



“FORMULATION AND EVALUTION OF HERBAL HAIR OIL”

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ABSTRACT :

Herbal products are generally associated with fewer or no side effects compared to synthetic alternatives. This study aims to develop a herbal hair oil using a combination of natural ingredients, including Amla, Hibiscus, Bhringraj, Jatamansi, raw garlic, muskmelon seeds, moringa, curry leaves, guava leaves, papaya leaves, fenugreek (methi), Mimosa pudica, and spring onion. The formulation was prepared by boiling these herbal components to extract their active constituents and blend them into a hair oil. Five different formulations were developed and evaluated, all demonstrating significant anti-hair fall properties, along with additional benefits such as dandruff reduction, improved blood circulation to the scalp and hair roots, reduced hair pigmentation, antifungal activity, and delayed graying of hair. The herbal oils were assessed for various physicochemical parameters including organoleptic properties, specific gravity, stability, viscosity, acid value, and pH. The results conformed to standard values, with no signs of sedimentation or grittiness, and exhibited acceptable organoleptic characteristics. The detailed findings are presented in this study.

Keywords: Hair oil, coconut oil, curry leaves, amla, hibiscus leaves and flowers, Fenugreek seeds, onion, Banyan tree roots



INTRODUCTION

Hair plays a significant role in human appearance and identity. Hair care products are commonly used to cleanse, enhance texture or color, rejuvenate damaged hair, provide nourishment, and promote a healthy appearance. Among these, hair oils are particularly valued for addressing conditions such as baldness, hair fall, dryness, and discoloration. The ancient Ayurvedic text *Charaka Samhita* emphasizes the importance of regular oil application to the scalp and hair for maintaining their health and preventing hair loss. It advocates the daily use of suitable herbal oils a practice that remains relevant and widely followed today [1].

Hair is a protein-based filament originating from dermal follicles and is a distinguishing characteristic of mammals. Beyond its aesthetic significance, hair is a crucial biomaterial primarily composed of alpha-keratin. It is subject to various cosmetic issues such as dandruff, thinning, dryness, split ends, frizz, dullness, heat and color damage, and premature greying. To manage these concerns, a wide range of hair care products are available, including oils, shampoos, conditioners, serums, gels, masks, and dyes. Among these, hair oils are widely used to improve hair appearance, nourish the scalp, and support healthy, vibrant hair growth.

Herbal hair oils, in particular, function as natural hair tonics, consisting of medicinal plant extracts infused in an oil base. These formulations help combat dryness of the scalp and hair while providing essential hydration. Rich in bioactive compounds, they support sebaceous gland function and stimulate the natural growth cycle of hair. The present study was undertaken with this objective—to formulate and evaluate an herbal hair oil that promotes scalp health and encourages natural, sustainable hair growth [2][3][4].

There are different types of **evaluation test** for hair oils such as [5]:

- Sensitivity test
- Saponification value
- Viscosity
- Specific gravity
- Ph etc.

1.1. HAIR

Hair is a distinguishing characteristic of mammals, serving multiple functions, including protection from environmental factors such as heat and cold. It is classified as a protective appendage and forms part of the integumentary system, alongside structures like sebaceous and sweat glands. Structure of hair:

➤ Hair consists of two parts: Hair Follicle[10][11][12]

