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## Review Article

# A Review On: Herbal Hair Serum

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### ABSTRACT

The hair serum has been developed by incorporating Aloe Vera, almond oil, ginger, rose water, Vitamin E, and Lime Essential oil. These cosmetics prove to be highly beneficial and have minimal chances of causing any adverse reactions. All the ingredients required for this serum are readily accessible in the market. This serum not only effectively manages frizz, improves smoothness, minimizes tangles, boosts shine, enhances straightness, but also safeguards against damage. Aloe vera offers numerous benefits for our hair and scalp, as it has the ability to moisturize and seal the hair. This moisturizing effect helps prevent a dry and flaky scalp, as well as dandruff. Almond oil, derived from vitamin B, not only moisturizes the scalp but also strengthens the hair follicles. Zinger conditions the hair, prevents dandruff, promotes hair growth, prevents scalp inflammation, and protects the hair from heat damage. Rose Water is known for its moisturizing and conditioning properties on the hair. Lime essential oil is effective in reducing dandruff, promoting hair growth, and enhancing the natural shine of your hair. Lastly, vitamin E contains natural antioxidants that can support a healthy scalp and hair, potentially aiding in hair growth. In order to ascertain the various parameters associated with this formulated hair serum, I have conducted an assessment encompassing physical appearance, homogeneity test, pH test, viscosity, spreadability, and other relevant factors. The rise in living standards has led to an increase in the utilization of herbal cosmetics for personal hygiene and hair care. This analysis specifically examines the application of natural cosmetics in promoting healthy hair growth and preventing premature greying of hair.

### INTRODUCTION

**Hair-** Hair is one of the most important parts of the human body. Hair comes in different shapes, lengths, diameters, textures and colours. All mammals have hair. Hair plays a vital role in regulating body temperature. Hair also helps to

reduce friction and protect the scalp from the sun's rays. [1]

The rising cost of living around the world has led to an increase in the need for cosmetic products. Cosmetics have become more important because

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people want to look younger and more attractive. Cosmeceuticals is a term used to describe a combination of the cosmetics and pharmaceutical industries. Cosmetics companies manufacture cosmetics and pharmaceutical companies manufacture medicines. A skincare product is a combination of cosmetics and medicines. Herbal cosmetics are products that are created using a variety of approved cosmetic ingredients as a foundation, with one or more herbal components added to provide specific cosmetic advantages. The term "cosmetic" originates from the Greek word "cosmeticos," which means having the ability, skill, and expertise in adornment. Initially, cosmetics were linked to hunting, warfare, religion, and magic, and later to medicine. Skin lightening products form a significant portion of the global cosmetics market, offering the promise of flawless skin devoid of age spots, imperfections, and scars. The demand for "skin fairness products" stems from the desire to eliminate localized hyperpigmentation and lighten the overall skin tone. Herbal cosmetics contain compounds that can be utilized to develop medications made from various approved cosmetic ingredients, serving as the foundation for addressing challenging-to-treat diseases like cancer with one or two significant herbal ingredients. Regardless of age, serums or concentrates can be utilized. In addition to creams, biologically active substances and plant-derived compounds have gained prominence, leading to an increase in the number of herbal remedies that effectively tackle beauty concerns due to the growing demand and faster pace of life.

Serum is among the cosmetic products with a very high active ingredient content in their formula to provide intense nourishment to the deeper layer of the skin and a non-greasy, skin-friendly finish.[2]

Hair can be defined as- "improved epithelial structure formed as a result of keratinization of germinative cells" Hair loss has the potential to

impact either the scalp or the entire body, and it can be either temporary or permanent. This condition can arise due to various factors such as genetics, medical conditions, hormonal fluctuations, or simply as a natural consequence of aging. It is more commonly observed in men that they experience hair loss on their head. The term "baldness" is often used to describe excessive hair loss specifically from the scalp. The primary cause of baldness is typically attributed to hereditary factors as individuals grow older. Some individuals choose to allow their hair loss to progress naturally without any intervention or concealment. On the other hand, some may opt to camouflage it using different hairstyles, makeup, hats, or scarves. Additionally, there are those who decide to pursue treatments aimed at preventing further hair loss or promoting hair growth. [3]

Hair is a crucial component that enhances the overall beauty of the body. It serves as an epidermal derivative and faces various issues such as dandruff, hair fall, and greying. As individuals age, the pigment called melanin, responsible for hair colour, ceases to function, resulting in the hair turning white. A facial serum is a beauty product that offers deep nourishment to the skin's underlying layers, featuring a non-greasy texture and a high concentration of active ingredients. This serum, available in gel or light lotion form, provides anti-aging, anti-wrinkle, antioxidant, and moisturizing properties, effectively delivering nutrients to the skin. By using a quality facial serum, you can achieve smoother, firmer, and more hydrated skin. Plant-based facial serums are particularly beneficial, as they contain natural extracts with antioxidant, tyrosinase inhibiting, and antibacterial qualities that are advantageous for skincare formulations. [4] This styling product is formulated with silicone to create a protective layer on the hair's surface, enhancing shine, smoothness, and hydration. It also provides defense against humidity and pollution.



