

A Review on Herbal Cosmetics Products: Hair Care in Natural Way

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Abstract: *The concept of hair care cosmetics dates back to ancient civilizations, where natural ingredients were used to maintain and enhance hair health. Herbal hair care cosmetics, often referred to as natural cosmetics, are formulated using various cosmetic bases combined with herbal ingredients to address different hair-related issues.*

Hair plays a vital role in protecting the scalp and contributing to overall appearance. Herbal hair care products such as shampoos, conditioners, and oils are used for cleansing, conditioning, and nourishing the hair. These products help make hair smooth, shiny, and manageable while preventing breakage, reducing split ends, and enhancing luster. Their primary function is to minimize friction between hair strands, making combing and styling easier, while also providing therapeutic benefits to the scalp.

Keywords: Hair, hair care, herbal cosmetics, herbal oil, herbal shampoo, herbal conditioner, herbal dye, herbal serum and hair preparation

I. INTRODUCTION

In recent years, there has been a global shift toward embracing a natural lifestyle and returning to the use of herbal products. For maintaining a healthy way of life, people increasingly prefer natural foods, herbal hair cosmetics, herbal medicinal formulations, and traditional healing practices. The demand for herbal hair care cosmetics has grown significantly, making them more accessible to a wider population. This trend has largely emerged as a response to the extensive use of synthetic chemicals and chemical-based products over the past century and a half, which have been associated with various side effects and environmental concerns due to their harmful by-products [1].

The growing awareness among consumers about the benefits and superior quality of herbal products has led to a significant rise in the use of herbal hair cosmetics. Herbal cosmetics represent one of the most promising and effective branches of cosmetic science, aimed at enhancing beauty and overall appearance naturally. These products are generally welltolerated and safer compared to synthetic alternatives, making them a preferred choice for long-term use.

Hair oils are essential hair care products that help maintain and improve hair health. They are formulated to cleanse, nourish the scalp, enhance texture, and preserve the hair's natural appearance. Herbal hair oils, in particular, are used to treat issues such as hair fall, greying, baldness, and dryness while providing deep nourishment. With the growing preference for natural cosmetics, herbal hair oils have gained popularity due to their effectiveness, minimal side effects, and use of easily available natural ingredient [2].

Herbal shampoos are formulated using natural ingredients and are designed to cleanse the hair and scalp effectively, similar to regular shampoos. However, unlike synthetic shampoos, herbal shampoos are free from harmful surfactants, making them safer and more stable. Prolonged use of synthetic shampoos containing surfactants can cause adverse effects such as scalp irritation, hair loss, dryness, premature greying, split ends, and skin irritation. Due to these concerns, consumers are increasingly turning toward herbal shampoos, appreciating their minimal side effects, natural composition, and affordability [3].

A conditioner is a formulation designed to improve the overall condition of the hair and is suitable for all hair types. It works by replenishing moisture and smoothing the cuticles of hair strands, resulting in softer and more manageable



hair. Conditioners enriched with powerful antioxidants also help protect the hair from UV damage, preventing color fading and protein degradation [4].

Synthetic hair dyes can cause irritation and side effects, leading many people to prefer herbal alternatives. Herbal hair dyes are safer and promotes healthy hair. Around 70% of people experience hair loss or premature greying, which may be influenced by genetics, illness, medications, or stress. Since ancient times, natural dyes from plant parts like roots, leaves, bark, and flowers have been used to color fabrics and hair [5].

Hair is an essential part of the human body that greatly contributes to a person's appearance. Therefore, proper hair care is crucial for maintaining its health and beauty. Hair is a modified epithelial structure that grows from hair follicles, which are abundant on the scalp and connected to sebaceous glands. The pH of the hair shaft is approximately 3.67, while the scalp's pH may vary due to environmental factors and sebaceous gland activity. These variations can make the scalp prone to fungal and bacterial infections such as tinea capitis, dandruff, scalp psoriasis, folliculitis, head lice, and alopecia [6].

HAIR:

Hair is one of the defining features of mammals and serves several important functions, including protection against external factors such as heat and cold. It is considered an essential part of the body, acting as a protective appendage and an accessory structure of the integumentary system, along with the sebaceous and sweat glands. The main parts of hair include the bulb, root, and shaft. Common hair-related problems include hair fall, dandruff, lice infestation, split ends, and premature greying. Although a strand of hair may appear simple, it is actually one of the most complex structures in the human body [7].

HAIR ANATOMY:

Hair is a complex structure made up of a shaft and a root that work together as a unit. The shaft is the visible part above the skin, while the root lies below, enclosed within the hair follicle connected to sebaceous glands and the arrector pili muscle. The base of the root forms a bulb containing the dermal papilla, which supplies nutrients for hair growth. Hair follicles are surrounded by nerve endings, making them sensitive to touch. Structurally, the hair shaft consists of three main layers: the cuticle, cortex, and medulla. [8].