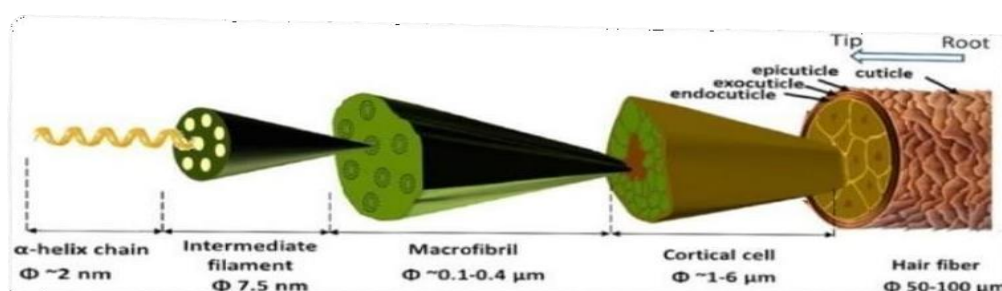
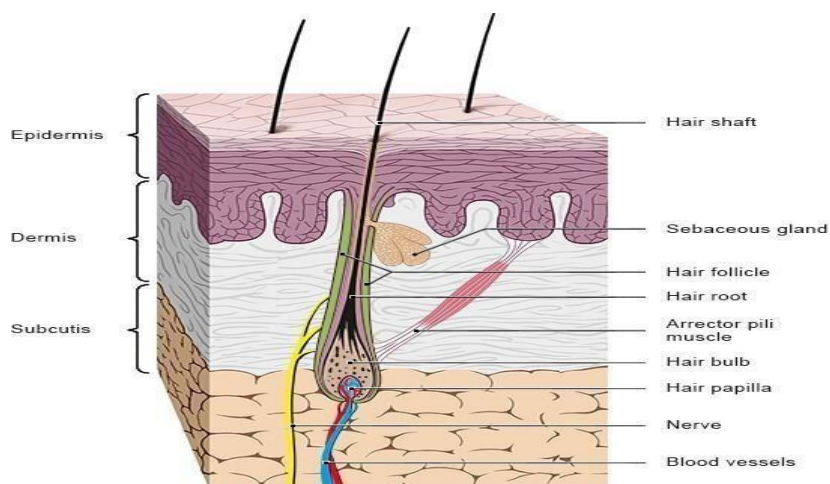
The hair follicle is a club-shaped structure embedded in the skin. At its base lies the papilla, a region rich in blood vessels that supply essential nutrients to support and stimulate hair growth. Hair follicles are formed through interactions between the dermis and epidermis and are composed of three distinct segments:

1. **Infundibulum:** This segment extends from the follicle's surface opening down to the point where the sebaceous gland connects
2. **Isthmus:** This segment extends from the infundibulum to the site of attachment of the arrector pili muscle.
3. **Inferior segment:** The base of the hair bulb is indented by the dermal papilla, a tuft of highly vascularized loose connective tissue. Rich in blood vessels, the dermal papilla provides essential nutrients that support and regulate hair growth.

➤ Hair shaft: [10][11][13]

The hair shaft is composed of three distinct layers:

1. **Medulla:** The medulla is the central core of the hair shaft, which may be continuous, double, or segmented. It is typically filled with cells but can also appear as a hollow tube. While the medulla is absent in many hair strands, it may occasionally be fragmented or discontinuous. This layer forms the innermost section of the hair shaft, and very fine hairs generally lack a medulla.
2. **Cortex:** The cortex is the primary and largest layer of the hair shaft, responsible for containing melanin, the pigment that determines hair color.
3. **Cuticle:** The cuticle is the transparent outer layer of the hair shaft, composed of overlapping scales that protect the inner layers. These scales are arranged with their ends directed toward the scalp at the proximal end and towards the tip of the hair at the distal end.



Types 1.

- The fundamental components of hair are the bulb, root, and shaft.
- Hair loss, dandruff, lice, split ends, and gray hair are some of the most common hair-related problems.
- A single strand of hair may appear simple, but it is actually one of the most complex structures in the body. Hair is composed of two main components:-

1.2. Hair types

Hair type is primarily determined by the curl pattern, which is shaped by the hair follicle. Genetics play a significant role in defining hair type. Andre Walker, Oprah Winfrey's stylist for many years, is credited with developing a system that classifies hair into four distinct curl patterns..