Hair growth is governed by a complex and finely tuned process that remains incompletely understood. This process is cyclical, encompassing the synthesis of hair shafts, their elongation, and eventual shedding. Typically, human hair consists of follicles in the anagen, catagen, and telogen phases. During the anagen phase, the hair follicle actively collects cytochrome and facilitates the growth of the hair shaft. As the hair follicle transitions from anagen to telogen, it loses the ability to produce new hair shafts.[5]

Hair loss can impact either the scalp or the entire body, and it can be temporary or permanent. The causes may include heredity, medical conditions, hormonal changes, or simply aging. Typically, hair loss on the head is more common in men, often referred to as baldness. The primary reason for baldness is usually hereditary as individuals grow older. Some individuals choose to embrace their hair loss without intervention, while others may opt to conceal it with various methods such as hairstyles, makeup, hats, or scarves. Alternatively, some may decide to pursue treatments to prevent further hair loss or promote hair growth. It presents as small white or gray flakes that accumulate unevenly on the scalp. Variations in the severity, frequency, and duration of dandruff symptoms are observed among individuals. This condition is considered chronic, with signs and symptoms that may evolve over time. Itching and flaking of the scalp skin are common manifestations. Individuals with oily or greasy hair are more prone to experiencing these symptoms. The flakes may be visible on the hair, appearing grey or yellowish. Moreover, there may be recurring skin infections on the face, hair loss, acne, pimples, and redness of the scalp. In terms of hair treatments, a blend of botanical ingredients has been utilized, including Aloe vera pulp, Tulsi, Hibiscus, Guava Leaves, Coconut oil, Almond oil, and Methi. Orange peel, scientifically known as *Citrus sinensis*, has been

proven to have a positive impact on hair. When used in moderation, these peels can enhance the smoothness and shine of hair. Due to their abundance of antioxidants, they also aid in minimizing the damage caused by pollutants. The increasing cost of living has led to a surge in the demand for cosmetics. As more individuals aspire to maintain a youthful and attractive appearance, the significance of cosmetics has grown. Cosmeceuticals, which combine the cosmetics and pharmaceutical industries, have emerged as a result. While cosmetics companies specialize in producing cosmetics, pharmaceutical companies focus on manufacturing pharmaceuticals. Cosmeceuticals are skincare products that blend the benefits of cosmetics and drugs. Serum, a cosmetic product with a substantial amount of active ingredients, is formulated to provide essential nourishment to the deeper layers of the skin. It offers a non-greasy finish, making it suitable for all skin types. [6] Castor oil, scientifically known as *Ricinus communis*, is an oil derived from castor beans that is abundant in nutrients. Although it originates from tropical East Africa, it is widely utilized in India and the West Indies for both cosmetic and medicinal purposes. Typically transparent or pale yellow, unless it undergoes roasting or boiling, castor oil is a type of long-chained fatty acid at the molecular level. According to Bridgette Hill, "Fatty acids provide essential proteins and nutrients to hair follicles, preventing inflammation." Apart from its anti-inflammatory properties, castor oil also offers other notable benefits. These include increased hair gloss and flexibility by coating the hair shaft, as well as antimicrobial properties. Approximately 90% of castor oil consists of ricinoleic acid fatty acid, which is believed to activate the Prostaglandin E2 receptor. This activation contributes to the dilation of blood vessels, thereby enhancing the supply of oxygen-rich and nutrient-

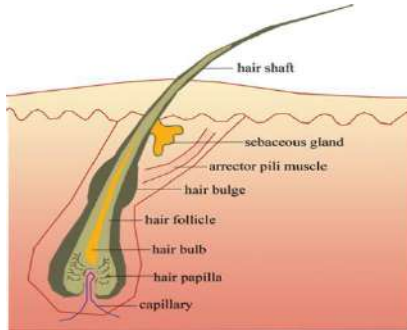


rich blood to the hair root or dermal papilla, the follicle's powerhouse.

