

Devising Herbal Serum For Integrity Of Hair

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Abstract: This study has been undertaken to investigate the effectiveness of herbal serum for overall nourishment of hair. Currently Cosmetic industries are reaping gallantry through cosmeceuticals like skin care, hair dos; nail arts etc. along with the pharmaceutical company. Herbal formulations are said to have no/ lesser harmful effect or safe because they lack synthetic chemicals. Present work focuses on development of an effective daily use herbal serum for overall nourishment & management of hair. Hair cosmeceuticals are important for cleaning, nourishing, and protecting hair and scalp health, which improves manageability, strength, and appearance. Healthy hair can significantly boost your self-confidence. Combining a topical serum with proper nutrition provides a holistic approach to hair care, addressing both external damage and internal deficiencies. An assortment of herbal extracts, vitamins, essential oils, and other natural ingredients are often found in herbal hair serums, which are designed to nourish hair, enhance its appearance, and treat particular issues like frizz, dryness, or damage. Present herbal serum contains herbs like onion, amla, aloe, ashwagandha, neem leaves; curry leaves etc having certain characteristics fostering hair nutrition. Prepared Serum was red in colour and stable with visual clarity. At the same time our formulation was found to leave the hair soft and shiny. Serum found to prove intended use after application. Ingredients incorporated in serum are easily available and of low cost making final formulation cost effective.

Key words: Cosmeceutical, serum, nourishment, hair care etc.

INTRODUCTION

Emerging knowledge of self-care, appearance and cozy lifestyle of people, cosmetics are gaining more attention now days. Along with skin care; hair care products have occupied place to a greater extent in market. Hair care products such as gels, shampoos, oils, hair masks, hair colors and conditioners are available in market^[1]. Hair plays a significant role in defining appearance. Hair cosmeceuticals are important for cleaning, nourishing, and protecting hair and scalp health, which improves manageability, strength, and appearance. They help maintain the scalp's health and replenish moisture, while also protecting hair from damage caused by environmental factors or styling tools. Having healthy hair is not just about having good hair looks. It is important to overall well-being. Healthy hair not only looks and feels great, but it also has a positive impact on our mental and emotional well-being. When you have well-maintained & healthy-looking hair, you feel more confident, happy, and satisfied with your appearance, it can enhance your overall look, making you feel more attractive and put-together. It frames your face, complements your features, and adds a touch of elegance to your style. Healthy hair can significantly boost your self-confidence. This confidence can positively impact various aspects of your life, including personal relationships, professional opportunities, and social interactions. On the other hand, unhealthy hair can lead to self-esteem issues, anxiety, and even depression.

One of the hair care routine products is Hair serum to provide protection and nourishment to hair. Now day's serums are getting popular because of their use and performance. Serums act as a protective barrier against heat styling, sun damage, dirt, and pollution. They provide instant smoothness, reduce frizz and tangles, and give hair a natural shine. Herbal serums replenish nutrients in dry and damaged hair, helping to repair it from root to tip. Ingredients like neem and fenugreek can help combat dandruff and maintain a healthy scalp due to their antibacterial and antifungal properties. A diet rich in protein, iron, zinc, and omega-3 and -6 fatty acids provides the building blocks for healthy hair growth and stronger follicles. Essential nutrients like protein are vital because hair is made of keratin, and vitamins like E can help reconstruct the protective barrier of hair, reducing breakage. Omega-3 and -6 fatty acids contribute to a healthier scalp, which is crucial for overall hair vitality. Combining a topical serum with proper nutrition provides a holistic approach to hair care, addressing both external damage and internal deficiencies. A good serum can tackle immediate concerns like frizz or dullness, while good nutrition ensures long-term health and resilience ^[2].

I. SERUMS AS NEW TREND

Hair serums emerged as a new class of hair care products and started to become popular in the 1980s and 1990s. Lightweight oils, silicones, and other conditioning ingredients were used in the serums to reduce frizz, boost shine, and shield the hair from the environment. Hair serums were mostly used in professional salon settings, but they were later made available to consumers for use at home.

