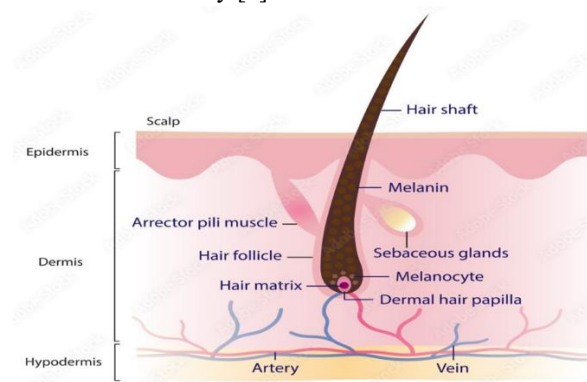


Fig. No. 1. Structure Of Hair

1.3 Hair growth cycle

The cycle of growth, rest, and shedding of hair is constant. Three phases make up this cycle: telogen (resting phase), catagen (transitional phase), and anagen (active growth). The length and quality of each phase are determined by a number of factors, including age, hormones, nutrition, and general health.

Human hair is organised into follicles that undergo distinct phases: Anagen (characterised by active growth), Catagen (a transitional phase), Telogen (a resting phase), and Exogen (the shedding phase).

1.4 Phases of Hair Growth Cycle

1. Anagen Phase: It is the active growth phase of hair follicles. During this phase, rapid cell division occurs and hair shaft formation takes place. This phase may last for several years.
2. Catagen Phase: It is the transitional phase of hair growth. In this phase, hair growth slows down and the hair follicle shrinks.
3. Telogen Phase: It is the resting phase of the hair follicle in which no active growth occurs.

4. Exogen Phase: It is the shedding phase in which old hair falls out and new hair begins to grow [7].



Fig.No.2 Stages of Hair Cycle

1.5 Hair mask

It is imperative to provide our hair with the necessary care and nourishment in a world where it is subjected to numerous environmental stress and chemical treatments. Using the strength of plant-based substances, herbal hair masks provide a natural treatment that will revive and repair your hair from root to tip. Hair and scalp nourishing, strengthening, and revitalising properties of herbal hair masks, made from a combination of natural ingredients like herbs, oils, and plant extracts, have been well praised. In order to shed light on the emerging trend of herbal hair care and its possible consequences for people looking for natural solutions for their hair care needs, this investigation will explore the wide range of botanicals used in these masks and their alleged impact on hair health.

1.6 Benefits of hair mask

- Nourishment
- Moisture Balance
- Repair & Strengthen
- Scalp Health
- Enhanced Shine & Softness
- Detoxification
- Aromatherapy
- Gentle & Safe [8].

II. LITERATURE SURVEY

Roy D, Panchami MV, Kavitha PN. (2024): State that reported that herbal hair masks have gained significant importance because of their ability to improve hair health and vibrancy naturally. The authors stated that herbal hair masks contain natural ingredients such as

herbs, oils, and plant-based extracts with nourishing and revitalizing qualities. The study explained that regular application of herbal hair masks improves scalp health, strengthens hair follicles, reduces hair loss, prevents dandruff and dryness, and enhances hair texture and shine. The authors also emphasized that herbal products provide fewer side effects compared to synthetic products.[9]

Jadhav AP, Wakale MT, Telangi GM, Varpe PV, Lokhande R. (2022); State that Jadhav et al. carried out formulation and evaluation of herbal anti-dandruff hair mask containing, Neem extract. the study reported that dandruff is a common scalp disorder caused by oily scalp, fungal infection, dry skin and poor hygiene. The prepared herbal formulation showed significant anti-dandruff and antifungal activity against *Candida albicans*. The formulation was evaluated by organoleptic evaluation, pH, ash value, loss on drying, phytochemical evaluation, stability studies and microbial assay. The authors concluded that the prepared herbal anti-dandruff hair mask was safe and effective as a cosmeceutical preparation [10].

Palande S, Khan N, Niwatkar H, Nehate D, Navlakhe S, Pachade P, Kale M. (2024): Palande et al. reviewed the importance of herbal hair masks for anti-dandruff and hair fall management. The study described that hair masks and shampoos are important for nourishment and cleansing of hair. The authors explained the benefits of ingredients such as Methi, Onion, Aloe vera, Multani mitti, Curd, Coconut oil and Castor oil in maintaining scalp health and improving hair condition. Aloe vera was reported to possess anti-inflammatory, antimicrobial and moisturizing properties useful for dandruff management. Methi was found to strengthen hair roots and fight scalp problems. The study concluded that herbal hair masks improve scalp health, reduce hair fall, promote healthy hair growth and provide natural conditioning effect [11].

Mukesh Kumar Shukla (2023) et.al. State that studied antidandruff herbal hair mask to treat dandruff related problem. This mask was prepared from natural ingredient like neem, fenugreek and hibiscus. Apart from antidandruff activity the formulated mask found to have scalp-nourishing properties. Formulated product was evaluated for the parameter including like organoleptic evaluation, ph, loss on drying, ash content, colour, odour, texture, phytochemical evaluation, stability studies, and microbial test. this

study demonstrates the safety and efficacy of a herbal anti-dandruff hair mask formulation for cosmeceutical usage [12].

Dr. Rahulkumar Damodhar Rahane (2023) et.al.: State that antidandruff herbal hair mask to treat dandruff related problem and this mask was formulated by using natural ingredient such as amla, neem. The

development and assessment of several herbal anti-dandruff formulation is the focus of the formulation author also evaluated the prepared formulation by assessing further parameter angle of repose, bulk density, tapped density, phytochemical evaluation [13].

