

## Study of Different Herbs in Hair Mask

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### ABSTRACT

Hairs are the elegant part of the body. So, accordingly to take care of them we made the formulation of herbal hair mask to protect our hair from various types of hair issues like dandruff, frizz, brittleness, premature graying, etc. The hair mask contents are included based on what has been found to be good for hair. Using a hair mask has three major purposes: it strengthens the hair, darkens the hair colour and get rid of contaminants and dandruff. There are no chemicals at all in the mask. It is made completely of natural substances that won't damage our hair. Additionally, the health benefits of these combination balance the negative effects of the ingredients. There are multiple reasons why natural or herbal cosmetics are chosen over synthetic ones. As the natural cosmetics are made entirely of plants and have no harmful effects. The main ingredient of our herbal hair mask is rice water which strengthens the hair roots, enhances the hair growth, reduces hair fall and makes the hair smoother and silkier. It is also used as a cleansing agent to remove the debris, dirt and dandruff from the scalp.

### INTRODUCTION

#### Semi-Solid Dosage Form

The increased interest in semi-solid dosage forms contributed to a recent increase in demand for CDMOs with such experience. There are several formulations for these easy-to-administer drugs, which are also known as semi-liquid dosages. However, while designing and manufacturing semi-solid dosage forms, there are considerations that must be made.

#### Anatomy of Hair

A variety of disciplines, including anthropology, biology, genetics, forensic science, and beauty science, have examined human scalp hair morphology throughout the past century from often conflicting points of view. To better understand the scientific foundation and biological significance of hair microstructure and morphology, we examine and synthesize recent and historical hair studies here (1). Discovering the molecular mechanisms behind hair follicle newly formed morphogenesis is important because it is estimated that 25% of women and 50% of men experience hair loss globally. But the chemical mechanisms behind follicle creation remain mostly unknown to us today because of the high diversity of cells and delayed growth of hair follicles (2). Various functions are carried out by the hair follicle (HF), such as thermoregulation, immune and physical defense against environmental hazards, sensory perception, social interaction, etc. One of the most unique features of HFs is their ability to self-renew during the hair cycle (HC) in order to continually create new hair to the duration of an individual's life (3).

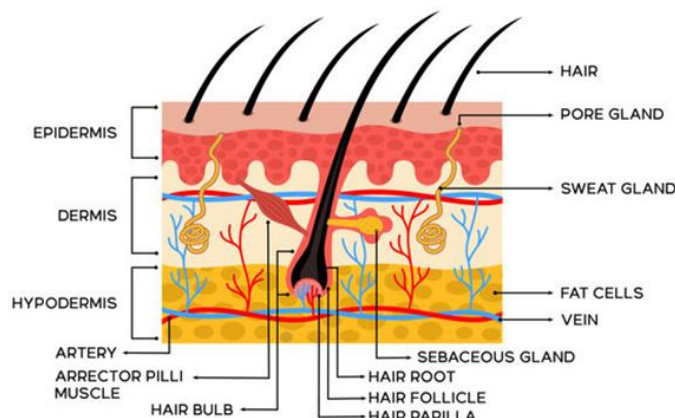


Fig 1. Anatomy of Hair

## Hair Structure

Proteins, especially keratin, make up the majority of the fibrous biological material called hair. The human hair's structure is widely known: the cortex, which surrounds the medulla, a disorganized and loosely packed area in the hair's center, houses the majority of the fiber mass, which is mostly made up of structural lipids and keratin proteins. The cuticle, which forms a protective coating around the hair and is composed of dead, overlapping cells, envelops the cortex (4).

## Growth of Hair Cycle

Every type of hair experiences recurrent cycles of active development and rest. The age of the person as well as the part of the body where the hair develops affect the duration of each phase. An indication of the follicle's cyclic period is its rapid growing phase, called anagen, middle phase called catagen, and resting phase called telogen.