- Type 1: Straight
- Type 2: Wavy
- Type 3: Curly
- Type 4: Coily

1.3. HAIR GROWTH CYCLE [14]:

Hair growth cycle consists of 3 stages: -

1. Anagen stage (Growth)
2. Catagen stage (Transition)
3. telogen stage (Rest)

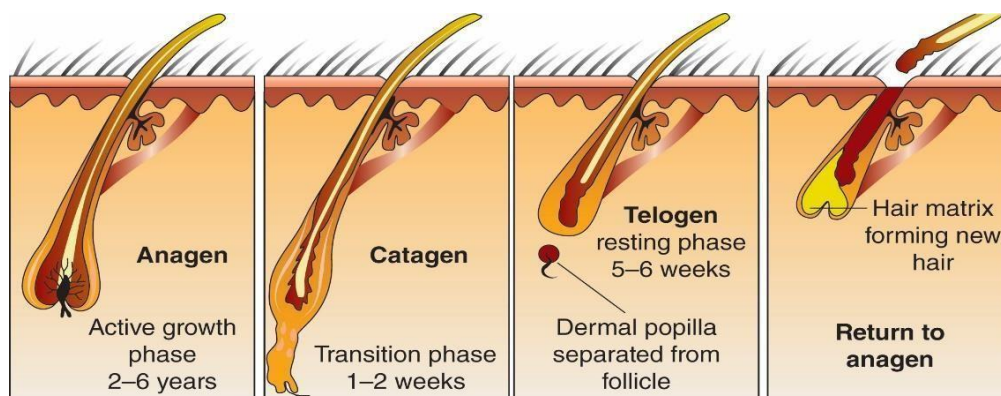


Fig 3: Hair growth cycle

1. Anagen phase: -

The anagen phase is the active growth period of hair, lasting anywhere from 2 to 6 years. During this phase, new hair pushes out the older hair that has stopped growing from the follicle.

2. Catagen phase: -

The catagen phase is a transitional stage, with about 3% of all hair in this phase at any given time. This phase usually lasts 2 to 3 weeks.

3. Telogen phase: -

The telogen phase is the resting period, lasting approximately 2 to 3 months. During this phase, the hair follicle remains inactive, and the club hair is fully formed.

2. HAIR OIL

Hair care products, such as hair oils, are essential for maintaining both the health and appearance of hair. These products are formulated to cleanse the scalp, nourish the hair, and enhance its texture and strength. Hair oils, in particular, are commonly used to address various hair issues, including baldness, premature graying, hair loss, and dryness. By delivering vital nutrients, hair oils help fortify the roots, reduce breakage, and improve the hair's shine and softness. Regular use of hair oils can also stimulate blood circulation in the scalp, promoting healthier and faster hair growth[15]

In recent years, herbal cosmetics, particularly herbal hair oils, have gained considerable popularity due to their natural ingredients and effectiveness. Many people prefer herbal hair oils over synthetic alternatives because they are free from harmful chemicals and offer long-lasting benefits. These oils are enriched with extracts from plants, seeds, and essential oils, which help nourish and protect the hair. Common ingredients in herbal hair oils include amla, coconut oil, almond oil, hibiscus, bhringraj, and neem, all of which are renowned for their hair-strengthening and conditioning properties[16].

As awareness of natural and organic products grows, the demand for herbal hair oils has been increasing rapidly. Consumers are becoming more conscious of the ingredients in their hair care products, seeking formulations that are safe, effective, and environmentally friendly. Moreover, with improving living standards, individuals are increasingly willing to invest in premium hair care solutions to maintain the health and beauty of their hair[17]

To elevate the user experience, many herbal hair oils are infused with natural scents and colors, making them more attractive. These oils not only promote hair health but also offer a soothing and relaxing experience during application. The refreshing aromas of essential oils like lavender, rosemary, and tea tree enhance the overall benefits, making herbal hair oils a popular choice for many.[18]

Overall, hair oils, particularly herbal varieties, remain a cornerstone of hair care routines worldwide. Their ability to nourish, protect, and rejuvenate hair makes them an essential product for anyone seeking healthy, shiny, and strong hair.

Different types of herbal hair oil available in market

- I. Amla hair oil
- II. Coconut hair oil
- III. Bhringraj hair oil
- IV. Jasmine hair oil
- V. Brahmi hair oil
- VI. Cantharidine hair oil
- VII. Onion hair oil



3. Hair oil Benefit:

The advantages of using hair oil include:

- It delivers essential nutrients to the hair. Herbal oils are rich in vitamins and micronutrients that nourish the hair.
- Hair oil aids in reducing hair loss and managing frizzy hair. The ends of the hair require special attention, and herbal oil provides the necessary care for their nourishment.
- Consistent application of hair oil can address the issue of premature greying.
- It helps maintain scalp hydration.
- It promotes hair growth.
- It helps prevent dandruff.
- It enhances shine and luster.
- It provides relief from stress.

Common Hair Conditions:

1. Natural hair growth disorders
2. Acquired hair growth disorders
3. Dandruff
4. Split ends
5. Frizzy hair
6. Short crown

1.4. HISTORY:

The practice of hair oiling has its origins in Ayurveda, an ancient medical system that offers holistic remedies. This tradition, which began over 5,000 years ago, continues to promote the well-being of the mind, body, and spirit. Massaging oil into the hair not only strengthens the strands but also provides a moment of self-care. Hair oiling has been a central aspect of hair care across various cultures, with its roots in Ancient India. In Ayurveda, hair oiling remains a fundamental wellness practice

Aim & Objective Aim:

The aim of formulating and evaluating herbal hair oil is to develop a natural solution that promotes hair health boosting growth, strength, and shine—while minimizing the negative effects commonly associated with chemical hair care products.