Later with the emergence of complete hair care concept serum formulations were improved with the addition of antioxidants, vitamins, and herbal extracts as consumer demand for more sustainable and natural beauty products increased. These mixtures helped to strengthen and protect the scalp, hair and add on for the beautiful hair. Increasing Product Variety Hair serums have evolved into more complex products with cutting-edge ingredients and delivery methods to maximize their effectiveness, thanks to developments in cosmetic science and technology. These days, some serums use heat activated formulas for improved penetration into the hair shaft, while others contain encapsulated nutrients that are released gradually for extended benefits.

People are now turning to natural hair care products to bypass chemical ones, herbal hair serum may become more well-known more recently. An assortment of herbal extracts, vitamins, essential oils, and other natural ingredients are often found in herbal hair serums, which are designed to nourish hair, enhance its appearance, and treat particular issues like frizz, dryness, or damage.

II. TYPES OF HAIR SERUM ^[2]

Hair serums are of different kinds and are designed to target particular hair issues. Typical herbal hair serum varieties include the following.

1. **Moisturizing serum-** These serums are designed to hydrate dry, brittle hair. Herbal components usually contain nutrients like argan oil, shea butter, coconut oil, and aloe vera, which locks in moisture and nourish the hair strands, leaving them silky, smooth and easier to manage.
2. **Growth-promoting serum-** Hair density and growth stimulation are the two main goals of these serums' formulations. Ingredients like biotin, promote hair growth ginseng extract, and fenugreek extract may be present in them; these are thought to stimulate follicles.
3. **Strengthening serum -**To prevent breakage and encourage healthier-looking hair, strengthening serums are made to strengthen weak, damaged hair. The presence of vitamins, minerals, and antioxidant rich herbs that promote hair resilience and strength, such as horsetail extract, nettle leaf extract, and rosemary oil, is common in them.

4. **Anti-dandruff serum-** Anti-dandruff serums are designed to address problems with the scalp, including flakiness, itching, and dandruff. They frequently contain herbal ingredients like tea tree oil, neem oil, and peppermint oil that have antimicrobial and anti-inflammatory qualities. These ingredients help to calm the scalp and lessen the bacteria that cause dandruff.
5. **Color-protecting serum-** The purpose of color-protecting serums is to maintain the brightness and durability of hair that had color treatment. Herbal components like green tea extract, grape seed oil, and sunflower seed oil are frequently found in them; these ingredients help prevent UV rays and environmental damage from fading hair color.
6. **Repairing serum-** Damage from chemical treatments, heat styling, and environmental stressors can all be repaired with the help of repairing serums. Herbal extracts that help to seal the hair cuticle, tame frizz, and bring back shine include keratin, avocado oil, and bamboo extract.
7. **Soothing serum -**The purpose of soothing serums is to soothe and calm the scalp, thereby lowering inflammation and irritation. Herbal ingredients with anti-inflammatory and calming qualities, such as calendula extract, lavender oil, and chamomile extract, may be present in them to help soothe and reduce scalp discomfort.
8. **Smoothing serums -**These serums are intended to make hair look sleek and smooth, manage to fly away, and reduce frizz. They frequently include ingredients like silicone or argan oil for a smooth texture and to coat the hair shaft.
9. **Shine serums-**Are designed to give dull hair luster and brightness. To increase shine without weighing the hair down, they typically include light-reflecting particles or oils like coconut or jojoba oil.
10. **Repairing serums-** By supporting and fortifying the hair shaft, reparative serums help repair damaged hair. Along with vitamins and minerals to support healthy hair and repair damage, they may contain proteins like keratin or amino acids.
11. **Heat protectant serums -**These serums act as a barrier to protect the hair from heat-producing styling instruments like blow dryers, flat irons, and curling irons that are safe. To reduce the harm caused by heat styling, they frequently include silicones or other heat-protective substances. The versatility of hair serums makes them a must-have in any hair care routine.

