

NATURE'S PHARMACY FOR HAIR: A REVIEW OF BOTANICAL INGREDIENTS FOR
HAIR GROWTH, DANDRUFF CONTROL, AND SCALP WELLNESS

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ABSTRACT

Hair plays a crucial role in human appearance, cultural identity, and overall well-being, underscoring the importance of proper hair care. The increasing popularity of herbal hair oils can be attributed to their natural composition, minimal side effects, and therapeutic benefits in maintaining scalp health and promoting hair growth. This review delves into the structure of the hair follicle, the hair growth cycle, and the functional role of herbal ingredients commonly used in hair oil formulations, such as coconut, amla, curry leaves, fenugreek, hibiscus, nagarmotha, and black cumin. A traditionally prepared herbal hair oil was evaluated through physicochemical assessments, including pH, viscosity, acid value, saponification value, specific gravity, and stability testing. The results demonstrated a favourable pH, acceptable viscosity, low acid value, and good stability, with no skin irritation or sensitivity observed. The findings highlight the potential of herbal hair oils as a safe and natural alternative to synthetic hair care products, offering significant benefits for promoting healthy hair and scalp.

KEYWORDS: Hibiscus, Coconut oil, amla, curry leaves, fenugreek.**I. INTRODUCTION**

Hair is a vital component of human existence. Hair care products are those formulas that are used to clean hair, change its texture, change its color, revitalize stressed hair, nourish it, and give it a healthy appearance.^[1]

The ancient method in India involves making hair oils and combining them with other medications that promote hair growth. Indian ladies are renowned for having long, lustrous, and healthy hair.^[2]

Hair oils are formulated to treat common hair problems including split ends, dandruff, and thinning hair, especially those that contain herbs like castor, coconut, almond, and onion oils. Coconut oil is unique among these oils since it may effectively penetrate hair strands, provide nourishment, support scalp health, and encourage hair development. Herbal hair care products, such as hair oils, have been increasingly popular in the modern era because of their higher efficacy, natural composition, and low negative effects. As contrast to artificial substitutes. By supplying vital moisture and nutrients that promote the proper function of the

sebaceous glands, herbal oils—often in combination with other medicinal herbs—offer a comprehensive solution for maintaining healthy hair.^[3]

Herbs are used in hair care products these days, and they are more well-known than artificial ones. During those years, the usage of hair oil has grown as part of hair care, and this is mostly due to its benefits in treating hair problems. Both natural and synthetic substances are used in the formulation of hair oils. Hair care products composed of synthetic or chemical materials are known as artificial hair oils. They help minimize frizz and offer shine and superior conditioning.^[4]

Natural hair oils are hair care products that are high in vitamins, minerals, and fatty acids—all of which are essential components of human cells and are also found in our skin and hair. As a result, when we apply natural hair oils, these essential nutrients are well absorbed into the scalp and hair, promoting healthy scalp regeneration and strong, healthy hair growth.^[2]

Herbal hair oil not only hydrates the scalp but also cures dry hair and scalp conditions. It offers a variety of vital nutrients needed to sustain regular sebaceous gland function and encourage normal hair growth. Flavonoids, polyphenols, saponins, tannin, vitamins, proteins, minerals, ricin oleic acid, and other compounds are abundant in the plant portions that are utilized. Additionally, these components aid in hair growth and offer numerous advantages for hair.^[5]

Herbal hair oils can help fortify your hair and improve its texture. It also provides a lot more moisture to the scalp, which aids in the removal of dandruff. It gives the hair a flawless finish and smoothes it outshine. The blood is increased when hair is oiled circulation in the scalp and, consequently, healing from the hair damage. Hair oil also consistently lessens the hygral fatigue or swelling and drying the hair. Additionally, it shields the follicle from surfactants by bridging the cuticle cell gap and it promotes the health of the scalp. Scalp massage with the oil aids in exfoliation, and occasionally that also aids in lowering hair loss.^[6]

The composition of the herbal hair oil has notable quality and it offers a number of vital nutrients required to sustain the regular operations of the sebaceous glands and encourage the development of hair naturally.^[7]

Both the health care system and personal hygiene are improved by the use of herbal cosmetics. The use of bioactive components in formulation has a significant impact on body characteristics and provides nutrients needed to keep hair healthy and appealing. Because it is made using herbal substances, it has either no negative effects or very few.^[8]

Hair Follicle & Hair Structure

A follicle of hair is an intricate, dynamic organ that grows hair and is embedded in the skin. Knowing its structure gives insight into hair health, growth, and the causes of hair loss.

