



Formulation and Evaluation of Herbal Hair Serum

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Abstract— Nowadays, cosmetics are becoming more high demand in daily life and it was used frequently by many of people per year. Mankind uses various products to enhance beauty and elegance to look young and charming. Cosmetics thus play a vital role in human life. Now days, herbal cosmetic are widely used because of the belief that they have fewer side effects and better safety. Hair is one of the primary parts of the body which acts as a protective appendage. The main objective of the present work is to develop an herbal hair serum for general purpose (daily use) using various herbs with this evaluate the characteristics of cosmetic serum and to identify the best formulation of cosmetic serum. Three formulations of cosmetic serum (H1, H2 and H3) with different concentration of excipients have been developed. They were evaluated for its physical appearance, pH, homogeneity test, viscosity, spreadability test and stability test. All the parameters were found to be good and within the standards. Current research has revealed that herbal formulations are effective in enhancing hair consistency.

In the mammalian system, the hair follicle is known to be the most significant organ that determines appearance, gender distinction, give violent temperature protection, and plays a part in tone- defense.

The youngish generation have begun to suffer from extreme hair loss problems due to numerous life- related changes similar as fatigue, anxiety, input of junk foods, use of diiferent hairstyling/ coloring styles, etc. The loss of hair isn't temporary in utmost cases, but it results in alopia. numerous people suffering from hair loss are in hunt of multiple treatments

due to extreme anxiety and pressure, from tradition to traditional and remedial mending to the use of minoxidil and finasteride. To ameliorate hair growth and to help hair loss, hair root activation is needed. Herbal dress are still generally used by average citizens because of smaller side goods and lesser protection and safety profile. The present study was intended to use different sauces to formulate herbal hair serum for general purposes (hair operation).

Keywords: Citrus Sinensis, flaxseed, Nigella sativa, Zingiber officinale, castor oil painting, Trigonella ,Cosmetic, hair, herbs, formulation, effective, etc.

➤ INTRODUCTION:

he cost increase in worldwide living standard hascreated a rise in demand for cosmetic products. The importance of cosmetics has increased as many people want to stay young and attractive. Cosmeceuticals refers to the combination of the cosmetics industry withthe pharmaceutical industry. Cosmetics companiesproduce cosmetics and pharmaceutical ones producemedicines. Cosmeceuticals are skincare products that combine cosmetics and medicines.

Serum is one of the cosmetic products with very high concentration of active ingredient in their formula for providing intensive nutrition to the deeper skin layer and non-greasy finish product which suitable for skin.¹

Herbal toilet article is more preferred and is employed within the repairmen of the many ailments of hair .(1)They promote hair growth, improve elegance of hair and forestall hair fall(2)

- . Toiletries not only promotes hair growth but they also provide necessary moisture to the scalp rendering in beautiful hair(3) . Hair tonics maintain the lipid levels.(4) .Many cosmetics are available nowadays to unravel these problems and hair grease is one of them.(5) persons are born with approximately 100,000 terminal hair follicles on the scalp that are predetermined to grow long and thick hair. (6) Ninety percent of the hair on the healthy scalp is growing, some are undergoing involution (less than 1%), and remaining are resting (5% to 10%).(7,8,9) Post Finasteride depression has also been reported.(10) Minoxidil, on the opposite hand, is related to facial hypertrichosis and phone dermatitis.(11).

Highlights of Hair Serum:

Hair serum is the styling product that coats the surface of the hair known as hair serum. It is basically a hair care product in liquid form, its consistency thicker than water.

Hair serum is not just meant for hair styling. They are also for treating multiple hair concerns like dry hair, dull hair, and unmanageable hair.

There are different types of hair serums for different hair goals. Depending on the products formula, a hair serum might reduce frizz, add shine, or straighten the hair.

This is silicone based styling product that is designed to coat the surface of hair to help impart added shine, smoothness hydration, humidity and pollution protection.

Intended to be used on wet hair.

Suitable types of hairs for using hair serum: ²

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

Advantages of Hair Serum:

1. Hair serum can effectively smoothen, soften and make your hair silky.
2. It protects the hair from environmental aggressors.