III. POPULAR USES OF HAIR SERUM ^[3]

1. **Pre-Styling Protection:** To minimize heat damage; create a protective layer that shield hair from high temperatures.
2. **Post-Wash Application:** To smooth and detangle the damp hair; lock in moisture and keep hair manageable throughout the day.
3. **Everyday Frizz Control:** To keep hair looking polished; perfect for maintaining a neat and tidy look even on humid days.

IV. APPLICATION OF HAIR SERUM

Using a hair serum correctly ensures you get the maximum benefits. Here are some tips on how to apply hair serum:

1. Apply serum to freshly washed, towel-dried hair for better absorption. Avoid using it on soaking wet hair to maintain the product's effectiveness
2. Start from a small quantity of serum, increasing if needed based on your hair length. Too much serum can weigh hair down and make it greasy.
3. Warm the serum in your hands by rubbing to ensure smooth and even application.
4. Apply it to the mid-lengths and ends of your hair, avoiding the scalp to prevent greasiness. Focus on the drier parts of your hair, like the mid-lengths and ends, while avoiding the scalp to keep your roots fresh.

5. Comb through hair to ensure even distribution. Use wide tooth comb to spread the serum evenly and detangle hair without causing damage.

IV. BENEFITS OF USING HAIR CARE PRODUCTS ^[3]

- **Cleansing and hydration:** Shampoos clean the scalp and hair, while conditioners add moisture to combat dryness and frizz.
- **Nourishment and strengthening:** Products like masks, serums, and oils deliver vitamins and proteins that strengthen hair, reduce breakage, and promote growth.
- **Scalp health:** Specialized products like anti-dandruff shampoos and anti-microbial maintain a healthy scalp, which is essential for healthy hair growth.
- **Protection:** Heat protectants and leave-in conditioners shield hair from damage caused by styling tools, UV rays, and pollution.
- **Color and chemical protection:** Products designed for color-treated or chemically processed hair help preserve vibrancy and shield against further damage.
- **Styling and maintenance:** Products like hairspray, wax, and gel help style and maintain hair's shape and appearance.

IV. WHAT IS HAIR & HAIR NUTRITION?

Hair consists of hair follicle and shaft. The hair follicle serves as a reservoir for epithelial and melanocyte stem cells and it is capable of being one of the few immune privileged sites of human body. Hair follicle development is related to the interactions between epithelial and mesenchymal cells. Many genes play substantial role in this interaction and also in hair follicle cycling. ^[4] Human hair usually comprises follicles of anagen, catagen, and telogen phases. The hair follicle in the anagen phase actively accumulates cytochrome and easily develops the hair shaft. When the hair follicle matures into the anagen hair follicle, the telogen hair follicle is not able to develop neonatal hair shafts. ^[5,6,7]

The most common phenomenon of aging in hair is graying. It occurs in the fourth decade regardless of gender, even if some clinical differences are noted between men and women: the temporal and occipital areas are more involved in men than in women and graying starts in the frontal area in women. Maintenance of hair pigmentation is dependent on the presence and function of melanocytes, which are maintained by the stem cells of the bulge area of the hair follicle. Loss of melanocytes and melanocyte stem cells is associated with the loss of hair pigmentation seen with human aging. ^[5,6,7]