The present study intended to use extracts of different herbs to formulate herbal hair serum for the improvement of hair quality.

### **Anatomy and physiology of hair: -**

#### **Structure of hair: -**



**Fig1- Structure of hair**

#### **Parts of hair: -**

##### **1. Dermal papillae: -**

The dermal papilla is essential in controlling the hair cycle and growth, as it houses androgen receptors that are responsive to DHT.

##### **2. Matrix: -**

The matrix surrounds the dermal papillae and contains all the vital elements needed for hair growth and the development of specific sections of the hair, such as the outer root sheath, inner root sheath, and the hair shaft. Together, the matrix and dermal papillae form the structure of the hair.

##### **3. Bulb, outermost sheath: -**

The most external part of the hair, referred to as the outer root sheath (ORS), is distinguished by its keratinized structure. Conversely, the internal root sheath (IRS) is comprised of three separate layers: the Henley layer, Huxley layer, and Cuticle. [7]

#### **Anatomy of hair: -**

Hair follicles, situated in the adipose layer of the scalp, produce hair in clusters of 1-4 strands known as "follicular units". The growth process of hair takes place at the hair bulb, located at the bottom of each follicle. The follicles receive nourishment from blood vessels in the dermis, and the cells divide and mature to form the hair shaft.

While developing beneath the epidermis, the hair remains soft, but once it emerges, the outer layer hardens into keratin. Terminal hairs are primarily found on the scalp, eyebrows, and eyelashes. Vellus hairs are distributed throughout the body. At birth, vellus hairs are present on the scalp and eyebrows, while terminal hair is present on other body parts. During puberty, specific terminal hairs (such as beard hair, chest hair, armpit hair, and pubic hair) are distinguished by the presence of androgens.

Terminal hair is long (> 2 cm), thick (~60  $\mu\text{m}$ ), and pigmented. Terminal hairs are also medullated and have a bulb at the base of the hair. Vellus hair is thin (< 30  $\mu\text{m}$ ), very short (< 2 mm), and mostly non-medullated. Vellus hair is categorized into three main ethnic groups: Asian, African, and European. A recent study has further expanded this classification to include eight major subgroups by considering three parameters (hair diameter, hair curliness, and number of waves). [7]

#### **Physiology of hair:**

Hair growth undergoes three distinct phases: Anagen, Catagen, and Telogen. Anagen is the primary growth phase, lasting several years for each hair. Catagen is a brief stabilization phase, lasting a few weeks, during which the hair follicle shrinks and the cuticle slows down. Telogen is the resting phase when old hair is shed and new hair begins to grow. Telogen consists of dead hardened cells, providing protection to the old hair as it is pushed out from the follicle over the course of months.

The Anagen phase, which is the growth phase of hair, is comprised of three components: the Henley layer, Huxley layer, and a distinct phase. At any given time, the majority of hair is in the Anagen phase. The Henley and Huxley layers are capsular layers that intertwine to ensure the hair's stability. This particular phase continues for a duration of several years.

During the catagen phase, which lasts for a few weeks, there is a slowdown in hair growth and the hair follicle, particularly the cuticle that is closest to the hair shaft, undergoes a shrinking process.

Telogen, the phase of rest, can span over multiple months. Throughout this period, hair growth stops and the old hair separates from the hair follicle. Subsequently, a new hair initiates the growth phase, displacing the old hair. The cuticle, consisting of deceased hardened cells, offers extra safeguarding to the hair shaft. Alongside the capsular layers of the Henley's and Huxley's layers, it guarantees the hair's protection and facilitates its growth.



**Fig2 Different phases of hair cycle**

Telogen, the resting phase, can last for several months. Throughout this phase, hair growth stops and the old hair separates from the hair follicle. A new hair then starts the growth phase, displacing the old hair. The cuticle, made up of dead hardened cells, provides additional protection to the hair shaft. Together with the capsular layers of the Henley's and Huxley's layers, it ensures the hair's security and enables its growth. [8] Hair growth is a complex process that involves the coordinated activities of multiple keratinocyte layers within the hair follicle. This dynamic and cyclic development is regulated by various hormones and cytokines, with the duration of growth cycles influenced by factors such as location, age, nutritional habits, and environmental changes like day-length. Cytokines play a crucial role in instructing the follicle to undergo necessary changes, ensuring that each hair is at a different stage of the growth cycle compared to its neighboring hairs. Hair follicles undergo a continuous cycle of growth and