- (a) **Anagen phase:-** When the follicle reaches its maximum length, the matrix cells increase and creating the internal root sheath, the hair shaft's cortex and medulla, as well as the cuticular layers that cover the shaft and the inner sheath. The inner and outer sheaths of epilated anagen hair are bound around the hair bulb and remain undamaged.
- (b) **Catagen phase:-** The proximal (keratinitis) part of involutinal hair is thicker compared to the portion of curled hair, and their outer as well as inner layers can be more effectively maintained.
- (c) **Telogen phase:-** Hair can also be wrapped within the remaining parts of an epithelial sac, which is missing from nongrowing, spontaneously shed hair(5).

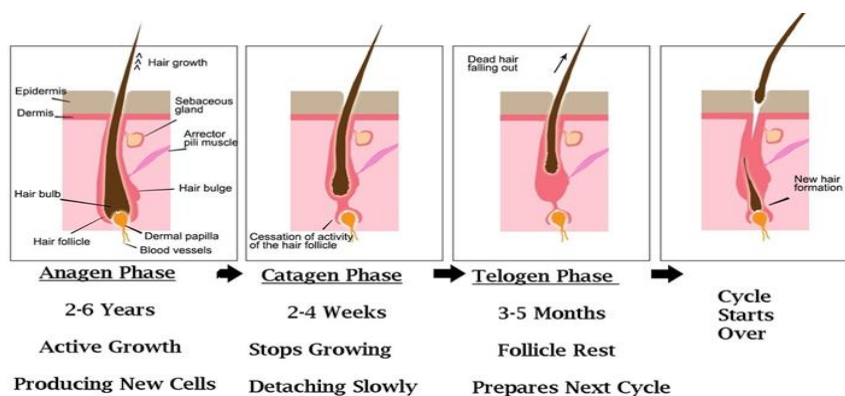


Fig 1.2 Growth of hair cycle

## Hair Problems

A clinical practitioner is come with hair loss as a common issue. Tinea capitis, areata alopecia and schizophrenia are the more typical causes of hair loss within pediatric patients. In the adult population, factors to take into account include hormonal changes, systemic health conditions, and alopecia areata-related hair loss (6).

**Alopecia areata:-** It is an acute, patchy hair loss that affects men and women equally Children make up to 20% of the patients suffering. While the pathophysiology is probably autoimmune, the cause is uncertain. Patients may experience recovery followed by repetition, or they may only experience one episode.

**Tinea capitis:-** Children are the main victims of tinea capitis, a dermatophyte infection of the hair shaft and follicles . Exposure in the home and contact with infected caps, brushes, and barber tools are risk factor.

**Trichotillomania:-** The usual age at which trichotillomania, an impulse control condition, initially presents itself is approximately 13 years old. Patients who have this disorder pull or twist their hair, either intentionally or unintentionally. Up to 4% of people are estimated to be affected with trichotillomania, with childhood and adolescence having the greatest risk (7).

## Herbal Hair Mask

Hair issues like dandruff, frizz, brittleness, and premature graying can be resolved using hair masks. It can be difficult to select a hair mask that suits your hairline and has less side effects because there are so many different kinds available. The hair mask's contents are included based on what has been found to be good for hair. Using a hair mask has three main purposes: it strengthens hair, darkens hair color, and gets rid of contaminants and dandruff. There are no chemicals at all in the mask. It is made completely of natural substances that won't damage your hair (8). The structure of hair is uncomplicated. Keratin is a unique protein which builds up hair. cleanser is a hair care product that is used to clean hair; it usually comes in the form of a sticky liquid which is known as hair mask(9).

Herbal cosmetics have been popular in the modern era due to the growth of the fashion and beauty industries. The desire for natural substances rather than chemical formulations to enhance beauty has grown, mostly among women. Additionally, the health benefits of these combination balance the negative effects of the ingredients. There are multiple reasons why natural or herbal cosmetics are chosen over synthetic ones. As the natural cosmetics are made entirely of plants and have no harmful effects.