The hair shaft consists of a cortex and cuticle, and in some cases, a medulla in the central region. The medulla is the central part of the hair, whereas the cortex, which represents the majority of the hair fiber composition and plays an important role in the physical and mechanical properties of hair. ^[7] Cuticle is outermost layer of hair (made up of protein keratin) that protects the inner layers of the hair strand and is responsible for shine and smoothness. Keratin is fibrous protein; it forms long, thread-like structures. Keratin is composed of amino acids cysteine, serine, glycine etc. amino acids are linked together by peptide bonds. Chemically hair structure is a complex interplay of proteins, primarily composed of protein keratin, held together by different types of chemical bonds like Sulphur bonds, Hydrogen bonds. Disulfide bond formed between cysteine amino acids, contribute to the hair's strength and shape. The specific arrangement and bonding of these amino acids contribute to keratin's strength and flexibility. Sulfur is a vital building block of keratin, the primary protein in hair. Adequate sulfur levels help strengthen hair strands, making them less

prone to breakage and damage, sulfur helps improve hair's elasticity, allowing it to stretch and bend without breaking. Sulfur is involved in the production of keratin and collagens, both are crucial for hair growth and development. Sulfur has anti-inflammatory and antimicrobial properties that can help maintain a healthy scalp. By reducing inflammation and strengthening hair follicles, sulfur can potentially play a role in preventing hair loss.

Beyond enhancing our physical appearance, cosmetics hold the power to boost our confidence and nurture our sense of self-care and our overall hygiene. Hair cosmetics are important for maintaining healthy and aesthetically pleasing hair. They play a crucial role in cleaning, conditioning, moisturizing, and protecting hair from damage, also enhancing its appearance and overall health. Having healthy hair allows us to look our best and ensure our hair and scalp is healthy. It plays a significant role in defining appearance. Well-maintained and healthy hair can enhance your overall look, making you feel more attractive and put-together.

Hair is a symbol of beauty for a long time. Women with long and straight hair were considered beautiful. So to keep hair healthy, one needs some additional stuff to nourish your hair, provide essential nutrients and maintain its strength and beauty. Using recommended Hair Cosmetics such as shampoos, conditioners, and treatments one can take care of hair in short span of time. Hair Cosmeticeuticals assist in preventing damage from everyday factors like pollution, dry weather, heat styling, and other environmental stressors. One of these Hair Cosmetics is hair serum which plays vital role in maintaining aesthetics & nourishment of hair.^[8]

V. FORMULATION

Materials

1. HIBISCUS



Figure 1

- **Generic name-** *Rosa-sinensis*
- **Family** – Malvaceae

- **Chemical constituents-**
- Amino Acids, Flavonoids, Vitamins and Antioxidants (including vitamin C, A, and anthocyanins), Saponins, Alpha-hydroxy acids (AHAs), Mucilage.

▪ **Role as cosmeceutical-**

1. Strengthens the hair shaft and stimulates follicle health
2. Promotes hair growth
3. Prevents hair fall and adds shine and luster to hair.

2. AMLA



Figure 2

- **Generic name-** *Phyllanthus emblica*
- **Synonym-** Indian Gooseberry, Emblic Myrobalan, Amlaki
- **Family -** Phyllanthaceae
- **Chemical constituents-**
- Vitamin C, Polyphenols (Tannins, Gallic acid, Ellagic acid, Flavonoids), Minerals (Iron, Calcium, Phosphorus, Copper), Essential Fatty Acids and Amino Acids.
- **Role as cosmeceutical-**

 1. Reduces hair fall
 2. Prevents premature graying
 3. Combats dandruff
 4. Strengthens and nourishes hair
 5. Protects from environmental damage

3. ASHWAGANDHA



Figure 3

- **Generic name-** *Withania somnifera*
- **Synonym-** Winter cherry, Indian ginseng, and Ajagandha, Queen of Ayurveda
- **Family -** Solanaceae

- **Chemical constituents-**
- Withanolides, Antioxidants, Tyrosine, essential nutrients like protein, iron, vitamin C, potassium, and glucose
- **Role as cosmeceutical-**
- 1. Reduces stress-related hair loss
- 2. Improves scalp health
- 3. Fights damage
- 4. Promotes thicker hair

4. ONION



Figure 4

- **Generic Name-** *Allium cepa*
- **Synonym-** Onion
- **Family** – Amaryllidaceae
- **Chemical constituents-**
- Sulfur, Flavonoids, Quercetin, Vitamins, Minerals, Organo sulfur compounds
- **Role as cosmeceutical-**
- 1. Onion juice promotes hair growth by increasing blood circulation to the scalp.
- 2. Onion can stimulate hair follicles.
- 3. The sulfur in onions helps strengthen hair strands, reduce breakage, and prevent hair fall, antimicrobial and antifungal properties.
- 4. Prevent premature greying due to its antioxidant properties and ability to optimize the hair growth cycle.