regression, characterized by alternating periods of rapid growth and hair shaft formation, as well as stages of hair follicle regression and relative quiescence driven by apoptosis. The hair growth cycle can be categorized into three distinct phases: the anagen phase, which represents the active growth phase; the catagen phase, which signifies the transitional phase; and the telogen phase, which denotes the resting phase of the hair follicle. The anagen phase represents a period of active growth in which the hair follicle undergoes enlargement to achieve its characteristic onion shape and produces a hair fiber. This phase is further categorized into six stages (I–VI). Throughout anagen I–V (proanagen), hair progenitor cells undergo proliferation, encase the growing dermal papilla, extend downwards into the skin, and initiate differentiation into the hair shaft and IRS. Subsequently, the nascent hair shaft commences development, while melanocytes within the hair matrix exhibit pigment-producing activity. [7] In anagen VI (metanagen), complete restoration of the hair fiber-producing unit occurs, marked by the formation of the epithelial hair bulb encircling the dermal papilla situated deep within the subcutaneous tissue, and the emergence of a new hair shaft from the skin surface. This phase may persist for numerous years within hair follicles. The catagen phase commences once the anagen growth phase concludes. At the onset of the catagen phase, there is a notable decline in the differentiation and proliferation of hair matrix keratinocytes. Additionally, the melanocytes cease their pigment-producing activity, and the production of hair shafts reaches completion. Consequently, the hair follicle experiences regression driven by apoptosis, leading to a reduction in diameter by approximately one-sixth of the usual size. The dermal papilla undergoes a metamorphosis, transitioning into a group of inactive cells that are situated in close proximity to the receding hair follicle epithelium. It then

migrates from the subcutaneous layer to the border between the dermis and subcutis, ensuring continuous connection with the distal segment of the hair follicle epithelium, which encompasses the secondary hair germ and the bulge. This particular stage persists for a limited duration of a few weeks. The telogen phase commences subsequent to the catagen phase; the hair enters a period of rest, which can range from a few weeks (eyelashes) to eight months (scalp hair). Even though there is no growth of hair during this phase, the dermal papilla remains in a state of rest. Telogen hair follicles are identified by the absence of pigment-producing melanocytes and the IRS. Their dermal papilla is closely linked to a small cap of secondary hair germ keratinocytes that contain hair follicle stem cells. Around 10-15% of all hairs are in the resting phase at any given time. At the conclusion of this phase, the hair sheds (exogen phase); a few weeks later, the hair follicle re-enters the growth phase by activating stem cells from the bulge region. Understanding the hair cycle mechanism is crucial in the study of hair growth disorders. The anagen–catagen transformation plays a significant role in this context, making it essential to accurately identify and distinguish this transition for hair research. Kloepper et al. have introduced a method to objectively differentiate between anagen and catagen stages in human hair follicle organ culture. They have proposed seven qualitative criteria based on the assessment of hair matrix, dermal papilla, and pigmentary markers distribution, as well as ten quantitative criteria involving morphometric evaluation of cell count, proliferation, apoptosis, and hair follicle pigmentary markers. It is important to note that while organ-cultured human hair follicles do not exhibit the complete sequence of catagen transformation seen in vivo, the catagen transition in vitro occurs more rapidly and is often followed

by hair follicle degeneration before the completion of catagen transformation.

#### **Review of literature:**

1. Rohan R. Vakhariya, et al., 2022 Cosmetics are increasingly in demand in everyday life and are frequently utilized by a large number of individuals annually. People utilize a variety of products to improve their beauty and grace in order to appear youthful and attractive. Therefore, cosmetics have a significant impact on human existence. In the present era, herbal cosmetics are extensively employed due to the perception that they offer fewer adverse effects and greater safety. The hair, being one of the main components of the body, serves as a protective extension.
2. Shruti Shivaji Ippalwad, et al., 2023 Hair plays a significant role in shaping an individual's personality, and we rely on numerous cosmetic products to take care of it. Herbal formulations, in particular, offer effective solutions with minimal or no side effects. This research focuses on the significance of polyherbal toiletries in addressing common hair issues such as baldness, alopecia, hair fall, gray hair, dryness, and dandruff. Cosmetics are widely utilized in our daily lives for their diverse range of benefits. Humanity utilizes various products to enhance beauty and maintain a youthful and charming appearance.
3. Mr Randad Shubham Shrinivas, et al., 2022 The hair serum contains a blend of coconut oil, various vegetable oils, argan oil, almond oil, lavender oil, lime essential oil, and triphala. This cosmetic product is highly beneficial and has a low risk of causing any adverse reactions. All the components can be easily purchased in the market. This serum not only manages frizz, improves smoothness, minimizes tangles, boosts shine,



enhances straightness, but also shields the hair from damage.

