

Development and evaluation of quality standards of hair growth stimulator serum

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Abstract- In this expeditious world, cosmetics are in great demand. Cosmeceuticals in Pharmaceutical industry is booming day-by-day. Cosmetics are used on daily basis. Cosmetics are intended for skincare, hair care, nails and for teeth as well. Also, to take the note, toothpastes, hair oils, hair dyes are classified into the cosmetics that is been used by every individual on everyday basis. The synthetic or chemical products have side effects and adverse effects of when used, thus now people have high approach towards organic, natural and herbal formulations that show no or minimum side effects. Generally herbal preparations are known for its “No side effect” property. Various problems are experienced by the people such as hair fall, split ends, dandruff, increased sebum production, hair thinning, premature hair greying etc. Thus, people are looking for ways to increase hair development, their prevention and care. A hair serum helps to lock the moisture and keep the scalp hydrated and healthy. Trigonella foenum graecum (Fenugreek) is a popular homemade remedy for hair growth and also improves hair density. Brahmi is beneficial in treatment of dandruff and boosts hair growth. Amla is rich in anti-oxidants that are very effective in treatment of split ends. Tulsi improves the blood circulation and boosts hair growth. These also useful in treating dry and damaged hair, provides hydration to the scalp. Thus, preparation of the herbal formulation using natural products will help in treatment of various hair diseases.

Introduction- Hair growth is based on a dynamic and precisely regulated mechanism that is not fully understood. It is a cyclical mechanism involving hair shaft synthesis, elongation, and ultimately shedding. 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 [1]. Alopecia Areata (AA) is a recurrent immune mediated skin disorder with a non-scarring loss of hair. In the general population, it has an incidence range of 1.7 percent and 2.1 percent, with higher prevalence in young patients (21 40 years) and no significant difference in incidence between males and females reported. This condition may have a detrimental effect on the quality of life of patients in a manner close to that reported for other skin diseases such as dermatitis and

psoriasis. AA's pathogenesis can be explained by the inflammatory cascades involving a breakdown of the hair follicle's immune privilege, associated with T lymphocyte invasion, and an autoimmune process that creates autoantigens from proteins associated with melanogenesis. In addition, different variables, including family backgrounds, genetic bases, environmental factors, illnesses, medications, injuries, potential emotional stress, and oxidative stress, can be implicated in AA pathogenesis [2]. Defective antioxidant defense or exaggerated expression of reactive oxygen species (ROS) has been reported to predispose to oxidative stress, which is believed to play a significant role in many inflammatory skin disorders such as AA. In this respect, several studies have documented that AA has a detrimental effect on the blood and skin tissue's oxidant-antioxidant balance. AA's latest clinical treatments are centered primarily on immune regulation using numerous forms of medications, including topical and systemic steroids, phototherapy, and immune suppressants such as cyclosporine and methotrexate; meanwhile, certain vitamins and micronutrients are expected to play a role in the treatment of AA and can alleviate oxidative stress [3].

Advantages [4,5]

Herbal serums give your hair a natural shine while also moisturising it deeply to protect it from environmental or heat-related damage, Controlling and dryness.

- Protecting in opposition to damage.

It protects the hair from environment.

- It can be used both before or after using heat styling.
- Boosts smoothness of the hairs.

Disadvantages [6]

- Regular uses of hair serum make the hair unhealthy.
- When Applying the serum on the scalp, can lead to inflammation.
- Scalp application should be avoided because it may cause oiliness or irritation

However, the development of such formulations necessitates a comprehensive evaluation to ascertain their efficacy and safety profiles [7]. In this study, we aim to formulate, develop, and rigorously evaluate a poly-herbal hair serum comprising Grapeseed, Sweet Almond, and Argan oils, along with Ylang-Ylang and Vitamin E oils [8]. Through systematic experimentation and analysis, we seek to assess the serum's physicochemical properties, stability, hair moisturization potential, scalp health benefits, and user acceptability [9-11]. The findings of this research endeavor hold the promise of contributing novel insights into the formulation of botanical-based hair care products, with implications for enhancing consumer well-being and satisfaction [12, 15].

METHODS AND MATERIALS

The following ingredients were used for the preparation of the herbal hair serum formulation.

Trigonella foenum graceum (Fenugreek):-

Trigonella foenum graceum (Fenugreek) seed extract is a nutritional supplement that also contains micronutrients like B-vitamins, antioxidants, and trace elements found in hair. Trigonella foenum-graceumL. (fenugreek) is a leguminous herb. Fenugreek is indigenous to Southern Europe, Western Asia, and the Mediterranean [16]. Saponins, including diosgenin, yamogenin, and gitogenin derivatives, trigonelline alkaloids, flavonoids, galactomannan vitamins, and fibre, among other active components, are found in fenugreek seeds [17]. The seeds have a pleasant aroma and a tart taste. Fenugreek is recognised to promote healthy hair development, although the exact mechanism has not been identified [18]. It is suggested that fenugreek increases the blood flow to hair follicles and steroid saponins, which interact physiologically with the formation of DHT (dihydrotestosterone) [19, 20]. One possible cause of both male and female variant hair loss is the effect of DHT on genetically predisposed hair follicles [21, 22]. The increasing miniaturisation of the hair and eventual hair loss are caused by binding DHT to the hair follicle.[23]

Brahmi Benefits for Hair

Brahmi is an excellent herb for hair growth. It strengthens the roots, prevents premature greying of hair, treats split ends, and reduces dandruff. Brahmi uses are included in the herbal formulations to promote the development of new hair follicles by improving blood circulation to your scalps.