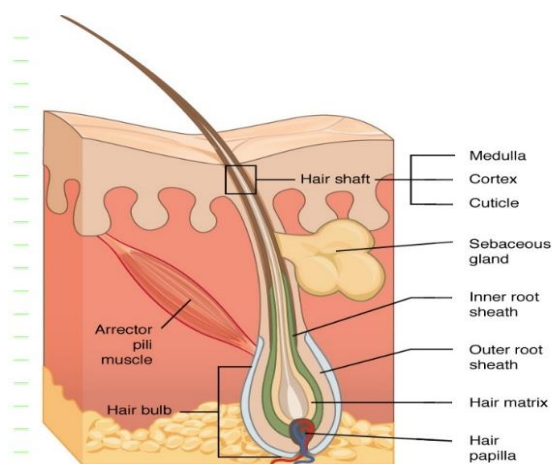


Fig. No. 01 Hair Structure.

Key Components of a Hair Follicle

❖ Shaft of Hair

- Cuticle - The outermost layer, known as the cuticle, is made up of keratinized cells that provide protection and add shine to hair.
- Cortex - Keratin and melanin are found in the cortex, a thick layer that lies beneath the cuticle and determines the color, elasticity, and strength of hair.
- Medulla - The central core of thicker hairs, known as the medulla, contributes to the structure of the hair.

❖ Hair Root and Bulb:

- Bulb - The bulbous base of the follicle, where the hair product starts, is home to melanocytes, which give hair its color, and keratin-producing cells.

❖ Papilla Dermal

a cone-shaped structure at the base of the follicle that is full with blood vessels and provides vital nutrients and oxygen to promote vigorous hair growth.

❖ Internal and exterior Root Capsule

- Inner root sheath: - Maintains the shape of the growing hair shaft by attending to it. Extending through the epidermis and dermis,
- External Root Sheath: - it sacrifices structural support and contains stem cells that are essential for skin formation and hair renewal.

❖ Sebaceous Gland

This gland, which is attached to the follicle, secretes sebum, an oleaginous substance that prevents emptiness by conditioning the hair and crown.

❖ Arrector

- Tiny smooth muscle that is connected to the follicle and when it contracts, the hair stands up straight (piloerection), which is commonly referred to as "geesebumps."

Hair Growth Cycle



Fig. No. 2 Hair Growth Cycle.

Hair Follicles Suffer a Cyclical Process Comprising Four Stages

❖ Anaphase (growth phase)

The growth phase is called Anagen. The active period, which lasts two to eight times, is when hair grows about 0.35 mm every day.

❖ Catagen (transition phase)

The transition phase is called catagen. The hair follicle shrinks and separates from the dermal papilla during a brief two-week period, signifying the end of active growth.

❖ Telogen (Phase of Rest)

a period of rest that lasts for several months, during which follicles remain dormant and hair growth stops.

❖ Exogen (slipping phase)

The stage where new hair grows in place of old hair. In order to manage hair-related issues and promote general crown and hair health, it is crucial to comprehend the complex structure and function of hair follicles.^[9]

Hair Oil

Hair oil is a component of hair care products. Products designed to wash, change the texture of hair, nourish hair, and maintain the appearance of healthy hair are referred to as hair care products.^[10] Hair oils are hair care treatments used to treat dry hair, balding, graying hair, and hair loss. Additionally, they help feed the hair.^[11] Herbal cosmetics are in high demand because people are becoming more interested in them, their ingredients are easily accessible, and they are more effective than their synthetic equivalents.^[12] Herbal hair is an essential part of herbal cosmetics oil. For many hair conditions, herbal hair oil is becoming more and more popular.^[13]

Various varieties of herbal hair oil on the market

- Hair oil from Amla
- Hair oil from coconuts
- Hair oil from Bhringraj
- Hair oil with jasmine

II. OBJECTIVE

- The herbal benefits of hair
- Finding the ideal blend of herbs to provide the greatest impact.
- Managing frizzy hair
- preventing dandruff, split ends, and dull hair; and preventing hair loss
- A fun summary for a healthy scalp.^[4]
- Increase high density volume, giving the appearance of fullness and health.
- Give hair vital nutrients.^[14]

III. IDEAL CHARACTERISTICS

- Antidandruff and anti-itching
- Lightweight
- natural and mild
- pleasant aroma
- nourishing and hydrating to hair and crown
- encouraging hair growth.^[15]

IV. MATERIALS AND METHOD

Materials

Coconut Oil, Curry Leaves, Amla Fruit, Fenugreek Seed, Hibiscus Flower, Nagarmotha Roots, Kalonji Seed,

1. Coconut oil

Family- Aceraceae.

Scientific name- *Cocos nucifera* L.

Other names: Fossil oil, Grease, Lubricating oil

Part Used: kernel oil

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

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



Fig 03: Coconut oil.

The milk from the coconut palm fruit is used to make coconut oil. In addition to being used as a food oil, coconut oil is utilized in the manufacturing of detergents and cosmetics. Coconut oil gives hair luster and nourishes the scalp.