4. Mohsin Khan, et al., 2020 Hair is a vital component of the human body, serving as a fragile and intricate structure comprised of hair follicles. Various factors, including oxidative stress, environmental elements, and the aging process, can impact the appearance of hair. With the improvement in living standards, there has been an increase in the utilization of herbal cosmetics for personal hygiene and hair care. This analysis concentrates on the application of natural cosmetics to promote healthy hair growth and deter premature greying.

#### **Hair Serum: -**



**Fig3: Hair Serum**

Hair serum is a treatment that is typically made with silicones and comes in a liquid form. It is designed to create a protective barrier on the hair strands, helping to reduce frizz. This protective layer also has the ability to reflect light, resulting in a shiny appearance without any greasiness. By using hair serum, some individuals may find that they no longer need to use straighteners to achieve smooth hair, which can significantly reduce styling time and prevent heat damage to the hair.

Hair serum serves a variety of purposes beyond just controlling frizz. Depending on your hair type, the appropriate serum can help with smoothing, adding shine, detangling, repairing damage, and protecting against pollution. Additionally, using hair serum can effectively conceal split ends until your next appointment with the hairdresser.

#### **Highlights of Hair Serum:**

- Hair serum is a hair styling product that forms a protective coating on the surface of the hair.
- It is essentially a liquid hair care product with a consistency that is denser than water.
- This styling product is formulated with silicone to create a protective layer on the hair's surface, enhancing shine, smoothness, and hydration. It also provides defense against humidity and pollution.
- Designed for use on damp hair.[9]

#### **Type of hair for using hair serum:**

1. Straight
2. Wavy
3. Curly
4. Coily

#### **Advantages of hair serum:**

1. The hair is shielded from the elements.
2. Act as both a pre-styling treatment and a finishing product.
3. It can be utilized prior to or subsequent to employing heat styling.
4. It shields the hair from external factors that can cause damage.
5. Enhances the sleekness of the hair strands.

#### **Disadvantages:**

1. Consistent use of hair serum can compromise the health of the hair.
2. The act of applying serum directly on the scalp has the potential to trigger inflammation.
3. It is advisable to refrain from applying serum on the scalp to prevent potential issues such as oiliness or irritation.[10]

#### **Application of herbal hair serum:**

1. Moisturizes and nurtures the hair
2. they aid in maintaining hair's shine, softness, and strength
3. they shield hair from free radical harm
4. they deter hair loss and scalp infections
5. therapeutic serums possess antimicrobial characteristics.

6. they serve as a hair growth enhancer and diminish hair loss.[11]

### **Benefits of herbal hair serum:**

Prior to making a decision on a product, it is crucial to comprehend the merits of hair serum. The primary advantages of a hair serum can be summarized as follows.

#### **1. Multi-Purpose**

A hair serum tackles multiple hair-related issues instead of focusing on just one. It is known as a comprehensive solution for all your hair concerns. By using a hair serum, you can transform a bad hair day into a good one. With just a few drops, your hair will experience a noticeable difference in both texture and appearance.

#### **2. Give Shine to the hair**

Hair serum forms a protective barrier that enhances shine by reflecting light, resulting in a sleek and shiny look. Amino acids present in hair serums provide protection for chemically and color-treated hair.[12]

#### **3. Good for dry hair**

Hair serums are advantageous for individuals with dry and unruly hair. These serums effectively retain moisture, resulting in hair that is not only sleek but also lustrous.

#### **4. Protect hair: -**

Hair serum binds to the hair strands, providing a protective barrier against heat, sun damage, dirt, pollen, and pollution. This helps to maintain the health and integrity of your hair. It is advisable to apply a heat protectant cream prior to using any heat styling tools.[13]

#### **5. Prevents hair loss from breakage**

When our hair becomes tangled, we experience significant hair loss due to the strain and effort required to detangle it. Hair serum serves as a lubricant for tangled hair, making the detangling process easier and resulting in reduced hair fall.[14]

#### **6. Best for Dry Hair**

Hair serums are most beneficial for individuals with dry and frizzy hair, as they help to retain moisture and promote smooth, shiny hair.

### **7. Nourishes Hair and Makes Them Manageable**

Hair serums penetrate the hair follicles, repairing damage and restoring strength to brittle hair. By making hair more manageable, hair serum simplifies the styling process, saving time, energy, and patience.