3. both pre styling treatment and finishing product.
4. It can be used before or after using heat styling.
5. Controls frizz.
6. If your hair is weak and damaged, it may look frizzy or dry.
7. Boosts smoothness.
8. The anti-frizz effect of hair serum also helps improve the smoothness of hair serum.
9. Hair serum is also reduces the tangles and promote the shine.
10. To enhance the straightness and curls.
11. It protects against the damage.

Disadvantages:-

1. After several days of continued use, this build-up weights down your hair, making it appear flat and dull.
2. Accumulation on your scalp can cause dryness, flaking, and skin irritation.

Side Effects of Using Hair Serum:

1. Regular use and over application can make the hair unhealthy and ultimately dry.
2. Applying the serum on the scalp can lead to inflammation.
3. Silicones present in the hair serum can be harmful for the hair in the long hair.
4. Scalp application should be avoided as it might make it oily or can lead to inflammation.

Benefits of Using Hair Serum:

It is important to know hair serum benefits before you finalize the product. A hair serum predominantly has the following benefits.

1) Multi Purpose

A hair serum solves a lot of hair issues and not just one problem. There is a reason it is called a one stop solution for all your hair woes. Hair serum transforms a bad hair day into a good hair day. With just a few drops, your hair will feel and look different.

2) Protects Hair

Hair serum forms a layer on hair strands. It thus acts as an excellent protect against heat, sun damage, dirt, dust and pollution. It prevents your hair from getting damaged. This is why it is

advised to use a heat protecting serum before using hot styling tools.

3) Gives Shine to the Hair

The layer formed by hair serum acts as a reflector of light thus making your hair look shiny and lustrous. Hair serums consist of amino acids which protect colored and chemically treated hair.

4) Prevents Hair fall From Breakage

When our hair becomes a tangled mess, we tend to lose a lot of hair strands because of the wear and tear that goes into detangling. Hair serum acts as a lubricant for such hair and makes detangling easy. And the result is less hair fall.

5) Best for Dry Hair

The most to benefit from hair serums are those who have dry and frizzy hair. Hair serums lock in the moisture and make hair smooth and shiny.

6) Nourishes Hair and Makes them Manageable
 Hair serums fill the follicular cracks and revive brittle and damaged hair. Hair serum makes hair more manageable which further makes it easy to style them. Time, energy, patience. Everything is saved.

MATERIALS AND METHODS

The crude drug required in our project was procured from nearby Ayurvedic Medical shop. The following ingredients were used for the preparation of the herbal hair serum formulation.

Ingredients of Hair Serum:

1. Aloe vera:

Aloe vera has long been used for treating hair loss. It also soothes the scalp and conditions hair. It can reduce dandruff and unblock hair follicles that may be blocked by excess oil. You can apply pure aloe vera gel to your scalp and hair a few times per week. A large amount of melanin is synthesized. This generally happens due to excess exposure of the skin to the sun. In reaction to UV rays in sunbeams, the skin cells called melanocytes initiate to synthesize melanin. This increased synthesis of melanin is responsible for the emergence of darkened patches on the skin. *Aloe vera* has the property of diminishing the pigmentation and dark spots on the face.

Fig. Aloe vera

2. Vitamin E:

Vitamin E-rich oil can help replace that protective layer and bring back shine. Oil in general also helps seal out moisture, reduce breakage, and protect

the hair from damage.



Fig. Vitamin E

3. Rose Water:

Rose water is a mild astringent which may help to reduce oiliness and dandruff. It has anti-inflammatory properties, which may make it beneficial for certain scalp conditions, like psoriasis and eczema. Many women with curly hair swear by rose water's ability to calm down frizz and add shine.

Fig. Rose Water

Ingredients	Batch H1	Batch H2	Batch H3	Role of Ingredient
Aloe vera	2.5gm	3gm	3.5g	Conditioner
Vitamin E	1ml	1ml	1ml	For hair growth
Rose water	15ml	17ml	19ml	Perfume
Distilled water	10.5 ml	8ml	5.5 ml	Vehicle
Almond oil	1ml	1ml	1ml	For Nourishment



4. Almond Oil:

The nourishing oil can soften and strengthen your hair. It's rich in vitamin B-7, or biotin, so almond oil helps to keep hair and nails healthy and strong. It can also help protect your hair from sun damage, with a natural SPF 5. You can use almond oil as a scalp treatment.