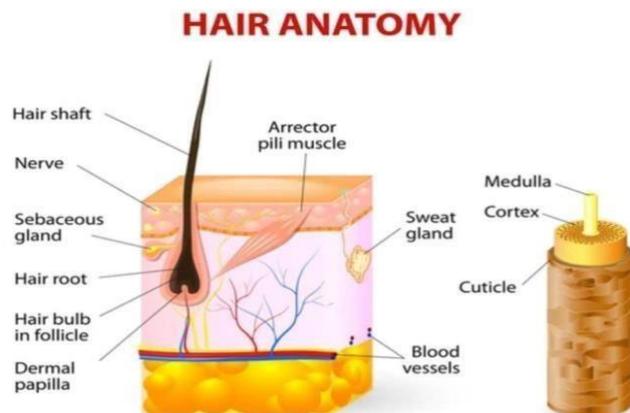


Fig: 1 Hair Anatomy

The hair shaft of mammals is divided into three main regions: a)Cuticle

b) Cortex

c) Medulla

A. Cuticle:



The hair cuticle is the outermost protective layer of the hair, made up of overlapping cells like fish scales. It is naturally coated with sebum, which helps retain moisture and protect the hair from drying. A smooth and intact cuticle keeps hair shiny, flexible, and hydrated by regulating moisture movement. However, chemical treatments and environmental factors can lift or damage the cuticle, leading to dryness, brittleness, and loss of shine. [9].

B. Cortex:

The cortex is the main part of the hair, making up about 75% of its weight and determining its color, strength, and texture. It is composed of tightly packed keratin strands held together by disulfide and hydrogen bonds, which provide durability. The cortex also contains melanin granules responsible for hair color. Its health depends on the cuticle’s protection, and its structure influences whether the hair is straight, wavy, or curly. [7].

C. Medulla:

The medulla is the innermost layer of the hair shaft. It is a soft, fragile layer that serves as the core of the hair. In some mammals, the medulla may be absent. The presence, absence, and structural characteristics of the medulla, such as the presence of air pockets and its histological features, are useful for taxonomists in identifying the species from which a hair originates.

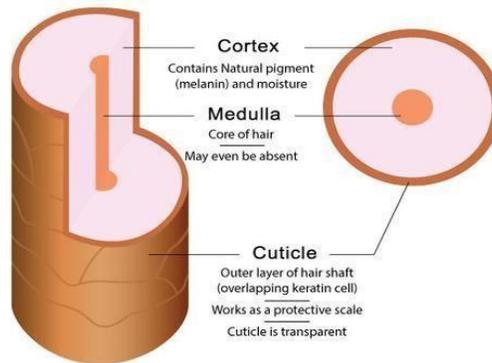


Fig: 2 Medulla

HERBAL HAIR CARE COSMETICS INCLUDES.

1. HERBAL HAIR OIL
2. HERBAL HAIR SHAMPOO
3. HERBAL HAIR CONDITIONERS
4. HERBAL HAIR DYES
5. HERBAL HAIR SERUM

1. HERBAL HAIR OIL:

Hair oils are essential product that help maintain healthy hair by providing nourishment and protection. Herbal hair oil, made from natural ingredients, are used to treat problems like hair fall, dandruff, dryness, and premature greying. They are gaining popularity because they are effective, safe, and free from harmful chemicals, making them an important part of natural hair care [10].

COMPOSITION OF HEARBL HAIR OIL [11] :

1. Brahmi:

Brahmi (Bacopa monnieri) is a traditional Ayurvedic herb widely used in herbal hair oils for its hair-strengthening and scalp-nourishing properties. It improves blood circulation in the scalp, stimulates hair follicles, reduces dandruff,



prevents split ends, and promotes thick, healthy hair growth. Regular use of Brahmi oil also helps calm the mind and relieve stress, which indirectly reduces stress-related hair fall.



Fig: 3 Brahmi

2. Neem:

Neem known as the — universal healer || in Ayurveda, is a key ingredient in herbal hair oils. Rich in active compounds like azadirachtin, nimbin, nimbidin, and quercetin, neem offers antibacterial, antifungal, anti-inflammatory, and antioxidant effects.



Fig: 4 Neem

3. Amla:

Amla also known as Indian gooseberry, is a rich source of vitamin C, antioxidants, and tannins. In Ayurveda, it is Tikta (bitter), Kashaya (astringent), Sheeta (cooling), which balances Pitta and Kapha doshas.



Fig: 5 Amla

3. Reetha:

Reetha commonly known as soap nut, is rich in saponins, which give it natural cleansing properties. In Ayurveda, it is Tikta (bitter), Kashaya (astringent), Sheeta (cooling) and helps balance Pitta and Kapha doshas.





Fig: 6 Reetha

4. Coconut oil:

Coconut oil improves the health and condition of your hair by helping to prevent protein loss. It is beneficial to apply it both before and after washing your hair.



Fig: 7 Coconut Oil

5. Almond oil:

Almond oil is rich in essential fatty acids that moisturize the scalp and hair strands, promoting healthy, smooth, and soft-textured hair. When used daily, it penetrates at a cellular level to soften the hair right from the roots.



Fig: 8 Almond Oil

6. Fenugreek

Fenugreek promotes blood circulation and helps reduce dandruff. Its seeds are rich in protein and contain nicotinic acid, which nourishes the hair, combats dryness, and helps prevent hair thinning and balding.





Fig: 9 Fenugreek

7. Lavender oil:

Lavender oil is valued for its soothing and calming effects. In hair care, it enhances blood circulation to the scalp, promotes hair growth, and helps reduce dandruff. Its antibacterial and antifungal properties keep the scalp healthy, while its pleasant fragrance leaves the hair fresh and aromatic.



