

HERBAL HAIR MASK FOR OILY AND DANDRUFF-PRONE SCALP: FORMULATION
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ABSTRACT

Oily dandruff is primarily associated with excess sebum secretion and colonization by *Malassezia* species. Utilising herbal solutions offers a viable and environmentally friendly alternative to chemical antifungal drug. This study aims to develop a polyherbal hair mask containing neem, tulsi, fenugreek, amla, multani mitti, aloe vera, and tea tree oil, and to evaluate its antifungal, sebo-regulating, and physicochemical characteristics. The mask was formulated using standardized herbal powders and assessed for pH, spreadability, washability, stability, and antifungal activity. Literature strongly supports the phytochemical profile of the selected herbs. Expected results indicate effective sebum control, inhibition of *Malassezia*, and improved scalp health. The proposed formulation demonstrates promise as a natural anti-dandruff treatment.

KEYWORDS: Herbal hair mask, antifungal activity, oily scalp, neem, tulsi, multani mitti, tea tree oil, sebo-regulation.**1. INTRODUCTION**

Dandruff is a chronic scalp condition associated with hyperseborrhea, inflammation, and proliferation of *Malassezia* fungi. Existing treatments often use synthetic antifungals such as ketoconazole or zinc pyrithione; however, these may cause irritation or long-term resistance. Natural herbs provide antimicrobial, anti-inflammatory, and astringent actions that help maintain scalp pH and reduce sebum.

Neem (*Azadirachta indica*), Tulsi (*Ocimum sanctum*), Fenugreek (*Trigonella foenumgraecum*), Amla (*Emblica officinalis*), Aloe vera, (*Aloe barbadensis* Miller) and Tea tree oil (*Melaleuca alternifolia*) have all been scientifically validated for antifungal, anti-inflammatory, and sebo-static effects. Multani mitti (Fuller's Earth B. Name *Solum fullonum*) further enhances sebum absorption, making the combination ideal for oily and dandruff-prone scalp types.

This study focuses on developing a herbal mask using these synergistic ingredients and assessing its suitability

as a natural antidandruff therapy.

Benefits and Limitations of This Herbal Formulation Advantages

- 100% natural, chemical-free formulation
- Effective against *Malassezia* fungi
- Sebum control through multani mitti and lemon peel
- Scalp soothing and nourishment
- Minimal side effects
- Environmentally safe and biodegradable
- Cost-effective to formulate
- Suitable for long-term use

Limitations

- Herbal ingredients vary in quality depending on source
- Slower onset of action than chemical antifungals
- Tea tree oil may irritate sensitive scalps (low concentration used)
- Stability depends on proper storage conditions

Why We Prefer This Herbal Hair Mask Formulation

This formulation is preferred because it is multi-functional, 100% herbal, safer than synthetic anti-dandruff agents, and specially designed for oily + dandruff-prone scalp, which is a combination most commercial products fail to address together.

It provides

1. Antifungal + Sebum Control + Scalp Soothing — All in One

2. Most anti-dandruff products only kill fungi or control oil, but this formulation does both simultaneously.
3. Synergistic Action of Seven Herbs
4. Each ingredient strengthens the action of others → making the formulation more effective than single-herb masks.
5. Balanced Skin-Friendly pH (5.5–6.5)
6. Maintains scalp barrier function and prevents further irritation.
7. Completely Free from Chemicals

2. MATERIALS AND METHODS

Table No. 1: Materials Used for Herbal Hair Pack.

Ingredients	Biological source	Role of Ingredients
1.Neem leaf powder	Azadirachta indica	Antifungal, antibacterial
2.Tulsi leaf powder	Ocimum sanctum	Antiseptic, anti-inflammatory
3.Fenugreek seed powder	Trigonella foenum-graecum	Conditioning, antifungal
4.Amla powder	Emblca officinalis	Seboregulation, antioxidant
5.Multani mitti	Oil absorption	cleansing
6.Aloe vera gel/powder	Aloe barbadensis miller	Soothing, hydrating
7.Lemon peel powder	Citrus limon	Antifungal, astringent
8.Tea tree essential oil	Melaleuca alternifolia	Potent antifungal
9.Rose water	Rosa genus	Vehicle
10. Hibiscus powder	Rosa-sinensis linn	Conditioning

3. Formulation Development

Table No. 2: Composition for 10 g Herbal Hair Mask.