#### **Objective:**

1. To offer a substitute for synthetic hair serum.
2. To conduct the formulation of herbal hair serum.
3. To enhance the luster of lackluster hair, minimize frizz, and shield against heat damage.
4. To enhance the quality and feel of hair.
5. To perform an assessment of herbal hair serum.[15]

#### **Problems Associated with Hair:**

Hair is an important part of human body. The problem associated with it includes hair loss, lack of hair volume, conditioning, immature graying, dandruff, thinning of hair, dullness etc. Hairs can in shape, length, diameter, texture and color.

All mammals possess hair, which serves primarily to regulate body temperature and reduce friction to protect against sunlight. In ancient times, hair on the scalp was considered a form of protective covering.[16]

#### **Dandruff**



**Fig4: Dandruff**

Dandruff consists of small white flakes of dead skin found in the hair or on the scalp. It is believed

to be triggered by a fungus known as *Malassezia restricta* and *Globose*, previously referred to as *Pittosporum*, which can lead to yeast infections on the skin and scalp. Factors contributing to dandruff include inadequate hair brushing, allergies, and insufficient showering.

### Hair loss



**Fig5: Hair loss**

Hair loss has been predominantly associated with men throughout history; however, it is also prevalent among women. Female hair loss is commonly attributed to factors such as stress, medication, fluctuating hormones, and even menopause. Additionally, the use of various hair styling products can contribute to hair loss.

### Split ends



**Fig6: Split end**

Split ends can occur due to various factors, including excessive brushing, frequent perming, excessive heat styling, and inadequate conditioning. Additionally, exposure to harsh weather conditions and the use of hair care techniques like blow drying, straightening, and curling can also contribute to the development of split ends.

### Gray hair



**Fig7: Gray hair**

Gray hair is often seen as a symbol of wisdom and experience by many individuals. However, some may opt to eliminate it due to its tendency to become fragile and harder to manage compared to other hair types.

### Oily/greasy hair



**Fig8: Oily/greasy hair**

Excessive oil production on the scalp is the main cause of oily hair. This is due to the overproduction of sebum, a natural oil produced by the sebaceous glands.[17]

### Ingredients of Hair Serum

#### Alo vera



**Fig9: Alo vera**

**Synonym:** *Aloe barbadensis* Mill

**Biological Source:** Aloe is obtained from the dried juice of the leaves of *aloebarbadensis* miller.

**Family:** Liliaceae.

**Chemical constituents:** Barbaliin, Aloin, Isobarbaloin, aloe-emodin, and aloesone, Aloinoside A & B, resins.

**Uses:**

- Anti-inflammatory.

- Heal wound.
- Anti-aging
- Treats dry skin
- Treats stretch mark.

Aloe vera gel is truly a blessing when it comes to taking care of your hair and skin. Maintaining a well-balanced pH level is crucial for promoting healthy hair growth, and aloe vera gel plays a significant role in achieving this. Additionally, it acts as a natural conditioner, effectively preventing hair loss. By gently applying the gel to your scalp and hair, you allow its magical properties to nourish and revitalize your hair completely.[18]and Aloe vera has been utilized for an extensive period to address hair loss concerns. Additionally, it possesses the ability to alleviate scalp discomfort and enhance hair condition. Moreover, it has the potential to alleviate dandruff and unclog hair follicles that might be obstructed due to excessive oil production. To address these concerns, it is recommended to apply pure aloe vera gel to the scalp and hair on a regular basis, typically a few times per week. [19]

#### **Almond Oil**



**Fig10: Almond oil**

Almond oil application provides deep hydration to your scalp and fortifies hair follicles, resulting in voluminous, glossy, and luxurious locks. In case of dandruff, almond oil effectively eliminates it by virtue of its antibacterial properties, effectively treating dry and flaky skin while eliminating dead cells from the scalp.

Almond Oil is rich in Biotin, a derivative of Vitamin B, which is often recommended for individuals experiencing hair thinning. Applying almond oil to your hair through massage is a

beneficial method to supply your hair with Biotin, promoting hair growth and minimizing hair thinning. Research indicates that the topical application of almond oil can aid in shielding the skin from UV-induced damage and delaying the aging process. By reducing DNA damage caused by UV rays, almond oil can safeguard your cells and prevent the associated chemical and structural alterations.[5]

#### **Zinger**



**Fig11: zinger**

Ginger juice is beneficial for hair as it helps in preventing seborrheic dermatitis, commonly known as dandruff. Dandruff is caused by a yeast infection called malassezia, leading to itchy flakes and redness on the scalp. Antifungal agents can assist in controlling its growth. Studies have shown that ginger possesses a strong antifungal effect on hair, aiding in reducing dandruff. The active ingredient gingerol, found abundantly in ginger rhizome, contributes to its antimicrobial properties. Additionally, ginger for hair exhibits an anti-inflammatory effect, reducing inflammation and alleviating dandruff-related discomfort.[20]

#### **Triphala**



**Fig12: Triphala**

Enhances Hair Fullness. Triphala works to enhance the texture of your hair, resulting in a boost to your natural hair volume.