Fig: 10 Lavender Oil

8. Vitamin E:

Vitamin E tablets act as powerful antioxidants when added to herbal hair oil. They protect hair from free radical damage, improve scalp circulation, and strengthen hair follicles to promote healthy growth. Vitamin E also nourishes the scalp, reduces dryness and split ends, and adds natural shine, softness, and smoothness to the hair.



Fig: 11 Vitamin E

Types of Herbal Hair Oils Available in the Market:

- Coconut Hair Oil
- Amla Hair Oil
- Bhringraj Hair Oil
- Brahmi Hair Oil
- Jasmine Hair Oil
- Onion Hair Oil
- Cantharidin Hair Oil [12].



LIST OF INGREDIENTS AND IMPORTANCE IN THE FORMULATION OF HERBAL HAIR OIL: [12]

Table: 1

Sr. No	Ingredients	Importance/Role
1.	Brahmi	Hair Growth, Boosting scalp health
2.	Neem	Antibacterial, Strengthens roots
3.	Amla	Graying
4.	Reetha	Anti-Dandruff, Add shine
5.	Coconut Oil	Moisturise dry hair
6.	Almond Oil	Treat hair loss, Rich vitamins
7.	Fenugreek	Control hair fall, add thickness
8.	Lavender Oil	Conditioning agent, reduces stress
9.	Vitamin E	Preservative

Requirements of a Herbal Hair Oil:

- It should be easily washable with water.
- It should leave the hair dry, soft, shiny, and manageable with minimal frizz.
- It should impart a pleasant fragrance to the hair.
- It should not cause any adverse effects on the skin or eyes [13].

Method of Herbal Hair Oil Preparation:

- Plant materials such as Reetha (powder) and Fenugreek (seeds) were procured from the local market.
- Brahmi (leaves), Neem (leaves), and Amla (fruit) were dried under sunlight and ground into coarse powders.
- Extracts of the herbs were prepared using the decoction method and stored in well-closed containers.
- All dried and fresh herbs—Neem, Amla, Reetha, Brahmi, and Fenugreek—were accurately weighed, triturated using a mortar and pestle, and mixed with Almond oil.
- The mixture was boiled for 15 minutes and then filtered through a muslin cloth.
- Coconut oil was added to the filtrate to achieve the desired final volume.
- A small amount of a flavoring agent (Lavender oil) was incorporated into the oil.
- Vitamin E was added as a preservative.
- The prepared herbal hair oil was stored in a tightly closed container [14]

Evaluation of Herbal Hair Oil:

The formulated herbal hair oil was subjected to both physical and biological evaluations.

Sensitivity Test: A small amount of the herbal hair oil was applied to a 1 cm² area on the hand and exposed to sunlight for 4–5 minutes to observe any skin reactions.

pH: The pH of the herbal hair oil was measured using a pH meter [14].

Viscosity: The viscosity of the herbal hair oil was measured using Ostwald's viscometer.

Specific Gravity:

The specific gravity bottle was first rinsed with distilled water, dried in a hot air oven for 15 minutes, cooled, capped, weighed, and recorded as (a). The bottle was then filled with the herbal hair oil, capped, and weighed again (b). The specific gravity of the oil was calculated by subtracting the empty bottle weight from the filled bottle weight to determine the weight of the sample per milliliter.

Benefits of Herbal Hair Oils:

- Promote Hair Growth:** Ingredients like rosemary and ginseng help stimulate blood circulation in the scalp, activating hair follicles and encouraging hair growth.



- Strengthen Hair:** Oils such as amla and bhringraj are rich in vitamins and minerals that nourish hair follicles, minimize breakage, and improve overall hair strength.
- Improve Scalp Health:** Neem and tea tree oils possess antifungal and antibacterial properties, supporting a healthy scalp and helping to prevent dandruff.
- Enhance Shine and Texture:** Almond and argan oils add natural shine, reduce frizz, and improve the overall texture and manageability of hair [15].

2. HERBAL SHAMPOO:

Shampoos are primarily used as hair care products to cleanse the scalp and hair in daily life. The herbal shampoo are natural hair cleansers made with plant-based ingredients that remove dirt and impurities without stripping natural oils. They are preferred over synthesis shampoo for their safety, mildness, and minimal side effects [16].

COMPOSITION OF HERBAL SHAMPOO: [17]

1. Neem Powder:

Neem powder is a common ingredient in herbal shampoos due to its antibacterial, antifungal, and anti-inflammatory properties. It helps cleanse the scalp, remove dandruff, control oil, and promote healthy hair growth while keeping hair soft and manageable.



Fig: 12 Neem Powder

2. Bhringraj:

Bhringraj (*Eclipta alba*) is a powerful herb used in herbal shampoos to promote hair growth, reduce hair fall, and prevent premature greying. It nourishes the scalp, strengthens roots, and adds natural shine to the hair.



Fig: 13 Bhringraj

3. Aloe vera powder:

Aloe vera is widely used in herbal shampoos for its soothing and moisturizing properties. It helps cleanse the scalp, reduces dandruff, and promotes hair growth. The natural enzymes and vitamins in aloe vera nourish hair roots, add shine, and prevent dryness, leaving hair soft and smooth.