Objectives of the present study are as follows:

The goals of this study include the following:

Herbal hair oil is widely regarded as an effective treatment for hair, providing hydration to the scalp while addressing issues such as dryness. It is rich in essential nutrients that support the healthy function of sebaceous glands and promote natural hair growth.

- Natural benefits for hair
- Soothing massage for a healthy scalp
- Helps combat hair loss
- Tames frizzy hair
- Encourages hair growth and enhances smoothness.
- Provides vital nutrients like vitamins and minerals to the hair.
- Aids in preventing dandruff, split ends, and lackluster hair.
- Serves as a safer alternative to harmful chemicals.
- Boosts hair growth by energizing hair follicles and increasing blood flow to the scalp.
- Decreases hair loss by fortifying hair roots and reducing damage from environmental influences and styling.
- Delivers vital nutrients to the hair and scalp, enhancing hair texture, luster, and ease of management
- Supplies essential nutrients to the hair and scalp, improving texture, shine, and manageability.
- Strengthens hair and increases its resilience, thereby lowering the chances of breakage and split ends.
- Moisturizes the scalp and hair, preventing dryness and fostering a healthy moisture balance.
- Provides a natural alternative to synthetic hair care products, reducing the likelihood of allergic reactions and other adverse effects.
- Enhances hair density and volume, giving it a fuller and healthier appearance.
- Protects hair from damage caused by pollution, UV rays, and other environmental stressors.

Plan of work:

The plan of work is having following points,

1. Sampling
2. Data collection
3. Tools of analysis

Material & methods

Coconut oil, Curry Leaves, Amla fruit, Fenugreek seed, Hibiscus flowers, Hibiscus leaves and Nagarmotha roots are used.

Raw material characterization

1. COCONUT OIL

Family- Aceraceae.

Scientific name- Cocos nucifera L.

Other names: Fossil oil. Grease Lubricating oil

Parts used- kernel oil.

Geographical location: Southern India.

Active constituents- Fatty acid, capric Acid, lauric acid.

Uses- Used as vehicle, promotes hair growth and Moistures the hair follicles.



Fig 5: Coconut oil

Coconut oil is extracted from the meat of the coconut palm fruit. It is commonly used as a cooking oil and in industrial applications, such as cosmetics and detergent production. Coconut oil nourishes the scalp and adds shine to the hair.

2. CURRY LEAVES

Family- Rutaceae.

Scientific name- *Murraya koenigii*.

Other names: karivepallai, karivembu, karivepaku, kadipatta

Parts used- Leaves.

Geographical location: Subtropical and tropical region through the Asia.

Active constituents- Bismahanine, murrayanine, murrayazolinol.



Fig 6: Curry leaves

Uses:

- Promotes hair growth and strengthens hair roots.
- Help moisturize the scalp and remove the dead hair follicles.
- Preventing hair loss and thinning of hair.

3. FENUGREEK

Family- Fabaceae

Scientific name- *Trigonella foenum-graecum*.

Parts used- Seeds.

Geographical location: Maharashtra.

Active constituents- Trimethylamine, Trigonelline, Quercetin.

Other names: Herbaceous plant, Fenugreek seed, Trigonella.

Uses- Reduce dandruff, promotes hair growth and shows anti-fungal activity.