- Promotes hair growth

- Imparts A Natural Shine.
- Prevents Premature Greying
- Nourishes Hair Roots
- Minimizes Frizz
- Prevents split Ends

### Vitamin E



**Fig13: vitamin E**

An oil abundant in vitamin E can aid in rejuvenating shine by reconstructing the protective barrier. Typically, oils assist in locking in moisture, reducing breakage, and shielding the hair from damage. Vitamin E has the potential to promote a healthy scalp and hair due to its natural antioxidants that can potentially promote hair growth. The presence of vitamins and antioxidants may decrease the level of oxidative stress and free radicals that contribute to the breakdown of hair follicle cells on the scalp.

### Lime essential oil



**Fig14: Lime essential oil**

Boosts the immune system greatly and brings relief to different respiratory conditions.

- Reduces stress and anxiety
- Fosters good oral health
- Promotes healthy and glowing skin
- Perfect as a hair treatment
- As an effective cleaning agent
- Naturally repels insects.

Lime Essential Oil possesses remarkable properties that can effectively restore and

rejuvenate your hair. It is renowned for its ability to combat dandruff, stimulate hair growth, and enhance the natural shine of your hair. Incorporating Lime Essential Oil into your diffuser blends or using it alone can yield excellent results. Moreover, this essential oil is particularly beneficial during the cold and flu seasons, as it offers numerous advantages for both the skin and hair. Additionally, it has the power to uplift your mood, aid in relaxation after a tiring day, and purify the air. [5]

### Evaluation of hair serum:

#### 1. Physical Appearance

The visual inspection of the herbal hair serum involves evaluating its physical characteristics, color, and consistency.

#### 2. Homogeneity Test

An object glass that was clean and dry had hair serum smeared onto it, followed by sealing it with a cover glass. The presence of coarse particles or homogeneity was examined under light. Visual inspection was conducted on the herbal hair serum to check for homogeneity and to test for any lumps, flocculates, or aggregates.[21]

#### 3. Viscosity

The Brookfield viscometer (RVDV-II+PRO) was used to perform the viscosity measurement using spindle number 6. A beaker containing 50 ml of hair serum was utilized, and the viscosity was measured at different rpm values, specifically 10, 20, 50, and 100.

#### 4. Ph Test

The pH meter underwent calibration with pH 4 and pH 7 buffer solutions. Subsequently, the electrode was immersed in the hair serum and allowed to sit until the pH stabilized within a few minutes.

#### 5. Spreadability

The spreadability of the liquid preparation was evaluated using a parallel plate method commonly employed for this purpose. A gram of hair serum was sandwiched between two horizontal plates measuring 20× 20 cm, with the top plate weighing

125 g. The diameter of the spread was recorded one minute later.

Spreadability was measured using the following formula:

$$S = M \times L / T$$

Where,

S= Spreadability,

M= Weight in the pan (tied to the upper slide),

L= Length moved by the glass slide, and

T = Time(sec) taken to separate the slides completely [9]

### 6. Viscosity

The Brookfield Viscometer is utilized to measure the viscosity of the formulation at 100rpm, employing the spindle type model S6 with 4.5 ml of the serum. Prior to the measurement, the serum is placed in a wide-mouth container with the spindle immersed in it for approximately 5 minutes.

### 7. Stability Test

The herbal hair serum underwent storage for a duration of three months at two distinct temperatures of  $4 \pm 2^\circ\text{C}$  and  $30 \pm 2^\circ\text{C}$ , alongside 65% RH. Following this period, an assessment was conducted to compare the initial pH and viscosity values with those obtained after the three-month storage period.[22]

### Hairs Serums Used in the Market:

#### Hampa hemp Hair Growth Serum



**Fig15: Hampa hemp hair growth serum**

#### About this item-

- Hampa Hemp Hair Growth Serum combines the benefits of Vijaya Leaf extract, Hemp Seed Oil, Virgin Coconut Oil, and select herbs

to deliver rich nourishment to your hair and roots.