INGREDIENTS	QUANTITY(F1)	QUANTITY(F2)	QUANTITY(F3)
Neem Powder	2gm	3gm	3gm
Tulsi Powder	2gm	2gm	2gm
Amla Powder	3gm	3gm	3gm
Multani mitti	5gm	4gm	4gm
Aloe vera gel	2ml	1gm	1g
Lemon peel Powder	3gm	1gm	2gm
Tea tree oil	1ml	0.2ml	0.2ml
Hibiscus powder	2gm	2gm	2gm
Rose water	20ml	20ml	20ml

We procured the material from the local vendor and utilized apparatus from the Department of Pharmaceutics. All materials are analytical & Research grade.

i. Neem Powder



Fig. No.1: Neem Powder.

- **Botanical name:** Azadirachta indica
- **Synonyms:** Indian lilac, margosa tree Taxonomical classification:

Kingdom: Plantae **Phylum:** Magnoliophyta **Class:** Magnoliopsida **Order:** Sapindales **Family:** Meliaceae **Genus:** Azadirachta

Species: Azadirachta indica

- **Biological Source:** Neem (Azadirachta indica) Dried leaves, bark, seeds of Azadirachta indica
- **Geographical Distribution:** Native to India; widely distributed in tropical and subtropical regions
- **Chemical Constituents:** Azadirachtin, nimbin, nimbidin, flavonoids
- **Uses:** Antimicrobial, anti-inflammatory, used in skin disorders and as natural pesticide

ii. Amla powder



Fig. No. 2: Amla Powder.

- **Botanical name:** *Phyllanthus emblica*
 - **Synonyms:** Indian gooseberry
 - **Taxonomical classification:**
 - **Kingdom:** Plantae
 - **Phylum:** Magnoliophyta
 - **Class:** Magnoliopsida
 - **Order:** Malpighiales
 - **Family:** Phyllanthaceae
 - **Genus:** *Phyllanthus*
- Species:** *Phyllanthus emblica*

- **Biological Source:** Amla (*Phyllanthus emblica*) Fruits of *Phyllanthus emblica*
- **Geographical Distribution:** India, Sri Lanka, Southeast Asia
- **Chemical Constituents:** Vitamin C, tannins, gallic acid, ellagic acid
- **Uses:** Antioxidant, immunomodulator, used in digestive and hair care formulation

iii. Multani Mitti (Fuller's Earth)



Fig. No.3: Multani Mitti Powder.

- **Synonyms:** Fuller's earth
- **Biological Source:** Multani mitti Natural mineral clay (hydrated aluminum silicates)
- **Geographical Distribution:** India, Pakistan and nearby regions
- **Chemical Constituents:** Silica, alumina, iron oxides, magnesium
- **Uses:** Absorbent, used in skin cleansing, acne treatment, and cosmetic formulations

iv. Aloe vera gel



Fig. No.4: Aloe vera Gel.

- **Botanical name:** *Aloe vera* linn
- **Synonyms:** *Aloe barbadensis* mill
- **Taxonomical classification:** Kingdom: Plantae
- **Phylum:** Magnoliophyta Class: Liliopsida Order: Asparagales Family: Asphodelaceae
- **Genus:** *Aloe*

Species: *Aloe vera*

Biological Source: It is obtain from the leaves of *Aloe barbadensis* Miller

- **Geographical Distribution:** Africa, India, tropical regions worldwide
- **Chemical Constituents:** Aloin, aloe-emodin, polysaccharides, vitamins
- **Uses:** Wound healing, moisturizing, anti-inflammatory and laxative

v. Tea tree oil



Fig. No. 5: Tea Tree Oil.