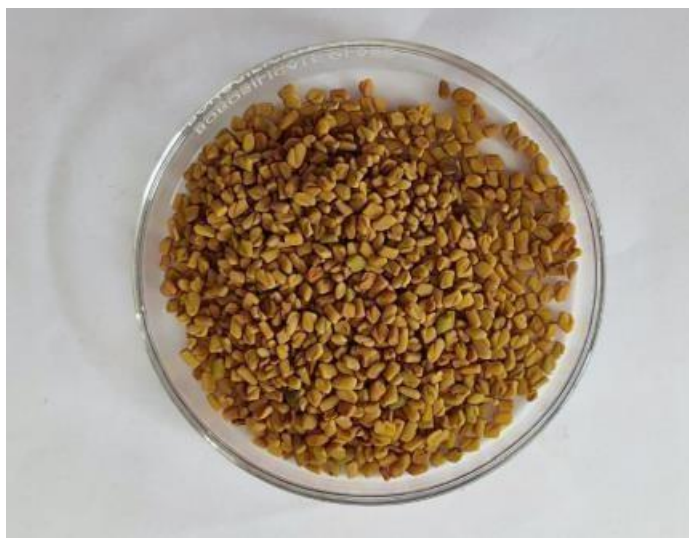


Fig 7: Fenugreek Seeds

Fenugreek seeds (Methi) help reduce hair fall and strengthen hair from root to tip. Rich in protein and nicotinic acid, these seeds are known to be effective in combating hair fall and dandruff. Dried fenugreek seeds are also valued for their antibacterial, anticancer, and anti-inflammatory properties. Additionally, they possess antioxidant qualities that contribute to revitalizing hair and promoting overall scalp health.

4. AMLA:

Family-Euphorbiaceae

Biological name: Phyllanthus Emblica

Parts used: Fruit powder

Other names: Indian gooseberry, Bhumi amla, Bhumyamalki,

Active constituents- Vitamin C, Tannins, Phenols

Use:

- Reduce premature pigment loss from hair, or greying.
- Stimulate hair growth.
- Reduce hair loss.



Phyllanthus emblica, commonly known as Amla, is a significant medicinal plant in the traditional Indian system of medicine. The tree grows to a height of 1 to 8 meters. Its leaves are simple and arranged closely along the branchlets, while the flowers are greenish-yellow in color. The fruit is nearly round in shape and has a firm texture. Amla contains up to 80 percent moisture, making it an excellent natural skin conditioner.

5. HIBISCUS FLOWER & LEAVES

Family: Malvaceae

Botanical name: *Hibiscus rosa-sinensis*

Other names: *Hibiscus arnottii* Griff. *Hibiscus boryanus* DC. *Hibiscus cooperi* auct.

Active constituents- flavonoids, tannins

Parts used: Whole flower & leaves

Uses:

- Hibiscus flowers are used to clout
- Premature greying of hairs.
- prevent hair loss and spilt ends.



ig 9: Hibiscus Flower & Leaves

The leaves are alternate, ovate to lanceolate, often with a toothed or lobed margin. The flowers are large and conspicuous, trumpet-shaped, with five or more petals. This plant is widely cultivated as an ornamental species in tropical and subtropical regions. It is commonly found throughout the tropics and is cultivated as a houseplant worldwide.

6. NAGARMOTHA ROOT

Family: Cyperaceae

Botanical name: *Cyperus rotundus*

Other names: *Cyperus rotundus*,
Nut grass

Active constituents- Alkaloids

- Controls hair fall associated with dandruff
- Helps to control the symptoms of skin disease
- Reduces hair greying



Fig 10: Nagarmotha Root

7. ONION

Family:-Amaryllidaceae **Botanical name:-**

Allium cepa

Other name : bulb onion or common onion.

Active constituent: allicin, quercetin, fisetin, and other sulphurous compound

Uses : Onions can be used for hair in a number of ways, including treating dandruff, hair loss, and premature graying.

Onion is a rich content of sulfur. The rich sulfur content also helps in minimizing the hair thinning & breakage.



8. BANYAN TREE ROOTS

Family: Moraceae. **Botanical name:** *Ficus benghalensis*

Active constituent: The aerial roots contain phytosterolin. The bark of tree contains a glucoside, bengallinoside and flavonoid glycosides, leucocyanidin.

Banyan Tree Uses and Benefits for Hair:

- 1) Uses Banyan tree roots improve scalp health and strengthen hair follicles.
- 2) Banyan tree roots may help balance the scalp's oil production.



Formulation of herbal hair oil

1. The plant ingredients, including amla, onion, and fenugreek seeds, were sourced from the local market.
2. Curry leaves, banyan tree roots, nagarmotha roots, along with hibiscus flowers and leaves, were sun-dried and ground into coarse powders.
3. Extracts were prepared using the decoction method, and the resulting extracts were stored in tightly sealed containers.
4. All dried and fresh herbs, including hibiscus and fenugreek, were weighed, ground with a mortar and pestle, and then mixed with almond oil.
5. The mixture was heated for 15 minutes and filtered through muslin cloth.
6. Coconut oil was added to the filtered liquid to achieve the desired volume.
7. Finally, a small amount of a flavoring agent, such as jasmine oil, was added to the oil.
8. The finished product was stored in a sealed container.