## Disadvantages of Synthetic Hair Mask

- 1) The excessive use of synthetic hair mask damage the natural oil glands capacity of the scalp.
- 2) The synthetic hair mask sometimes causes irritation on the scalp and also cause some serious scalp infections.
- 3) Synthetic hair fibers frequently contain dangerous chemicals such as polyethylene terephthalate (PET), polypropylene (PP) and polyvinylchloride (PVC). A variety of medical conditions, including malignancy and respiratory disorders, are linked to these compounds.
- 4) Synthetic hair masks also causes headache and vertigo and soreness in the eyes, nose, throat and lungs.

### **Advantages of Herbal Hair Mask**

- 1) Pure and organic ingredients
- 2) Free from side effects
- 3) No synthetic additives
- 4) Earth and skin friendly
- 5) They do not cause allergic reactions
- 6) Cost-effective and easily manufacture (10)

### **Benefits of Herbal Hair Mask**

- 1) Enhance hair growth
- 2) Cleansing
- 3) Remove clogging
- 4) Prevent premature greying
- 5) Repair damage
- 6) Cooling effect
- 7) Reduce hairfall
- 8) Healthy scalp
- 9) Conditioning [11][12].

## **GENERAL INGREDIENTS USED IN HERBAL HAIR MASK**

### **Methi**

- 1) Strengthen hair from root
- 2) Treat follicular problems
- 3) Adds shine
- 4) Prevent premature greying
- 5) Fight scalp problems (14,17)
- 6) Helps to reverse baldness and hair thinning(13)

### **Tulsi**

- 1) Smoothen the scalp
- 2) Helps in blood circulation
- 3) Reduce irritation
- 4) Reduce dandruff
- 5) Promote hair growth (15)
- 6) Antimicrobial
- 7) Antifungal
- 8) Antiseptic
- 9) Antistress
- 10) Anticancer
- 11) Antioxidant (16)

### **Aloevera**

- 1) Prevent hair loss
- 2) Repair dead skin cells
- 3) Give shine to our hair
- 4) Prevent itching from skin
- 5) Reduce dandruff
- 6) Promote the growth of hair
- 7) Adds shine and strength

- 8) Hydrate hair
- 9) Antifungal properties (17)

### **Curry Leaves**

- 1) Reduce hair fall
- 2) Helps to restore natural colour of hair
- 3) Treat damage hair
- 4) Remove clogged hair follicles
- 5) Scalp restoration
- 6) Prevent thinning of hair (17,18)
- 7) Antioxidant properties (19)

### **Multani Mitti**

- 1) Effective cleanser
- 2) Improve blood circulation
- 3) Conditioning
- 4) Smoothing for scalp (14,17,20)

### **Castor Oil**

- 1) Balance ph level
- 2) Anti dandruff properties
- 3) Prevent freezy hair
- 4) Provide moisture
- 5) Cooling effect (14,17,20)

### **Lemon**

- 1) It helps to control dry, frizzy and rough hair.
- 2) It helps to remove unyielding dandruff.
- 3) Effective cleanser
- 4) It removes grime and dust which assembles on the scalp.
- 5) It helps to clears the hair follicles.

### **Coconut Oil**

- 1) Helps the hair growth faster
- 2) Used as a preservative
- 3) Anti-bacterial properties (14,17,20)

### **Rice Water**

- 1) Strengthen hair roots
- 2) Makes hair smooth and silky
- 3) Repair damaged hair
- 4) Conditioning
- 5) Enhance hair growth
- 6) Cures dandruff
- 7) Adds shine and makes hair silky(14).

### **Sodium Benzoate**

- 1) It acts as a preservative in the formulation.