Fig: 14 Alovera powder

4. Shikakai:

Shikakai (*Acacia concinna*) is a natural cleanser that gently removes dirt and excess oil without stripping natural oils. It promotes hair growth, reduces dandruff, and leaves hair soft, shiny, and manageable.



Fig: 15 Shikakai

5. Amla Powder:

Rich in vitamin C and antioxidants, Amla powder strengthens hair roots, promotes hair growth, reduces hair fall, prevents premature graying, and adds natural shine and softness to hair. It also helps in maintaining a healthy scalp by reducing dandruff and dryness.



Fig: 16 Amla Powder

6. Sop Nut:

Acts as a natural cleanser and foaming agent, gently removing dirt and excess oil from hair and scalp. It helps in reducing dandruff, prevents hair breakage, and adds natural shine and softness to hair.



Fig: 17 Sop Nut

LIST OF DRUGS NAME, PARTS & MEDICINAL USES OF HERBAL HAIR SHAMPOO [18].

Sr.no	Drugs name	Parts	Medicinal Uses
1.	Neem powder	Leaves	Antibacterial agent
2.	Bhringraj powder	Flower	Promote hair growth



3. Aloe vera powder	Leaves	Moisturizing agent
4. Shikakai powder	Ponds	Detergent
5. Amla powder	Fruit	Anti-dandruff
6. Sop Nut	Nut	Foaming agent

Table: 2

Preparation of Extract:

Approximately 100 g of each powdered plant material Neem, Hibiscus flower, Aloe vera, Shikakai, Licorice, Amla, and Reetha (Cleaner nut) was homogenized. Each powder was boiled with distilled water for 4 hours, and the resulting extract was separated and filtered.

Formulation of Herbal Shampoo:

The herbal shampoo was prepared using the following steps: To 10 ml of gelatin solution, the herbal extract was added and continuously mixed for 20 minutes. Additionally, 1 ml of lime juice was incorporated with constant stirring. To enhance the fragrance of the formulation, a suitable amount of essential oil (rose oil) was added, and the total volume was made up to 100 ml with gelatin solution.

Evaluation of Herbal Shampoo:

The prepared herbal shampoo was evaluated for its performance, including organoleptic properties, pH, physicochemical characteristics, and solid content. Standard tests were also conducted to assess surface tension, foam volume, foam stability, and wetting time.

pH Determination:

The pH of the prepared herbal shampoo (10% v/v in distilled water) was measured using a pH meter at room temperature [19].

Surface Tension Measurement:

The prepared shampoo (10% w/v in distilled water) was evaluated for surface tension using a stalagmometer at room temperature [20].

Testing of Wetting:

Wetting time was determined by measuring the time taken for a piece of oil paper to sink completely. A 0.44 g oil paper was cut into a 1-inch disc. The paper disc was placed on the surface of 1% (v/v) shampoo solution, and the time required for it to sink was recorded using a stopwatch.

Foam Stability Test:

Foam stability was evaluated using the cylinder shake method. About 50 ml of the formulated shampoo was placed in a 250 ml graduated cylinder and shaken 10 times. Foam volume was recorded after 1 minute and 4 minutes to assess froth stability. The total foam volume was calculated after 1 minute of shaking. [39]

Ideal Properties of Herbal Shampoo:

- It should effectively and completely remove dirt, dust, excess sebum, fatty substances, and loose corneal cells from the hair and scalp.
- It should produce a rich and stable foam to provide a satisfying cleansing experience and a sense of freshness.
- It should meet user preferences by being well-lathering, aromatic, gentle, soothing, and calming to the scalp.
- It should be easily rinsed off with water without leaving any residue.
- It should leave the hair soft, smooth, lustrous, and manageable with minimal flyaways, giving a shiny and silky appearance even after the first few washes.
- It should impart a pleasant and long-lasting fragrance to the hair.
- It should be safe for regular use and should not cause irritation or allergic reactions to the skin or eyes.
- It should be mild enough to prevent roughness or chapping of the hands during application [20]



HERBAL HAIR CONDITIONER:

Hair conditioner is hair care product used after shampooing to restore moisture, smooth the hair cuticles, and improve hair texture. It enhances softness, shine, and manageability while protecting hair from damage. Herbal conditioners, enriched with natural antioxidant, help prevent UV damage, color fading, and protein loss. In this study, three different herbal hair conditioners were formulated and evaluated and evaluated for their effectiveness [21].

COMPOSITION OF HERBAL HAIR CONDITIONER: [22]

1. Flax seeds:

Flax seeds are rich in omega-3 fatty acids, vitamin E, and antioxidants that nourish and strengthen the hair. They help reduce dryness, frizz, and breakage while promoting smoothness and shine. Flax seeds also enhance scalp health, retain moisture, and make hair soft, manageable, and conditioned naturally.



Fig: 18 Flax seeds

2. Rose Petals:

Rose petals are rich in antioxidants and vitamins that help nourish and hydrate the hair. They smooth the scalp, reduce dryness, and add a natural shine. Their gentle conditioning properties make hair soft, smooth, and fragrant while promoting healthy hair growth.