Composition of Work

Sr.no	Ingredients	F1	F2	F3	F4	F5
1	Fenugreek Powder	3	3	3	3	3
2	Curry leaves Powder	3	3	3	3	3
3	Neem Extract	3	3	3	3	3
4	Aloe-vera gel	10.85	9.8	10.9	11.95	10.85
5	Menthol	0.15	0.2	0.1	0.05	0.15
6	Essential oil	0.5%	1%	0.5%	0.5%	1%
7	Phenoxyethanol	0.07	0.07	0.07	0.07	0.07
8	Water	q. s	q. s	q. s	q. s	q.s

2.1 Method of preparation

1. Take all powdered ingredient in a clean bowl.
2. Add aloe vera gel and neem extract.
3. Add some q.s water to mix properly to form a smooth paste.
4. Add menthol
5. Stir well until uniform consistency is obtained.
6. Add phenoxyethanol and mix.
7. store in airtight container.



Evaluation Test

1 Physical parameter: The particle size was tested by microscopy method. The flow property of the dried powder of the combined form was evaluated by performing Angle of Repose by the funnel method, bulk density and tapped density by Tapping Method.

2 Stability Study: Stability testing will be conducted by storing at different temperature condition for a period of one month. The packed glass vials of formulations stored at different Temperature conditions

like, room temperature, and were evaluated for physical Parameters like color, odour, pH, consistency and feel.

3 Irritancy Test: The irritancy test was performed to evaluate the safety and compatibility of the prepared herbal hair mask formulation for topical application. A small quantity of the formulation was applied on the skin surface and observed for any signs of irritation such as redness, itching, swelling and inflammation for 24 hours. During the observation period, no redness, itching, edema, irritation or inflammation was observed at the site of application. The formulation was found to be non-irritant and safe for topical use.

4 Spreadability Test: The spreadability test was performed to determine the ease of application and uniform spreading capacity of the prepared herbal hair mask formulation. A small quantity of the formulation was placed between two glass slides and compressed uniformly to form a thin layer. The spreadability of the formulation was evaluated by observing the ease with which the formulation spread on the surface. The prepared herbal hair mask showed good spreadability with smooth application and uniform spreading property. The formulation was found to spread easily without forming lumps or cracks.

5 Washability Test: The washability test was performed to determine the ease of removal of the prepared herbal hair mask formulation from hair and scalp using water. A small quantity of the formulation was applied on hair and washed with normal water after drying. The prepared herbal hair mask was removed easily without

leaving any residue on the scalp and hair. The formulation showed good washability and provided clean and smooth feel after washing.

6 pH Test: The pH of the prepared herbal hair mask formulation was determined by using a digital pH meter. About 1 g of the formulation was dissolved in

distilled water and the pH was measured at room temperature. The pH of the prepared formulation was found to be 5, which is near to the natural pH of scalp and hair. The obtained pH indicates that the formulation is suitable for topical application and does not cause irritation to scalp and skin.

III. RESULT

Parameter	F1	F2	F3	F4	F5
Appearance	Slightly Rough	Smooth	Smooth	Smooth	Smooth
Odour	Characteristic	Characteristic	Characteristic	Characteristic	Characteristic
State	Semi-solid	Semi-solid	Semi-solid	Semi-solid	Semi-solid
Irritancy	Positive	Negative	Negative	Negative	Negative
Redness	Negative	Negative	Negative	Negative	Negative
Swelling	Negative	Negative	Negative	Negative	Negative
Stability	No Change	No change	No Change	Slightly Thickening	No change
Spreadblity	Moderate	Good	Good	Very Good	Very Good
Washability	Washable	Easily washable	Moderate Washable	Easily Washable	Easily Washable
PH	5.2	5.0	5.1	5.5	5.0

IV. CONCLUSION

The hair mask shows good consistency and spreadability, homogeneity, pH, non-greasy and is no irritation during study period of research by using neem fenugreek, curry leaves, menthol, aloe vera gel, and their hair mask, should differ significantly. The hair mask has best properties and having using less chemical which overcome the various hair problem. Since the hair mask prepared by using simple ingredient and simple method so the hair mask also economical.

REFERENCES

- [1] Panchami MV, Roy D, Kavitha PN. Herbal hair mask for enhanced hair health: a comprehensive review. *World J Pharm Life Sci.* 2024;10(7):244–247.
- [2] Singh A, Saxena A, et al. Formulation and evaluation of herbal antidandruff shampoo from Bhringraj leaves. *Pharm Pract Res.* 2020;1(1):5–11.
- [3] Jadhav AP, Wakale MT, Telangi GM, Varpe PV, Lokhande R. Formulation and evaluation of herbal anti-dandruff hair mask. *Int J Sci Res Sci Technol.* 2022;9(3):556–564. doi:10.32628/IJSRST.
- [4] Panchami MV, Roy D, Kavitha PN. Herbal hair mask for enhanced hair health: a comprehensive review. *World J Pharm Life Sci.* 2024;10(7):244–247.
- [5] Chase HB. Growth of the hair. *Physiol Rev.* 1954;34:113–126.
- [6] Martel JL, Miao JH, Badri T, Fakoya AO. Anatomy, hair follicle. In: *StatPearls* [Internet]. Treasure Island (FL): StatPearls Publishing; 2025. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK470321/>
- [7] Panchami MV, Roy D, Kavitha PN. Herbal hair mask for enhanced hair health: a comprehensive review. *World J Pharm Life Sci.* 2024;10(7):244–247.