## EXCIPIENT PROFILE

### Methi

**Synonym-** Fenugreek

**Biological source-** It consists of the dried leaves of the *Trigonella foenum-graecum L.*

**Family-** Leguminosae (21)

**Organoleptic Characteristics:**

- **Appearance-** Solid- rhomboidal seeds, 3 to 5 mm long, 2mm thick.
- **Colour-** Yellowish brown or light brown
- **Odour-** Spicy
- **Taste-** Bitter (22)



Fig 3. Methi

**Chemical Constituents (23)-** The main constituents present in fenugreek seeds are steroidal saponins, alkaloids, mucilage and fibres.(24)

- 1) **Steroidal Saponins:** The most significant steroidal saponins are diosgenin and yamogenin (25)
- 2) **Alkaloids:** The main alkaloid present in the fenugreek seeds are trigonelline and others are gentaninand carpaine choline. (24)
- 3) **Mucilage:** The endosperm of the seed contains mucilage molecules which breakdown to create mannose and galactose. (25)
- 4) **Protein Compounds:** This plant has a high (22%-25%) protein content that is mostly composed of lysine, arginine, tryptophan and to a lesser extent histidine. (26)

**Mechanism of action -** Type 2,5-alpha reductase is competitively inhibited which prevents testosterone from converting to dihydrotestosterone (DHT). The primary cause of the endrogen dependent process in hair loss is DHT's binding to the androgen receptor. Androgens are sex hormone that are present in testosterone and are important for the growth of hair. The extract from fenugreek seed raises the body's testosterone level. In the sense the hormone receptor complex may stimulate the genes that cause the progressive transformation of large terminal follicles into smaller follicles during hair development. (27,28)

### Benefits of Fenugreek Seeds

- 1) Treat follicular problems
- 2) Adds shine
- 3) Strengthen hair from root
- 4) Fight scalp diseases

### Tulsi

**Synonym-** Holi basil (21)

**Biological source-** The drug consists of the leaves of *Ocimum sanctum Linn.*

**Family-** Labiatae (29)

**Organoleptic Characteristics**

- **Appearance-** Annual herb, 30-60cm high with more branches. The branches are purplish, sub-quadrangular and covered with soft hairs.



Fig 4. Tulsi

- **Odour**- Aromatic
- **Taste**- Sharp (30)

**Chemical Constituents** - Some phenolic compounds (antioxidants) such as cirsilineol, circimaritin, isothymusin, apigenin and rosameric acid as well as significant amount of eugenol, were extracted from fresh leaves and stem of *Ocimum sanctum*. Its leaves have 0.7% volatile oil, which is primarily composed of eugenol (20%). (31)

### **Benefits of Tulsi**

- 1) Prevent hair loss
- 2) Reduce dandruff
- 3) Anticancer activity
- 4) Chemopreventive activity
- 5) Radioprotective activity
- 6) Antioxidant activity
- 7) Antimicrobial activity(32)

### **Aloevera**

Synonym – Musabbar, Kumari

Biological source – It is the dried juice of the leaves of Aloe Barbadensis Miller.

Family – Liliaceae(33)

#### **Organoleptic Characteristics:**

Appearance- Brownish and blackish depending upon the method of concentrating the juice employed.

Odour-unpleasant

Taste- Sour and bitter (29)

Chemical constituents - It contains anthraquinones, carbohydrates, chromones, enzymes, inorganic compounds, saccharides, vitamins and hormones (34).



Fig 5. Aloevera

### **Benefits of Aloevera**

- 1) Antiseptic
- 2) Stimulate hair growth
- 3) Cleanses
- 4) Anti-inflammatory
- 5) Anti-tumor activity
- 6) Stabilize blood sugar level (35).

### **Curry Leaves**

Synonym- Curry leaf

Biological source – The botanical name of curry leaves is *Murraya koenigii*.