Fig. Almond oil.

Procedure of Herbal Hair Serum

Formulation:

1. Clean all the glassware and dry them properly as per SOP.
2. Measure the accurate quantity of aloe vera, transfer it in beaker.
3. Mix required quantity vitamin E in aloe vera.
4. Now mix rose water to the above mixture of aloe vera and vitamin E.
5. After stirring for few minutes, heat the prepared solution for few minutes.
6. Add few drops of almond oil.
7. After that stir the preparation with the help of magnetic stirrer
8. Transfer the preparation in measuring cylinder and adjust the final volume to 30ml.
9. Transfer final solution into container.

Formulation Table:

Table 1: Formulation Table of Herbal Hair Serum

Evaluation of Herbal Hair Serum

The following parameters are used to evaluate the prepared herbal hair serum:

1. Physical Appearance:

Physical appearance was evaluated by observation on the texture, color and smell of the formulated cosmetic serum.

2. pH:⁷

The pH test will be determined by using

Digital pH meter. Dipper of digital pH will be deep into the sample of serum formulation and the pH value will be recorded. The pH of the formulation should having acidic pH as the skin is having an acidic pH of around 4–6.

3. 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.

4. Viscosity:

Viscosity of the formulation is determined by Brookfield Viscometer at 100rpm, using spindle type model S6 4.5 ml of the serum. The serum will placed in a big mouth container with the spindle dipped in it for about 5 minutes before the measurement.

5. Spreadability Test:

Spreadability was measured by a parallel plate process typically used to assess and measure the spreadability of semisolid 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.

6. Stability Test:

The herbal hair serum was kept for three months at two separate temperatures of 4± 2°C and 30± 2°C, with 65% RH. Compared with the original pH and viscosity, the pH and viscosity of the herbal hair serum were determined after three months.

between distinct data sets through dynamic visualizations

Test the Sensitivity of the Eye (Draize Eye Test)

Eye sensitivity was tested on three rabbits for getting the average result of sensitivity. One drop of hair serum was injected into the left eyes of the rabbits in physiological NaCl (as the control is the right eye) and then observed for 30 minutes, 60 minutes, 120 minutes, 240 minutes, 1 day, 2 days, 3 days, and 4 days. The scores of the cornea, iris, and conjunctiva were determined [21].

Hair Growth Activity Test

This test was conducted on 3 areas of a single

rabbit on either foot, right and left of the shaved backs of the rabbits, each 4x4 cm in size. Then, after 3-5 minutes, depilatory cream (Veet @ cream) was applied, and the area was rinsed with water until the area was clean with hair. As an antiseptic, 70 percent ethanol was then added. Before any action evaluation, the rabbit was left behind for 24 hours. As no intervention was performed, treatment 1 was the standard control, and treatment 2 was the positive control where the hair serum with the test material was added. Again, as no intervention was undertaken, treatment 1 was the standard control, and treatment 2 was the positive control where hair serum with the test material was added. For 3 weeks, 0.1 ml of each drug was then administered twice a day to the rabbit. The first day of use of the hair serum was called day 0 [5, 6].

Qualitative Assessment of Hair Growth

Qualitative measurement of hair growth analysis was carried out by visual inspection of 2 criteria, initial hair growth time (minimum time needed for hair growth on the shaved area, measured from the darkening of the skin color showing initial hair growth) and completion time for hair growth (minimum time required for the entire shaved area to be covered with new hair) [22] on three groups (Group I: Normal control; Group II: Negative control; Group III: Positive control (Herbal hair serum)). Each group consists of three rabbits.

Observations of the Growth of Hair

It was done by taking 10 random hair strands on each box on days 7, 14, and 21. The hair had been drawn out, straightened, and stuck with the tape, and measured using Mitutoyo Digimatic wireless calipers. The average length collected was analyzed to see if the difference between the research region and the control was statistically significant [4, 21].