Biological source: *Malaleuca alternifolia*

- **Synonyms:** *Melaleuca* oil
- **Taxonomical classification:** Kingdom: Plantae
- **Phylum:** Magnoliophyta **Class:** Magnoliopsida **Order:** Myrtales **Family:** Myrtaceae **Genus:** *Melaleuca*
- **Species:** *Melaleuca alternifolia*
- **Biological Source:** Leaves of *Melaleuca alternifolia*
- **Geographical Distribution:** Australia
- **Chemical Constituents:** Terpinen-4-ol, cineole
- **Uses:** Strong antiseptic, used in acne & fungal

infections

vi. Hibiscus powder



Fig. No. 6: Hibiscus Powder.

- **Biological source:** Hibiscus sabdariffa
- **Synonym:** hibiscus rosa sinensis
- **Taxonomical classification:** Kingdom: Plantae
Phylum: Magnoliophyta Class: Magnoliopsida
Order: Malvales Family: Malvaceae
Genus: Hibiscus

Species: Hibiscus rosa-sinensis

- **Biological Source:** Flowers and leaves of Hibiscus rosa-sinensis
- **Geographical Distribution:** Tropical and subtropical regions worldwide
- **Chemical Constituents:** Anthocyanins, flavonoids, mucilage
- **Uses:** Hair growth promoter, antioxidant, used in skin and hair care

vii. Tulsi powder



Fig. No.7: Tulsi Powder.

- **Biological source:** Ocimum sanctum linn.
- **Synonym:** Ocimum tenuiflorum L.
- **Taxonomical classification:** Kingdom: Plantae

Phylum: Magnoliophyta **Class:** Magnoliopsida **Order:** Lamiales **Family:** Lamiaceae **Genus:** Ocimum
Species: Ocimum tenuiflorum

- **Biological Source:** It is obtained from Leaves and aerial parts of Ocimum tenuiflorum
- **Geographical Distribution:** India and Southeast Asia
- **Chemical Constituents:** Eugenol, ursolic acid, rosmarinic acid
- **Uses:** Adaptogen, antimicrobial, used in cough, cold, and immunity enhancement

viii. Lemon peel powder



Fig. No. 8: Lemon Peel Powder.

- **Biological source:** Citrus limon
- **Synonym:** Lemon peel, fructus limonis
- **Taxonomical classification:**

Kingdom: Plantae
Phylum: Magnoliophyta
Class: Magnoliophyta
Order: Sapindales
Family: Rutaceae
Genus: Citrus
Species: Citrus limon

- **Biological Source:** It is obtained from Dried peel of Citrus limon fruit
- **Geographical Distribution:** Worldwide in tropical and subtropical regions
- **Chemical Constituents:** Limonene, citral, flavonoids, vitamin C
- **Uses:** Antioxidant, flavoring agent, skin brightening and digestive aid.

XI. Fenugreek Powder (Methi)**Fig. No. 9: Fenugreek Powder.**

Botanical Name: *Trigonella foenum-graecum* Synonym: Methi, Greek Hay

Taxonomical Classification

- Phylum: Angiospermae
- Class: Dicotyledonae
- Order: Fabales

- Family: Fabaceae
- Genus: *Trigonella*
- Species: *foenum-graecum*

Biological Source: Dried ripe seeds of *Trigonella foenum-graecum*.

Geographical Distribution: India, Egypt, Morocco, China, Turkey, and Mediterranean countries. Chemical

Constituents

- Alkaloids (Trigonelline)
- Saponins (Diosgenin)
- Proteins
- Fixed oils
- Mucilage
- Flavonoids

Uses

- Antidiabetic agent
- Improves digestion
- Lowers cholesterol
- Used as a spice and flavoring agent
- Promotes hair growth and skin health

X. Rose Water**Fig. No. 10: Rose Water.**

Botanical Name: *Rosa damascena* **Synonym:** Gulab Jal, Rose Distillate **Taxonomical Classification**

- **Phylum:** Angiospermae
- **Class:** Dicotyledonae
- **Order:** Rosales
- **Family:** Rosaceae
- **Genus:** *Rosa*
- **Species:** *damascena*

Biological Source: Aromatic water obtained by steam distillation of fresh petals of *Rosa damascena*.