Family –Rutaceae(36)

#### **Organoleptic characteristics:**

Appearance- Dark green to brownish with numerous dots (37)

Taste- Bitter

Odour- Sulfuryodour and burnt (38)



Fig 6. Curry leaves

**Chemical Constituents** - Murrayakoenigii growing wild was examined for chemical composition using gas chromatography-mass spectrometry on fresh leaves. The thirty-four chemicals that made up 97.4% of the oil were found. Major components found were alpha-pinene (51.7%), beta-pinene (98.8%), beta-caryophyllene (5.5%), limonene (5.4%), bornyl acetate (1.8%), terpinene-4-ol (1.3%), gamma-terpinene (1.2%) and alpha humulene (1.2%).(39)

### Benefits of Curry Leaves

- 1) Reduce hair fall
- 2) Prevent thinning of hair
- 3) Antibacterial activity
- 4) Antifungal activity
- 5) Scalp restoration
- 6) Excellent hair tonic
- 7) Blood purifier
- 8) Antidepressant activity
- 9) Anti-inflammatory (40)

### Multanimitti

**Synonym**- Fuller's earth, Floridin

**Source**- It is mined in open quarry.

**Organoleptic characteristics:**

**Appearance** – White to yellowish grey

**Taste** – Tasteless

**Odour** – Odourless(33)

**Chemical Constituents** – Multani mitti is an essentially clay made up of small amount of aluminium silicate and other impurities. (41)



Fig 7. *Multani mitti*

### Benefits of Multani Mitti

- 1) It is effective in removal of impurities such as dead skin cells.
- 2) Comfort the scalp
- 3) Reduces irritation
- 4) Promote hair growth
- 5) Shinning hair (42)
- 6) Cleanser
- 7) Excellent constituents for talcum powder in pharmaceutical industries (41)
- 8) Smoothen the skin
- 9) Improves blood circulation
- 10) Conditioning (33)

### Castor Oil

**Synonym**- Oleumricini

**Biological source** – It is a vegetable oil obtained by pressing the seeds of castor oil plant (*Ricinus communis* L.) (43)

**Family** –Euphorbiaceae (44)

**Organoleptic characteristics:**



Fig 8. *Castor oil*

**Appearance** – Oval seed, compressed 7-16mm in length and from 4-7mm in thickness.

**Colour**–Grey, brown and black

**Chemical Constituents** – A combination of triglycerides containing stearic, dehydroxystearic, isoricinoleic and ricinoleic acid is present in the oil. Tricinolein which makes up about 75% of triglycerides is hydrolysed by lipases in the duodenum to liberate free ricinoleic acid and its stereoisomer which affects the small intestine membranes and has a purgative effect. (29)

### **Benefits of Castor Oil**

- 1) Stimulate hair growth
- 2) Free the scalp from any fungal or bacterial infection
- 3) Reduces dandruff
- 4) Prevents hair loss
- 5) Prevent split ends
- 6) Prevent dryness
- 7) Traps moisture
- 8) Thickening of hair
- 9) Conditioning
- 10) In cosmetics (45)

### **Lemon**

**Synonym**- Citrus limon

**Biological source**- Citrus limon (L.) Burm.f. is a tree with evergreen leaves and yellow edible fruits from the family Rutaceae.(46)

**Botanical distribution**- Lemon trees are small, rough and grow to a height of 10 to 20 feet. The lemon's leaves are dispersed irregularly on the stalk and have a deep green colour. The lemon has a white fragrant flower with five petals. Lemon fruit differs in colour from brilliant yellow to greenish yellow. Although lemons and limes have a similar appearance, lemons are usually larger and turn yellow when ripe while limes are green.



*Fig 9. Lemon*

**Nutritional Value:** Following is the nutrition value of raw lemon without peel

- 1) Protein – 1.10
- 2) Vitamin B6 – 0.080 mg (6%)
- 3) Folate (vit. B9) – 11mg (3%)
- 4) Vitamin C – 53.0 mg (88%)
- 5) Calcium – 26mg (3%)
- 6) Iron – 0.60 mg (5%)
- 7) Magnesium – 8mg (2%)
- 8) Phosphorus – 16 mg (2%)
- 9) Potassium – 138mg (3%)
- 10) Zinc – 0.06mg (1%)