Hair Weight Measurements

To evaluate the weight of each box, the hair was removed and weighed on day 21 and then statistically measured [3, 20].

Microbial Contamination

Microbial contamination of hair serum was determined via spreading a thin loopful of the serum on a nutrient and Sabouraud agars and incubating for 48 hours at 37°C. In order to examine the degree of contamination, one gram of material was used to be dispersed in 4 ml of sterile Ringer solution, containing 0.25% Tween 80. In the same dispersion vehicle, sufficient dilutions were made, and 0.5 ml was

mounted on the appropriate solid medium using the viable surface procedure. Following required incubation, emergent colonies were counted [23, 24].

Stability

The herbal hair serum was kept for three months at two separate temperatures of 4± 2°C and 30± 2°C, with 65% RH. Compared with the original pH and viscosity, the pH and viscosity of the herbal hair serum were determined after three months [21]

RESULTS AND DISCUSSION

1. Physical Appearance

Parameter	Batch H1	Batch H2	Batch H3
pH	5	5.2	5.5
Homogeneity Test	Good	Good	Very Good
Viscosity	216	221	229
Spreadability Test	Easily Spreadable	Easily Spreadable	Easily Spreadable

The physical appearance, color, odour and texture of the prepared herbal hair serum are visually tested. Table 2 reflects the outcomes.

2. Homogeneity :-

By visual examination of the looks and presence of any lumps, flocculates, or summations, the produced herbal hair serum was checked for unity. The unity of set serum has been shown to be fine.

3. pH Determination :-

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

4. Stability Studies:-

The herbal hair serum was stable during the exploration time, as these serums showed no physical insecurity, and there was no conspicuous difference within the pH ahead and after the study.

5. Skin irritation test :-

after we apply on skin no any variety of redness occur .

6. Sensitivity test :-

apply on skin and observed after 10 min no any rashes or itching occur.

Table 2: Physical Appearance of Herbal Hair Serum

7. pH, Viscosity, Homogeneity and Spreadability Test

The pH scale is used to specify the acidity or basicity of a product in order to ensure that it is safe to use. Brookfield viscometer is used to determine the viscosity of the formulation. The value obtained is recorded in table 3.

Table 3: pH, Viscosity, Homogeneity and Spreadability Test of Herbal Hair Serum

8. Stability Studies

Table 4 reveals that the herbal hair serum was stable during the research time, as these serums showed no physical instability, and there was no noticeable difference in the pH before and after the study.

Table 4: Stability Study of Herbal Hair Serum

Sr. No.	Parameter	Initial	Final
1	pH	5.5	5.6
2	Viscosity	229	232

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

Parameter	Batch H1	Batch H2	Batch H3
Color	Milky	Milky	Milky
Odour	Rose type	Rose type	Rose type
Texture	Smooth	Smooth	Smooth

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.

This research provides guideline on the employment of herbal ingredients on the preparation of Herbal toilet article having minimal or no side effects. All the parameters showed that they're within the boundaries and since all the ingredients added have many advantages, this oil will help in maintaining good growth of hair, turning grey hair to black, protects from dandruff and leads to lustrous looking hair.

Results have shown that herbal hair serum provides various 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 cosmeceutical 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 clamor. As nowadays, in the coming years, it is a fast-developing market with a mammoth scope. In cosmetic formulations, the use of bioactive ingredients has a valuable impact on body characteristics and offers nutrients that are important for preserving good and beautiful hair. It can be inferred that prepared herbal hair serum has a beneficial effect on the mechanism of hair growth and increased consistency. Medicinal plants have been used for the treatment of hair diseases since antiquity because of fewer side effects and hypersensitivity reactions. It is time to dump the chemical-laden hair care products in favour of natural alternatives. The traditional system of medicine in India acclaims a number of herbal drugs for hair growth promotion. The best part is that herbal extracts will provide microprotein supplements to hair and provide enough nourishment, resulting in safe and sound hair. Herbal cosmetics have become increasingly common in the personal care industry, and there is a high demand for them in everyday life due to their lack of parabens and sulphates. The global herbal industry is projected to be worth more than US\$10 billion dollars, and it is increasing at a rate of three to four percent per year due to increased demand.

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