5. ALOE VERA



Figure 5

- **Generic name-** Aloe vera
- **Synonym** -Aloe
- **Family** -Liliaceae
- **Chemical constituents-**
- Vitamins, Antioxidant Vitamins, B Vitamins, Minerals, Amino Acids, Enzymes, Bradykinase, Other enzymes, Monosaccharides, Polysaccharides, Salicylic acid, Lignin, Saponins
- **Role as cosmeceutical-**
 1. Soothes scalp
 2. Fights dandruff
 3. Strengthens hair
 Promotes growth
 5. Moisturizes and conditions
 6. Reduces frizz
 7. Provides sun protection

6. NEEM LEAVES



Figure 6

- **Generic name-** *Azadirachta indica*
- **Synonym** - Neem, Margosa
- **Family** – Meliaceae
- **Chemical constituents-**
- Azadirachtin, Nimbidin and Nimbin, Limonoids, Quercetin and other Flavonoids, Fatty Acids (e.g., Oleic, Linoleic, Stearic Acids,) Vitamin E.

▪ **Role as cosmeceutical-**

1. Treats Dandruff and Scalp Infections
2. Promotes Hair Growth
3. Conditions Hair.
4. Prevents Premature Greying.
5. Eliminates Head Lice.

7. CURRY LEAVES



Figure 7

- **Generic name-** *Murraya koenigii*.
- **Synonym** - Curry tree, sweet neem, Kadi Patta
- **Family** – Rutaceae (citrus)
- **Chemical constituents-**
- Beta-carotene, Proteins, Vitamins, Antioxidants, Essential oils, Carbazole alkaloids,
- **Role as cosmeceutical-**

 1. Strengthens hair
 2. Promotes growth
 3. Reduces hair loss
 4. Fights dandruff
 5. Moisturizes the scalp
 6. Acts as a natural conditioner

Method of Preparation of Serum:

Procedure for preparation of 30ml of Herbal hair serum is as follows:

1. **Hibiscus flower extract:** Freshly collected Hibiscus flowers were boiled in 15 ml water for 10 min to get extract.
2. **Neem leaves extract:** Freshly collected neem leaves were boiled in 15ml water for 10min to get extract.
3. **Curry leaves extract:** Freshly collected curry leaves were boiled in 15ml water for 10min to get extract.
4. **Amla extract:** 5 ml Amla extract was prepared using crushed amla and water, boiled for 5 min.
5. **Ashwagandha extract:** 5ml Ashwagandha extract was prepared by boiling Ashwagandha powder in water for 5-7min.
6. **Onion juice:** Onion juice was obtained by crushing onion in mixer and straining the mixture.
7. **Aloe vera gel:** Aloe vera gel was obtained from freshly cut aloe plant, aloe leaf was cut and gel was removed using spatula. Required quantities of all the ingredients were measured properly.

8. To the aloe vera gel Hibiscus flower extract, Neem leaves extract, Curry leaves extract, Amla extract, Ashwagandha extract and onion juice were added one after the other and mixed to get a homogeneous mixture. To this mixture Jasmine oil was added as flavouring agent.