Fig 19: Rose petals

3. Curry leaves:

Curry leaves are rich in antioxidants, amino acids, and essential nutrients that nourish the scalp and strengthen hair roots. They help prevent hair fall, promote hair growth, and restore natural shine. The presence of vitamin B and proteins in curry leaves also helps repair damaged hair and reduce premature graying, making them an excellent ingredient for herbal hair conditioners.





Fig 20: Curry leaves

4. Mint Oil:

Mint oil provides a cooling and refreshing effect to the scalp, improving blood circulation and stimulating hair growth. It helps soothe irritation, reduce dandruff, and maintain scalp health. Its antimicrobial properties keep the scalp clean, while its invigorating aroma leaves the hair feeling fresh and revitalized, making it an ideal ingredient for herbal hair conditioners.



Fig 21: Mint oil

5. Alovera pulp:

Aloe Vera is rich in vitamins, minerals, and enzymes that deeply moisturize and nourish the hair. It helps repair damaged strands, reduce dandruff, and soothe scalp irritation. Its natural conditioning properties leave hair soft, smooth, and shiny, making aloe vera a key ingredient in herbal hair conditioners or healthy and manageable hair.



Fig 22: Alovera pulp

6. olive oil:

Olive oil is rich in vitamins A, E, and antioxidants that deeply nourish and moisturize the hair. It helps smoothen the hair cuticle, reduce frizz, and add natural shine. Regular use of olive oil in a hair conditioner strengthens hair strands, prevents breakage, and promotes soft, healthy, and manageable hair.





Fig: 23 Olive Oil

List of Herbal Ingredients and Their Role of Herbal Conditioner [23]

Sr.no	INGREDIENTS	ROLE OF INGREDIENTS
1.	Flax Seeds	Deeply moisturizing and Nourishing hair.
2.	Rose Petals	Smoothing hair cuticles.
3.	Curry Leaves	Promote hair growth
4.	Mint Oil	Antimicrobial agent
5.	Alovera Pulp	Conditioning agent
6.	Olive Oil	Frizz hair control.

1. Physical Evaluation: Physical parameters such as color, appearance, and consistency are examined to assess the overall quality and uniformity of the shampoo [1].
2. pH Test: The pH strip is immersed in the herbal conditioner solution and observed for a color change. The resulting color is compared with a standard pH color chart to determine the pH value. The normal pH range for hair strands is 3.6–5.5, while that of a hair conditioner should be between 3 and 7.
3. Dirt Dispersion Test: Two drops of the conditioner are added to a test tube containing 10 ml of distilled water, followed by one drop of Indian ink. The tube is capped and shaken ten times. The amount of ink dispersed in the foam is observed and rated as none, light, medium, or heavy, indicating the dirt dispersion capacity of the conditioner.
4. Cleansing Action: About 5 g of wool yarn is coated with grease and placed in a flask containing 200 ml of water and 1 g of conditioner. The mixture is maintained at 35°C and shaken at a rate of 50 times per minute for 4 minutes. Afterward, the yarn is removed, dried, and weighed to determine the amount of grease removed, which indicates the cleansing efficiency.
5. Stability Testing: The formulated herbal hair conditioner is stored at 37°C for a period of 6 weeks. Observations are made at regular intervals to note any changes in color, appearance, or viscosity, which indicate the product's stability.
6. Moisturizing Time Determination: A 1 g ball of approximately 20 cm³ size is placed on the surface of 60 ml of various diluted conditioner samples. The time required for the ball to completely sink is recorded as the moisturizing time.
7. Viscosity Test: The viscosity of the conditioner is measured using a Brookfield Rotational Viscometer. The spindle is immersed in the sample and rotated at a specific speed, and the resistance offered by the sample is used to determine its viscosity.
8. Wetting Time: The wettability of surfactants depends on their concentration in the formulation and is commonly tested to evaluate their effectiveness. The wetting time was determined by measuring the time taken for a disc to completely sink into the conditioner [24]
9. Spread Ability: Spreadability refers to the ease with which the formulation can be uniformly spread over the skin or applied area. It influences the product's performance and bioavailability. The test is performed by placing a small



amount of conditioner between two glass slides and applying a specified weight. The time required for the upper slide to slip off the lower one is recorded shorter separation time indicates better spread ability. [25]

10. Physical Characteristics: The organoleptic properties of the conditioner were evaluated based on the following parameters: Color, Odor, Texture [26]

Benefits of Herbal conditioner:

- Herbal conditioner nourishes and strengthen hair naturally.
- They smoothen and soften hair, reduce dryness and frizz.
- Promote healthy shine, repair damage, and prevent split ends.
- Safe, gentle, and eco-friendly [27]

5. HERBAL HAIR DYES:

Hair coloring or dyeing refers to the practice of changing the natural color of the hair. The primary purpose of this process is cosmetic to cover grey or white hair and to achieve a desired or fashionable appearance. Herbal hair dyes are formulated using natural ingredients that not only impart color but also nourish and strengthen the hair. The unique blend of herbal components promotes hair growth while providing a safe and gentle alternative to synthetic dyes [28].

COMPOSITION OF HERBAL HAIR DYES [29].

1. Henna (*Lawsoni inermis*):

Henna is one of the most widely used natural herbal hair dyes. It imparts a reddish-orange tint to the hair while conditioning and strengthening it. Rich in natural pigments called Lawson, henna binds to the hair shaft, enhancing shine and texture. Besides coloring, it helps reduce dandruff, prevents scalp infections, and promotes healthy hair growth without causing damage or irritation.