### **Benefits of Lime**

- 1) Effective cleanser
- 2) Relives dandruff
- 3) Anti- oxidant and detoxifiers
- 4) Skin care
- 5) Cure arthritis, rheumatism, prostate and colon cancer, arteriosclerosis, diabetes, fatigue & heart diseases (47)

### **Coconut Oil**

**ynonym** – Virgin coconut oil

**Biological Source** – It is derived from the kernel of *Cocos nucifera* L. (48)

**Family** –Arecaceae (49)

**Organoleptic Characteristics:** It is a clear liquid at ambient temperature and has a pleasant aroma (48).

**Chemical Constituents** - The constituents of fatty acid in virgin coconut oil are determined by Gas Liquid Chromatography involves saturated fats: Lauric acid, Myristic acid, Palmitic acid, Caprylic acid, Capric acid, Stearic acid, Caproic acid, Palmitoleic acid (in traces) and unsaturated fats: oleic acid, Linoleic acid and Linolenic acid (50).



*Fig 10. Coconut oil*

### **Benefits of Coconut Oil**

- 1) Increase hair growth
- 2) Adds shine
- 3) Helps in re-growth of damaged hair
- 4) Provide essential proteins required for nourishing (51)
- 5) Anticancer effect
- 6) Chemotherapy protective effect
- 7) Antioxidant activity
- 8) Anti-inflammatory activity (52).

### **Rice Water**

**Biological source**-*Lissorhoptrusoryzophilus* Kuschel

**Family** – Curculionidae (53)

### **Benefits of Rice Water**

- 1) Strengthen the hairs
- 2) Adds shine, smoothness and lusture
- 3) Increases the hair growth
- 4) Eliminate dandruff and flakes
- 5) Cleansing
- 6) Protect frizzy hair
- 7) Balance scalp pH level
- 8) Anti-cancer effect (54).



*Fig 11. Rice water*

## Sodium Benzoate

**Common name** – Antimol, Sorbenate

**Molecular formula** – C<sub>6</sub>H<sub>5</sub>COONa

– 144.10g/mol (55)

### Physical Properties Molecular weight

- **Colour** – Colourless crystalline powder (56)
- **Odour** – Odourless
- **Taste** – Sweetish, astringent taste (57)

### Chemical Properties

- Boiling point - >450<sup>o</sup>c to <475<sup>o</sup>c
- Melting point - 436<sup>o</sup>c
- Solubility – freely soluble in water, sparingly soluble in ethanol (58)
- Stability – Stable under recommended storage conditions (59)
- Decomposition – When heated it emits toxic fumes (60)
- Ph – Aqueous solution is slightly alkaline to litmus, Ph about 8 (57)

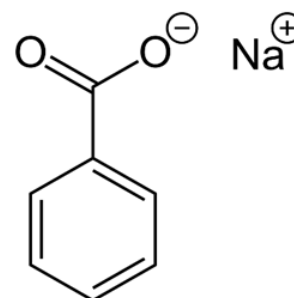


Fig 12. Sodium benzoate

**Description:** Sodium benzoate is an organic sodium salt resulting from the replacement of the proton from the carboxyl group of benzoic acid by sodium ion. It is used as antifungal preservative in pharmaceutical preparation and foods. It is also used as a test for liver functions (55).

## CONCLUSION

This study offers some plant medications that have been shown to be effective in preparing hair care product. Dandruff, excessive oil, frizz and other hair related issues are easily treated with a herbal hair mask. Cosmetics with an herbal hair mask are widely used due to their non-toxic properties. This hair mask contributes to the nourishment of scalp. It works by cleaning the scalp of extra oil to treat dandruff and other hair issues. These days natural remedies are widely used over the world due to their safety and lack of adverse effects when compared to solution made up of chemicals. It is possible to develop herbal formulations utilizing ingredient that are easily available at home. This is an attempt to make a herbal hair mask using the many benefits of easily available plants for use in hair mask formulation.

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