Figure 8: Herbal serum formulation

Evaluation

Evaluation of Herbal Hair Serum

- a. Physical Appearance -The serum preparation was visually evaluated for appearance, color, and texture.
- b. Homogeneity Test- This test was performed to check the presence of coarse particles lumps, flocculates, or aggregates. Homogeneity was tested by applying it to a dry, clean glass slide and then a covered with cover slip and observation was recorded.
- c. PH Test – pH was tested using pH meter.
- d. Skin Irritation Test – Test was performed by applying serum to the skin and observed for redness, rashes or itching after two hours.
- e. Spread ability- It is done to check the Spreadability of preparation on skin. For that small quantity of serum was placed on a glass slide then it was spread on slide and how much time it took to spread was measured.

Calculation: $S = M \times L / t$ S- Spreadability, M-weight of scrub, L-length of glass slide, t- time in seconds
 Spreadability was found to be 5gm.cm/sec.

- f. Stability – Stability studies were done by storing herbal hair serum at two different temperatures of 42 °C and 30 °C, with 65 RH for three months. After three months, the herbal hair serum's pH, appearance and homogeneity was checked.

VIII RESULT & DISCUSSION

Hair serums act as super food for hair. Hair needs nourishment to grow strong and healthy, as its growth is dependent on internal nutrients from a balanced diet and external moisture and lipids. Nourishment provides the essential building blocks like proteins, vitamins, and minerals required for hair structure, strength, and shine, while also protecting it from damage, dryness, and breakage. Herbal serum preparation in current study was prepared with the same perspective and found to be satisfactory after evaluation. The preparation was stable with red color and jasmine perfume. The liquid preparation was homogeneous visually and spreadable having a PH in range of 4.3-5.2. Further the formulation was found to be non-irritant to skin & scalp and washable from hair. At the same time our formulation was found to leave the hair soft, shiny and manageable.

CONCLUSION

Herbal formulations are said to have no/ lesser harmful effect or safe because they lack synthetic chemicals. Hibiscus (flowers) has a sticky extract chemically composed of amino acids, a stimulator of keratin (building block of hair cuticle). Its mucilage (natural conditioner) is responsible for moisturization of dry hair and counters the aging of hair with antioxidants. Amla is rich source of with Vitamin C and antioxidants that promote the formation of collagen, which is very vital in hair growth. Amla reduces oxidative stress in the scalp thus regulate hair greying and thinning. Hibiscus and amla help to restore the natural acidity of scalp, preventing fungal infections and dandruff, resulting in balancing Scalp pH.

While Onion can stimulate hair follicle as it is abundant in sulfur. Sulfur helps to strengthen hair strands, reduce breakage, and prevent hair fall. Presence of Sulfur also contributes to antimicrobial and antifungal properties. Antioxidants, Tyrosine, essential nutrients like protein, iron, vitamin C, potassium, and glucose present in Ashwagandha reduces stress-related hair loss, Improves scalp health, Fights damage and Promote thicker hair. Neem is a known for its anti-fungal and anti-inflammatory characteristics which can be useful in the treatment of dandruff, itchy scalp, and minor infections. Curry Leaves are Rich in beta-carotene and proteins which can cause strengthening of hair roots. Alkaloids and antioxidants contents of curry leaves support natural pigment production, delaying greying. Antioxidant-rich herbs like curry leaves and Amla fight free radicals. Monosaccharides and Polysaccharides in Aloe Vera seals moisture ease irritation of the scalp and make hair shiny. Aloe has proteolytic enzymes that restore dead cells on the scalp. It is a natural conditioner which locks moisture in every hair; forming a protective layer around hair strands and reducing frizz.

To sum up, Aloe in Hair Serum has potential to moisturize the hair, Neem extract can fight dandruff and microbial infection and other ingredients in serum contribute to solve hair problems by strengthening the hair. Thus preparation in current study can facilitate overall hair care making them shiny and manageable. Serum was stable and had satisfactory test results after evaluation. Serum found to prove intended use after application. Ingredients incorporated in serum are easily available and of low cost making final formulation cost effective. So herbal products having natural cosmeceuticals represent promising approach for effective hair care in low budget.

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