It is blended with herbs like reetha, shikakai, and amla or carrier oils like mustard, coconut, or amla oil to prepare a hair mask at home [24].

Bhringraj

Bhringraj is also known as Kesharaj which means “Ruler of the hair”. It is rich in proteins, vitamins and antioxidants which help protect the body against certain infections. Bhringraj oil is effective in promoting hair growth as well as reducing the greying of hair. This is due to the presence of various nutrients in Bhringraj that provide nourishment to the hair scalp. According to Ayurveda, Bhringraj juice rejuvenates the skin and thereby helps reduce the signs of aging such as fine lines, wrinkles and patchy skin due to its anti-aging property. Bhringraj powder can also be used to manage skin infections and allergies due to its antimicrobial property. It also protects the liver cells against damage caused by free radicals

due to its hepatoprotective and antioxidant properties. Bhringraj is also beneficial in managing the symptoms of gastrointestinal disorders like contractions or spasms in the stomach, intestine or urinary bladder due to its antispasmodic property. It is advisable to use Bhringraj in the recommended dosage as high dosage may cause stomach problems [25].

Amla

Amla, also known as Indian gooseberry, is a fruit commonly used in Ayurvedic medicine for its numerous health benefits. It is believed to have a positive impact on hair growth, making it a popular ingredient in various hair care products. When applied topically, "the vitamins and minerals along with the phytonutrients present in amla increases the blood circulation in the scalp, which stimulates the hair growth," he says. Blood circulation ensures that the scalp gets all the essential nutrients and oxygen to be healthy. Plus, subcutaneous blood flow helps in the anagen phase of the hair, making them grow longer. Research shows that that amla oil was a powerful inhibitor of 5-alpha reductase. The medication which is used to treat male and female pattern baldness, also works by inhibiting 5-alpha reductase. This is particularly key for those with hormonal hair loss, due to PCOS or thyroid imbalances.

2. MATERIALS AND METHODS

Collection of Plant Part

For the preparation of herbal hair oil, various plant materials were collected from medicinal garden.

Formulation of Herbal Hair Serum

All the ingredients were specifically weighed and dispensed in 500 ml of water and boiled for 15 min. They were permitted to cool after 15 minutes of boiling and then filtered. Castor oil and vitamin E were added to the filtrate. Afterward, the prepared serum was kept in a spray bottle.

Evaluation of the Hair Serum-

Physical Appearance- The physical appearance, color, and feel of the prepared herbal hair serum are visually tested.

Homogeneity Test- A clean and dry object glass was smeared with the hair serum, and a cover glass was sealed. The appearance under the light of some coarse particle/homogeneity was investigated. Herbal hair serum was tested by visual examination for homogeneity and tested for some lumps, flocculates, or aggregates [20]

pH Test- The pH meter was calibrated using pH 4 and pH 7 buffer solutions. Then, the electrode was soaked in the hair serum and left until the pH normalized after a few minutes [21].

Viscosity- The viscosity measurement was performed with spindle number 6 on a Brookfield viscometer (RVDV-II+PRO). In the beaker, 50 ml of hair serum was placed, and the viscosity was measured at various rpm, i.e., 10, 20, 50, 100 [20]

Spreadability- Spreadability was measured by a parallel plate process typically used to assess and measure the spreadability of semi-solid preparations. One gram hair serum was pressed between two horizontal plates of dimension 20× 20 cm, the upper of which weighed 125 g. The spread diameter was measured after 1 min. Spreadability was calculated 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 (in sec) taken to separate the slides completely [21].

RESULTS AND DISCUSSION-

Physical Appearance- It was observed that the color of all the herbal hair serum was pale brown with a translucent look, which on the application was found to be smooth.

Homogeneity- By visual examination of the appearance and presence of any lumps, flocculates, or aggregates, the produced herbal hair serum was checked for homogeneity. The homogeneity of prepared serum has been shown to be fine.

Rheological Study- The rheological examination of prepared herbal hair serum was conducted, and it was observed that viscosity was reduced as the shear rate increased. The pseudoplastic flow was also described, which is a beneficial attribute for topical herbal hair serum since it guarantees optimum area coverage upon application. The mechanistic explanation for the flow behaviour found is as follows: the long-chain molecules of the polymers are spontaneously arranged in dispersion under standard storage conditions. These molecules tend to organize their long axes in the direction of the force exerted when applying shear stress. This stress-induced orientation reduces the internal resistance of the material. In addition, the solvent molecules earlier associated with the polymer molecules will also be released. Thus, the effective concentration and size of the molecules are low. The material allows a progressive increase in the shearing stress.

pH Determination- The pH of the whole herbal hair serum was 7.3, which was sufficient for the hair, suggesting that the herbal hair serum was suitable for the hair.

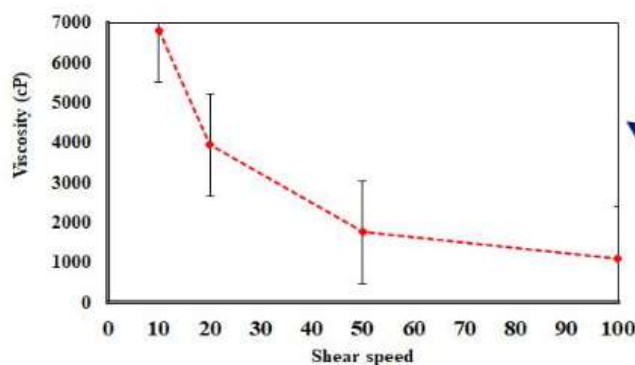


Fig. 1 Viscosity of Prepared Herbal Serum



Fig.2 Prepared Herbal Serum

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