Fig: 24 Henna

2. Indigo (*Indigo era tinctorial*):

Indigo is a natural herbal hair dye used primarily to achieve dark brown to black shades. When applied alone or combined with henna, it produces rich, natural dark tones. Indigo not only colors the hair but also conditions it, strengthens hair strands, and helps maintain scalp health without the harmful effects of chemical dyes.



Fig: 25 Indigo



3. Lemon Peel Powder:

Lemon peel powder is a natural herbal hair dye used to lighten hair or add subtle golden highlights. Rich in vitamin C and antioxidants, it helps nourish the scalp, reduce excess oil, and enhance hair shine. It also has mild cleansing properties and can gradually lighten hair naturally without harsh chemical



Fig: 26 Lemon Peel Powder

4. Coffee:

Coffee is a natural herbal hair dye that imparts rich brown shades to the hair. It not only enhances hair color but also adds shine and smoothness. Packed with antioxidants, coffee helps strengthen hair strands, reduce hair fall, and improve overall hair texture, offering a safe alternative to chemical dyes.



Fig: 27 Coffee

5. Shikakai (*Acacia concinna*):

Shikakai is a natural herbal used to cleans and condition hair it strengthens roots, reduce dandruff, promotes growth, adds shine, and given a mild dark tink, making it usrfula in herbal hair dye formulation.



Fig: 28 Shikakai

6. Reetha (*Sapindus mukorossi*):

Reetha, also known as soapnut, is a natural herbal ingredient used in hair care and hair dye formulations. It has mild cleansing properties, helps remove dirt and excess oil, and adds natural shine to the hair. While it does not impart strong color, it enhances the effectiveness of other herbal dyes, strengthens hair, and promotes a healthy scalp.





Fig: 29 Reetha

7. Hibiscus (*Hibiscus rosa-sinensis*):

Hibiscus is a natural herbal ingredient commonly used in hair dyes and hair care formulations. It helps darken hair naturally, adds shine, and enhances texture. Rich in vitamins and antioxidants, hibiscus nourishes the scalp, promotes hair growth, reduces hair fall, and helps prevent premature graying, contributing to overall healthy hair.



Fig: 30 Hibiscus

8. Bhringraj (*Eclipta alba*):

Bhringraj is a popular herbal ingredient used in hair dye and hair care products. It helps in darkening hair naturally, prevents premature graying, and promotes hair growth. Rich in nutrients and antioxidants, bhringraj strengthens hair roots, reduces hair fall, and improves overall hair texture and shine.



Fig: 31 Bhringraj

9. Red Sandalwood (*Pterocarpus santalinus*):

Red sandalwood is a natural herbal ingredient used in hair dye formulations to impart reddish-brown hues. It nourishes the scalp, strengthens hair strands, and enhances hair texture and shine. Additionally, its antioxidant properties help maintain scalp health and prevent premature graying.





Fig: 32 Red Sandalwood (*Pterocarpus santalinus*):

10. Brahmi (*Bacopa monnieri*):

Brahmi is a natural herbal ingredient used in hair care and hair dye formulations. It helps strengthen hair roots, prevent hair fall, and improve overall hair thickness. While it offers a subtle darkening effect, its main benefits are nourishing the scalp, enhancing hair shine, and promoting healthy hair growth.



Fig: 33 Brahmi (*Bacopa monnieri*)

11. Custard Apple (*Annona squamosa*):

Custard apple is a natural herbal ingredient used in hair care and hair dye formulations. It helps nourish and strengthen hair, improves scalp health, and adds natural shine. While it provides only a mild coloring effect, it supports healthy hair growth and prevents hair breakag



Fig: 34 Custard Apple (*Annona squamosa*)

List of Ingredients and Role of herbal hair dyes [30]

Sr.no	Ingredients	Role of Ingredients
1.	Henna	Hair dyes, Hair care product.
2.	Indigo	Improves hair colour.
3.	Lemon Peel	Antibacterial & Antifungal.
4.	Coffee	Stimulate hair follicles.
5.	Shikakai	Natural foaming agent.
6.	Reetha	Use as a cleanser and remve lice from hair.
7.	Hibiscus	Add volume, treat dandruff.
8.	Bhringraj	Increases blood circulation to the scalp & root.



9.	Red Sandalwood	Keeps the scalp hydrated.
10.	Brahmi	Reduce inflammation.
11.	Custard Apple	Shing & lustrous hair.

Table: 4

Methods of Hair Dye Preparation

1. Weighing: The first step involves accurately weighing all the components required for the batch. Some ingredients are needed in very small amounts, while larger batches may require significant quantities of multiple constituents. Precision is crucial to ensure product consistency and effectiveness.
2. Mixing: Once weighed, the ingredients are combined. For formulas that do not require premixing, the components are simply added together and thoroughly blended to achieve a uniform mixture.
3. Filling: After mixing, the prepared hair dye is transferred to the filling area. Here, the product is measured and dispensed into appropriate containers, ensuring each unit receives the correct quantity.
4. Packaging: The filled containers are moved to the packaging line, where they are sealed, labeled with complete product information, and made ready for distribution. The finished products are then stored in the warehouse until shipment.
5. Evaluation of Herbal Hair Dye The prepared herbal hair dye was assessed for several parameters, including organoleptic, physicochemical, phytoconstituents, and rheological properties.
6. Organoleptic Evaluation: The sensory characteristics of the hair dye, such as color, odor, taste, texture, and overall appearance, were examined. Raw materials and powders were also evaluated individually for their organoleptic and morphological traits.
7. Stability Test: The formulation was stored in glass vials at various temperatures for one month, and physical parameters like color, odor, pH, texture, and smoothness were monitored.
8. Patch Test: A small amount of the hair dye solution was applied behind the ear or on the inner elbow (1 cm²) and left to dry. Signs of irritation, redness, swelling, or discomfort were observed at regular intervals up to 24 hours.