2. Curry leaves

Family- Rutaceae.

Scientific name- *Murraya koenigii*.

Other names: karivepallai, karivembu, karivepaku, kadipatta

Parts used- Leaves.

Active constituents-Bismahanine, Murrayanine, Murrayazolinol.

Uses

- Strengthens the roots of hair and encourages hair development.
- Assist in removing dead hair follicles and moisturizing the scalp.
- Preventing thinning and hair loss.

3. Fenugreek Seeds

Family- Fabaceae

Scientific name- *Trigonella foenum-graecum*.

Parts used- Seeds

Active constituents- Trimethylamine, Trigonelline, Quercetin.

Other names: Herbaceous plant. Fenugreek seed, *Trigonella*.

Uses

- Reduce dandruff
- Improve hair growth

- Shows anti-fungal activity.



Fig 04: Fenugreek Seeds.

Methi curb, or fenugreek seeds, strengthens your hair from root to tip and prevents hair loss. Additionally, fenugreek seeds are high in protein and nicotinic acid, both of which are known to help prevent dandruff and hair loss. Dried fenugreek seeds are prized for their potent antibacterial, anti-inflammatory, and anti-cancer qualities. Additionally, these seeds are renowned for their reviving qualities as antioxidants.

4. Amla Fruit

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.



Fig 05: Amla Fruit.

In the Indian traditional medical system, Phyllanthus emblica is a significant medicinal plant. The tree's height ranges from 1 to 8 meters. The simple leaves are arranged closely next to branchlets. The color of the flowers is greenish yellow. The fruit has a hard appearance and is almost round in shape. An amla is an excellent natural skin conditioner because it contains up to 80% moisture.

5. Hibiscus flower

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

Uses.

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



Fig 06: Hibiscus Flower.

Oval to lanceolate, the leaves alternate and often have a toothed or lobed margin. The flowers are big, noticeable, and trumpet-shaped. Formed by at least five petals. This plant is extensively cultivated as an ornamental plant in tropical and Subtropical region. This plant can be found as a houseplant all over the world and is frequently found in the tropics.

6. Nagarmotha Root

Family: Cyperaceae

Botanical name: Cyperus rotundus

Other names: Cyperus rotundus, Nut grass

Active constituents- Alkaloids

Parts used: dried roots

Uses

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



Fig No 07: Nagarmotha Root.

7. Kalonji Seed

Botanical Name: black cumin

Family: Ranunculaceae

Other Name: nijella seed

Part Used: seed

Active Constituent: Thymoquinone, Dithymoquinone, P-cymene.

Uses

- Help soothe irritate scalp
- Prevent scalp infection.



Fig. of 08: Kalonji seed.

Formula Table

API

Ingredients and Quantities of Herbs.

| Sr No | Ingredients | Qty (mlper 100 ml) |
|-------|-----------------|--------------------|
| 1. | Coconut oil | 100 ml |
| 2. | Hibiscus Flower | 3-4Unit |

Excipient

Excipients with their Quantity.

| Sr. No | Ingredients | Qty (mlper 100 ml) |
|--------|-----------------|--------------------|
| 1. | Amla Fruit | 2 gm |
| 2. | Kaonja Seed | 1 gm |
| 3. | Curry Leaves | 8 unit |
| 4. | Fenugreek Seeds | 2 gm |
| 5. | Nagarmotha Root | 4-5 Unit |

Methods of Preparation

- 1) Herbal hair oil is made with a variety of ingredients, including coconut oil, curry leaves, amla fruit, fenugreek seeds, hibiscus flowers, kaonja seed, and nagarmotha roots.
- 2) To begin, grind the amla fruit, kaonja seed, and fenugreek seeds coarsely.
- 3) Transfer the powder into a glass container.
- 4) Next, fill it with 100 milliliters of coconut oil. Add the hibiscus flowers and curry leaves as well.
- 5) Next, mix the oil with the Nagarmotha.
- 6) Turn the stove on and bring it to a boil. Stir thoroughly and bring to a boil over a low heat.
- 7) It takes ten to fifteen minutes to boil. Bring to a boil until it turns brown.
- 8) Turn off the stove at this point and let it cool.
- 9) Afterward, use a fresh cotton cloth to filter it twice.

10) Transfer the mixture onto a cotton cloth, then squeeze it to fully extract the oil.

11) Place it in a container bottle and store it after extraction. The herbal oil is now usable.^[16]

Following the preparation, we must the assessment exam. Assessment offers a methodical approach to researching a practice, program, intervention or the effort to comprehend how Well, it accomplishes its objective. Additionally, it aids in determining What is effective and what could be enhanced in a Program.^[17]

V. EVALUATION TEST

PH Determination

A digital PH meter was used to measure the pH. The PH meter's bulb was dipped in 20 milliliters of herbal hair oil that had been placed in a beaker.