- In just 30 days, witness a significant reduction in hair fall, as well as a deep nourishment of both the scalp and hair roots, resulting in a noticeable decrease in dandruff.
- Encourages the natural growth of thick and long hair.
- The combination of Edestin Protein found in Hemp Oil, along with the nourishing properties of Geranium, Cedarwood, Cypress, and Fenugreek, effectively enhances hair health and safeguards against hair loss.
- Hemp Oil's Omega 3 and 6 provide deep hydration to your hair, all while maintaining a lightweight and non-greasy feel.
- Packed with Edestin protein, Omega 3 & 6, Vitamin E, and more.
- Amino acids that effectively unclog hair follicles and stimulate the growth of hair strands.[23]

#### Wild Stone CODE Hair Serum



**Fig16: Wild Stone code hair serum**

#### About the item

- Ideal For- Men
- Serum Type- Oil
- Hair Type- All Hair Types
- Hair Condition- Hair Condition
- Organic- No
- Organic Type- Argan Oil, Abyssinian Oil, Meadowfoam Oil, Wheatgerm Oil & Jojoba Oil.
- Maximum Shelf Life- 36 Month
- Sulfate Free- Yes

## Man Matters Advanced Hair Growth



**Fig17: Man matters advanced hair growth**

### About these item-

- Ideal For-Men
- Serum Type -Liquid.
- Applied For Anti- Hair Fall, Growth Stimulating, Nourishment, Volumizer.
- Hair Type- Curly Hair, All Hair Types, Dry Hair, Oily Hair.
- Hair Condition -All hair, Colored Hair, Damaged Hair, Permed Hair,
- Organic- No
- Organic Type- Natural
- Maximum Shelf Life -24 Months
- Sulfate Free- Yes

## Wishcare Hair Growth Serum



**Fig18: Wishcare hair growth serum**

### About this item-

Ingredient = Aqua, Propylene Glycol, Glycerine, Fermented Rice Water, Redensyl, Anagain, Baicapil, Cetrimonium Chloride, Plant Keratin, Saw Palmetto, Caffeine, Biotin, Ethylhexyl Glycerol, Xanthan Gum, Vitamin E, Cocamidopropyl Betaine, Phenoxyethanol, Sodium Benzoate, Potassium Sorbate

### How to use-

- Apply the serum directly onto the scalp using the micro-spray, and gently massage it into the scalp using your fingertips.
- For optimal outcomes, allow it to sit overnight.
- Please ensure regular usage of the product every evening for a duration of three months.

## Worthy Essentials Co



**Fig19: worthy essentials co**

### About this item-

- The exclusive dH5+ formula comprises of powerful ingredients that are specifically formulated to promote the growth of hair.
- The serum is formulated with a blend of biotin, keratin, redensyl, aminexil, procapil, sea weed extracts, and various other nourishing ingredients. Its purpose is to stimulate and support the growth of healthy hair.
- The serum is light and non-greasy, ensuring that it does not make your hair heavy or greasy.
- It is essential to test before contemplating a hair transplant.
- The serum has undergone clinical trials and has been proven to enhance hair growth and minimize hair loss within a span of just 20 days.

## Bontress Pro Hair Serum



**Fig20: Bostress pro hair serum**

**About this item-**

- Promotes the growth of hair and inhibits hair loss.
- Utilizes a Tri Peptide formula to achieve enhanced outcomes.
- A formulation of three peptides for enhanced and harmonious outcomes.

**Pilgrim Argan Oil Hair Serum with Camellia & White Lotus**



**About this item**

**Size:** 100 ml | 3.38 fl.oz

**Suitable for:** All Hair Types

Go beyond the mundane routine of shampoo & conditioner and give your hair the luxury and goodness it deserves! Our groundbreaking formula comes in a spray form so it spreads evenly, no messy hands and avoids wastage. This perfect fusion of argan oil, white lotus and camellia, is not only a superfood for your hair but also a quick-fix for frizzy and dull hair. It can be used both on dry and wet hair. It detangles the most rebellious knots and provides an extra boost of conditioning and gloss. The lightweight and non-greasy formula lightly coats the hair, without being oily or sticky restoring shine and youthful lustre to the hair.

**CONCLUSION**

All the parameters showed that they are within the limits and since all the ingredients added have many advantages, this hair serum will help in maintaining good growth of hair, turning grey hair to black, essential nutrients needed to preserve the proper function of the sebaceous glands and support the growth of natural hair. In the personal hygiene and health care system, the use of herbal cosmetics has changed by several folds.

Therefore, the herbal cosmeceuticals individual care or personal health care industry, which is actually concentrating and paying extra care on the production of herbal-based cosmetics, has a considerable glamour

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