Benefits of Herbal Hair Dyes:

1. Natural ingredients: Made from botanical extracts like henna, indigo, and amla, which are gentle on hair and scalp.
2. Reduced allergic reactions: Hypoallergenic nature minimizes scalp irritation and makes them suitable for sensitive skin.
3. Nourishing properties: Ingredients like henna and amla condition and strengthen hair, leaving it soft, shiny, and resilient.
4. Long-lasting color: Provides gradual, natural color that fades evenly without harsh lines. [31]

5. HAIR SERUM:

Hair serum is a lightweight, liquid treatment typically formulated with silicones that coat the hair shaft, helping to tame frizz and smooth the hair. This protective layer enhances shine without leaving a greasy feel. For many, using serum reduces the need for heat styling, cutting styling time and minimizing hair damage. [32]

COMPOSITION OF HEARBL HAIR SERUM [33,34]

1. Citrus sinensis (Orange):

Citrus sinensis extract is rich in vitamin C and antioxidants that help strengthen hair follicles, promote collagen production, and enhance scalp circulation. It adds natural shine, reduces dandruff, and helps control excess oil, leaving the hair smooth, soft, and refreshed.





Fig: 35 *Citrus sinensis* (Orange)

2. *Zingiber officinale* (Ginger):

Zingiber officinale extract stimulates blood circulation to the scalp, promoting hair growth and reducing hair fall. Its antioxidant and anti-inflammatory properties help maintain scalp health, prevent dandruff, and strengthen hair roots, leaving hair nourished and revitalized.



Fig: 36 *Zingiber officinale* (Ginger)

3. *Linum usitatissimum* (Flaxseed):

Linum usitatissimum is rich in omega-3 fatty acids, vitamin E, and mucilage, which deeply nourish and moisturize the hair. It helps reduce frizz, strengthen hair strands, and add natural shine, making the hair smooth, manageable, and healthy.



Fig: 38 *Linum usitatissimum* (Flaxseed)

4. *Nigella sativa* (Black Seed):

Nigella sativa is enriched with essential fatty acids, antioxidants, and vitamins that nourish the scalp and strengthen hair roots. It helps reduce hair fall, prevent dandruff, and promote healthy hair growth while adding softness and natural shine to the hair.





Fig:39 Nigella sativa (Black Sees)

5. Trigonella foenum-graecum (Fenugreek):

Trigonella foenum-graecum is rich in proteins, nicotinic acid, and lecithin, which nourish hair follicles and promote hair growth. It helps reduce dandruff, control hair fall, and add smoothness and shine, leaving hair stronger and more manageable.



Fig:40 Trigonella foenum-graecum (Fenugreek)

6. Hibiscus (Hibiscus rosa-sinensis):

Hibiscus is rich in vitamins, amino acids, and antioxidants that nourish the scalp and promote hair growth. It helps prevent hair fall, reduces dandruff, and conditions the hair, making it soft, shiny, and smooth.



Fig:41 Hibiscus (Hibiscus rosa-sinensis)

7. Castor Oil:

Castor oil is rich in ricinoleic acid and vitamin E, which deeply nourish the scalp and strengthen hair roots. It promotes hair growth, reduces breakage, and adds thickness and shine, leaving the hair smooth, hydrated, and healthy.





Fig:42 Castor Oil

8. Vitamin E:

Vitamin E tablets, when added to herbal hair oil, act as a powerful antioxidant that helps protect hair from damage caused by free radicals. They improve scalp blood circulation, support healthy hair follicle function, and encourage stronger hair growth. Vitamin E also provides deep nourishment, reduces dryness, prevents split ends, and adds natural shine and smoothness to hair. Its restorative properties help in repairing damaged strands, making the hair healthier, softer, and more manageable.



Fig: 43 Vitamin E

9. Aloe vera

Aloe vera is rich in vitamins, minerals, and enzymes that nourish the scalp and strengthen hair roots. It helps reduce dandruff, soothes irritation, adds moisture, and leaves the hair soft, shiny, and frizz-free.



Fig: 44 Aloe vera

10. Rose Water:

Rose water helps maintain the scalp's pH balance, reduces dryness, and provides gentle hydration. It soothes irritation, adds a pleasant fragrance, and leaves the hair soft, refreshed, and shiny.