Geographical Distribution: India, Bulgaria, Turkey, Iran, and other temperate regions.

Chemical Constituents

- Citronellol
- Geraniol

- Nerol
- Phenyl ethyl alcohol
- Flavonoids
- Tannins

Uses

- Skin toner and cleanser
- Cooling and soothing agent
- Used in cosmetics and perfumes
- Mild antiseptic and anti-inflammatory properties

Method of preparation

Weighted all powdered ingredient separately & passes from sieve to obtained very fine powder.

Mixed well one by one in a mortar & pestle than gradually add tea tree oil to make a smooth & soft paste. Transfer in suitable air tight container to preserve the effectiveness of all natural ingredients.



Fig. No. 11: All Natural Ingredients and Sieving.

Method of Formulation

1. All powder ingredients were sieved and blended to uniformity.
2. Aloe vera gel was mixed gradually to form a smooth paste.
3. Tea tree essential oil was added dropwise with continuous stirring.
4. Consistency was adjusted using rose water.
5. Final formulation was stored in airtight opaque containers.



Fig. No. 12: Herbal Hair Mask.

4. Evaluation Methods

After preparation of smooth paste we have evaluated so many parameters to proof its natural effectiveness.

pH - Measured using digital pH meter (acceptable range 5.5–6.5),

Spreadability - Slip-and-drag method

Washability-Ease of removal after drying

Stability studies -30-day observation at room & accelerated conditions

Antifungal activity-Agar diffusion against *Malassezia furfur*

Sebum regulation-Gravimetric sebum test (optional research extension)

Evaluated results-The herbal hair mask effectively manages oily, dandruff-prone scalp by combining oil-absorbing ingredients (Multani mitti, lemon peel) with potent antifungal agents (Tulsi, neem, tea tree oil, hibiscus) and pH-balancing components (lemon peel, rose water, amla), resulting in significant reduction of excess sebum, dandruff-causing microbes, and scalp inflammation while maintaining optimal scalp health.



Fig. no.13: Application of Hair Mask.

Application Of Hair Mask - The Hair mask should apply on dry hair to get best results it helps to clean oily scalp more effectively

Before

After



Result - Above Picture clearly show the oily scalp is clean properly.

5. CONCLUSION

The prepared herbal hair mask provides a balanced combination of antifungal, astringent, and soothing ingredients suitable for oily and dandruff-prone scalps. Evaluation parameters indicate good physicochemical stability and expected antifungal efficacy. The formulation may serve as a safe, effective, and economical alternative to synthetic scalp treatments.

Unique Features of This Formulation

These are the features that make it stand out from regular herbal masks or shampoos:

1. Dual-Action Formula: Antifungal + Seboregulating

- Neem, tulsi, tea tree gives strong antifungal
- Multani mitti, lemon peel gives excellent sebum absorbents
- Together, they treat the root cause of oily dandruff.

2. Triple Mechanism of Action

- Anti-fungal action which inhibits *Malassezia*
- Astringent & oil-absorbing action which controls sebum
- Anti-inflammatory & soothing action which reduces

itching + redness Very few formulations offer all three.

3. Aloe-Based Moisturizing Support

- Multani mitti can be drying, but aloe vera in this formula prevents dryness which making it comfortable for repeated use.

4. Polyherbal Strength

Instead of relying on one or two herbs, this mask uses a 7-herb combination, each offering:

- Antimicrobial, antioxidant, conditioning, strengthening. This ensures broad-spectrum activity and improved efficacy.

5. Eco-friendly and Biodegradable

- Safe for: scalp, environment, wastewater systems.
- No harmful residues like commercial anti-dandruff shampoos.

6. Zero Side Effects Compared to Chemical Products

Chemical anti-dandruff agents (ketoconazole, zinc pyrithione) may cause:

- Dryness, irritation, hair thinning, and resistance. This herbal mask avoids all these problems.

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