In hair lubricant. The pH values that were obtained are recorded.

| Sr No | Parameters | Observation |
|-------|------------|-----------------|
| 1 | Colour | Brown |
| 2 | Odour | Characteristics |
| 3 | Texture | Smooth |
| 4 | PH | 6.01 |
| 5 | Smoothness | Smooth |

Acid Value

One gram of the material was precisely dissolved in five milliliters of ethanol and ether mixture that had been neutralized with 0.1M KOH.

In the event that the sample did not dissolve completely, a reflux condenser was attached, and the sample was gradually heated using Until the sample was dissolved, stir frequently. Next, 0.1M KOH was used to titrate 1ml of phenolphthalein solution until

After 30 minutes of shaking, the solution still had a slight pink tint. The following formula was used to determine the acid value.

Value of acid = $5.61 \times n/w$

Number of milliliters of 0.1M KOH

Saponification Value

A 25 ml conical flask was filled with 2 ml of herbal hair oil after it had been weighed. 25 milliliters of alcoholic KOH solution were added to this.

It was as heated on a water bath for half an hour while the contents of the flask were constantly mixed, and then phenolphthalein was added to the cooled liquid.

And compared to 0.5M HCL. Saponification values were computed after a Blank solution was used. Value of saponification = $(b-a) \times 28.05/\text{substance weight}$

B=blank value

A = assay value

The formulas were put through a biological evaluation and saponification values were established.

| Sr No | Parameters | Observation |
|-------|----------------------|-------------|
| 1 | Acid value | 0.68 |
| 2 | Saponification Value | 28.05 |
| 3 | Viscosity | 1.07 |

Primary skin irritation Test

The primary skin irritation test was used to evaluate the prepared formulations. Human subjects in good health were chosen for the research.

The Each volunteer's 1 cm² of hair was shaved to make room for three test locations. Surgical spirit was used to clean it.

The amounts formulations were applied to the corresponding test sites, and for 48 hours following application, erythema and edema were monitored.^[18]

| Sr No | Parameters | Observation |
|-------|------------------|---------------|
| 1 | Irritation Test | Non-irritant |
| 2 | Sensitivity Test | Non-sensitive |

Specific Gravity

A specific gravity bottle was removed and cleaned with distilledwater, dried for fifteen minutes in the oven, cooled, and thenweighed (a). The same particular herbal hair oil was usedgravity bottle, sealed, and weighed once more (b). Subtracted the weight (b-a) from the sample's weight per milliliter.^[19] The specific gravity is found 0.83g/cm³

Stability Study

The bottle containing the herbal hair oil was stored in the room temperature for research on stability.^[20]

Sedimentation Test

There are no indications of sedimentation or separation in the herbal hair oil.^[21]

VI. RESULT

Coconut oil, amla fruit, fenugreek seeds, hibiscus flowers, and curry leaves were combined to prepare the herbal hair oil.

1. Physical Evaluation

- Brown is the colour
- The odour is characteristic
- It has a smooth texture.
- The pH is 6.01.
- The specific gravity is 0.83g/cm³

2. Chemical Evaluation

- The acid value is 0.68
- The value of Saponification is 28.08

3. Biological Evaluation

- The results of the irritation test are not irritating.
- The results of the sensitivity test are not sensitive.

CONCLUSION

The formulated herbal hair oil has emerged as a promising natural alternative to conventional synthetic hair care products, showcasing its potential to promote healthy hair growth, strengthen hair roots, and enhance overall scalp health. The judicious selection of ingredients, including coconut oil, amla, fenugreek, hibiscus, curry leaves, nagarmotha, and kaonja seeds, has

been instrumental in imbuing the oil with a rich array of nutrients, antioxidants, and therapeutic properties. The comprehensive evaluation of the formulation through pH, viscosity, acid value, saponification value, and primary irritation studies has unequivocally demonstrated its stability, non-irritant nature, and suitability for regular use.

The significance of this herbal hair oil lies in its ability to provide a holistic, economical, and effective solution for maintaining strong, nourished, and healthy hair, while mitigating the risks associated with chemical-based products. The oil's natural composition and therapeutic properties make it an attractive option for individuals seeking to adopt a more natural and sustainable approach to hair care. Furthermore, the use of this herbal hair oil can be seen as a proactive step towards minimizing the environmental impact of synthetic hair care products, thereby contributing to a more sustainable and eco-friendly lifestyle.

Ultimately, the successful formulation and evaluation of this herbal hair oil underscore the potential of traditional herbal knowledge and natural ingredients in addressing contemporary hair care needs.

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