Fig: 43 Rose Water

LIST OF INGREDIENTS AND THEIR ROLE: [35]

Sr. No	INGREDIENTS	ROLE
1.	Citrus Sinensis	Antioxidant, adds shine.
2.	Zingiber Sinensis	Stimulates growth.
3	Lilnum Vsitatissimum	Prevents dryness
4.	Nigella Sativa	Reduces hair fall.
5.	Trignoella Foenum-graecum (Fenugreek)	Reduces dandruff, adds volume.
6.	Hibiscus	Promotes growth.
7.	Castor oil	Nourish roots
8.	Vitamin E	Reduce frizz.
9.	Aloe Vera	Until-inflammatory.
10.	Rose water	Soothing, cooling.

Table : 5

HERBAL HAIR SERUM FORMULATION:

A. Collection of Plant Materials

- Plant materials including Citrus sinensis (orange) peel, Flax seeds (Linum usitatissimum), Nigella sativa, Zingiber officinale (ginger), Trigonella foenumgraecum (fenugreek), and Hibiscus were collected.
- Source: Medicine Factory Garden, Samarth Institute of Pharmacy, Ghargav, Shrigonda, Ahmednagar, India.

B. Formulation Procedure

- Measured Citrus sinensis peel, ginger root, flax seeds, Nigella sativa, Trigonella foenum-graecum, and Hibiscus and added to 500 ml of water.
- Boiled the mixture for 15 minutes.
- Allowed the boiled mixture to cool and then filtered it.
- Added castor oil and vitamin E to the filtrate.
- Stored the final herbal serum in a spray bottle for use. (32)

Evaluation of Herbal Hair Serum

1. Physical Appearance and Homogeneity:

The color, texture, and overall physical appearance of the herbal hair serum were evaluated visually. Homogeneity was assessed by spreading a small amount of serum on a clean, dry glass slide, covering it with a coverslip, and inspecting under light for the presence of lumps, flakes, or coarse particles.



2. pH Measurement:

The pH of the serum was determined using a pH meter calibrated with pH 4 and pH 7 buffer solutions. The electrode was immersed in the serum until a stable reading was obtained.

3. Viscosity:

Viscosity was measured using a Brookfield viscometer (RVDV-II PRO) with spindle #6. About 50 ml of serum was tested at various speed settings (10, 20, 50, 100 rpm) to determine its flow characteristics.

4. Spreadability:

Spreadability was evaluated using the plate method. One gram of serum was placed between two glass plates (20 × 20 cm), with a weight of 125 g on the upper plate. The diameter of the spread after 1 minute was measured. Spreadability (S) was calculated using the formula:

$$S = H \times WDS = DH \times W$$

where S = spreadability, H = thickness of the film, W = weight applied, D = time for complete separation of slides.

5. Stability (Solidity):

The serum was stored for three months at 4 ± 2 °C and 30 ± 2 °C with 65% relative humidity. The pH and density were re-evaluated after storage and compared with initial values to assess stability

Types of Herbal Hair Serums

- **Moisturizing Serum:** Hydrates dry, brittle hair using ingredients like argan oil, shea butter, coconut oil, and aloe vera, leaving hair soft and manageable.
 - **Growth-Promoting Serum:** Stimulates hair growth and increases density with ingredients such as biotin, ginseng extract, and fenugreek extract.
 - **Strengthening Serum:** Reinforces weak or damaged strands using vitamins, minerals, and antioxidant-rich herbs like horsetail, nettle, and rosemary oil.
 - **Anti-Dandruff Serum:** Reduces flaking, itching, and dandruff with tea tree oil, neem oil, and peppermint oil, which have antimicrobial and anti-inflammatory properties.
 - **Repair Serum:** Repairs damage from heat, chemicals, and environment with keratin, avocado oil, and bamboo extract, restoring shine and controlling frizz.
 - **Soothing Serum:** Calms irritated scalp using calendula, lavender, and chamomile extracts, reducing inflammation and discomfort.
 - **Shine Serum:** Enhances hair luster without heaviness, often containing lightreflecting oils like coconut or jojoba oil.
- [35]

Benefits of Hair Serum:

1. **Controls Frizz:** Forms a protective layer, locks in moisture, and smoothens rough hair.
2. **Adds Shine and Gloss:** Enhances natural shine and leaves hair glossy.
3. **Detangles Hair:** Reduces knots, makes combing easier, and prevents breakage.
4. **Protects from Heat Damage:** Shields hair from heat tools and prevents dryness.
5. **Prevents Split Ends:** Coats hair shafts and temporarily seals split ends.
6. **Moisturizes and Hydrates:** Nourishes dry hair with aloe Vera and natural oils.
7. **Reduces Hair Fall:** Strengthens roots and minimizes breakage.
8. **Treats Scalp Issues:** Fights dandruff and infections with tea tree or neem.
9. **Improves Hair Texture:** Repairs damage and keeps hair soft and silky.
10. **Boosts Hair Growth:** Stimulates scalp circulation and promotes new growth. [36]



II. CONCLUSION

The review on herbal hair care products highlights the growing preference for natural and safe alternatives in cosmetics. Herbal formulations such as hair oils, shampoos, conditioners, dyes, and serums provide multiple benefits including nourishment, strengthening, and protection of the hair and scalp without harmful side effects. These products, enriched with plant-based extracts, essential oils, and natural antioxidants, promote healthy hair growth and improve texture, shine, and overall hair quality. The natural approach to hair care not only supports beauty enhancement but also ensures long-term scalp health, making herbal cosmetics a sustainable and effective choice for modern consumers.

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