MATERIAL (INGREDIENTS) USED IN MANUFACTURING OF HERBAL HAIR OIL:

Sr. No	Ingredient	Quantity Taken
1	Coconut oil	70 ml
2	Almond oil	20 ml
3	Jasmine oil	10 ml
4	Curry leaves	8 unit
5	Fenugreek seeds	2 gm
6	Amla fruit	2 gm
7	Hibiscus flower	3-4 unit
8	Hibiscus leaves	3-4 unit
9	Nagarmotha root	
10	onion	2 uniits
11	Banyan tree roots	3 units

Table No 1: Material (ingredients) used in preparation of

FORMULATION OF HERBAL HAIR OIL



HERBAL HAIR OIL		100 mL
Ingredient:- Hibiscus flower, Leaves, Amala, Banyan tree roots, fenugreek seeds, Curry Leaves, onion, Nagarmotha roots, etc.	MFG Date:-	8/25
	Exp Date:-	8/26
	Storage:-	store in cool & Dry Place.
MFG BY:- L.N.B.C IOP, Raigad, Satara.		

EVALUTION TEST OF HERBAL HAIR OIL

The prepared herbal hair oil underwent a physical evaluation.

1) Sensitivity test:

The formulated herbal hair oil was applied to a 1cm area of skin on the hand that had been exposed to sunlight for 4-5 hours[8].

2) Saponification value:

Precisely 1 ml of the oil was weighed into a 250 ml conical flask, followed by the addition of 10 ml of a 2:1 ethanol:ether mixture. Then, 25 ml of 0.5 N alcoholic KOH was added, and the mixture was allowed to stand for 30 minutes. After cooling, the solution was titrated with 0.5 N HCl, using phenolphthalein as an indicator. A blank titration was also conducted without the oil sample. The amount of KOH used, in milligrams, was calculated[6].

3) pH:

The pH meter was powered on and calibrated using distilled water and oil. To obtain a pH-temperature reading, the electrode tip was rinsed with deionized water. The dispenser button on the top of the electrode was pressed until a click was heard, releasing 5 drops of reference electrolyte at the tip. The

readings were allowed to stabilize, indicated by the “READY” signal and a beep from the meter. Once stabilized, the results, including temperature, were recorded[6].

4) Viscosity:

The viscosity was measured using an Ostwald viscometer. First, the viscometer was filled with distilled water up to the upper mark of the tube. Pressure was then released to record the time it took for the liquid to reach the lower mark. The same procedure was repeated for the oil, and the readings were recorded for calculation [7].

5) Specific gravity:

A specific gravity bottle was rinsed with distilled water, dried in an oven for 15 minutes, and allowed to cool. It was then sealed with a cap and weighed (a). The same bottle was filled with the sample, capped, and weighed again (b). The weight of the sample per milliliter was calculated by subtracting the initial weight (a) from the final weight (b) [9].

RESULTS:

Evaluation of herbal hair oil:

S. NO	Parameter	Inference
1	Sensitivity test	No irritation
2	Saponification value	199.15
3	pH	6.8
4	Viscosity	0.00532
5	Specific gravity	114.9
6	Grittiness	Smooth
7	Colour	Brown faint
8	Odour	Pleasant

CONCLUSION

Herbal oils, commonly used for hair care, provide a range of essential nutrients that support the normal function of sebaceous glands and promote natural hair growth. The vitamin, mineral, and essential oil content of the final hair products fall within acceptable ranges. Herbal hair oils are typically formulated with ingredients like coconut oil, sesame oil, almond oil, hibiscus, and jasmine. The natural extracts and components chosen for the hair oil formulation are believed to possess properties that help control hair fall and enhance hair thickness. When combined, these ingredients create a synergistic effect that promotes vibrant, healthy hair. The use of a unique herbal blend with distinctive benefits further enhances the formula. The method is safe for human use, and after formulation, the natural hair oil was evaluated using various parameters, including pH, organoleptic properties (color, odor, texture, sedimentation), acid value, specific gravity, and stability, all of which confirmed its high quality.

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