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## Review Paper

# Formulation And Standardization of Herbal Hair Serum: A Review

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### ABSTRACT

Hair problems are increasing due to the pollution, stress and improper lifestyle because of all this condition hair problem are associated such as hair fall, dandruff, dryness, premature graying and alopecia. The growing awareness regarding safe and effectiveness of natural product has resulted in increased demand for herbal cosmetic formulation. The herbal hair serum is new and modern formulation for topical use which is designed to improve hair texture, promote scalp health, improve follicular cycle provide protection against physical and chemical damage. Some essential herbal product containing phytoconstituents such as flavonoids, tannins, saponins and vitamin which is essential for improving hair strength and reducing hair breakage. Among these plants, fenugreek (*Trigonrlla foenum- graecum*), Hibiscus (*Hibiscus rosa-sinensis*), and kalonji (*Nigella sativa*). Formulation of herbal hair serum requires proper selection of excipients, suitable extraction methods and standardization parameter to ensure product quality and stability. This review focuses on formulation, herbal ingredients, preparation methods and their evaluation parameter involve in preparation of herbal hair serum. The review also highlights phytochemical constituents, pharmacological activities, extraction technique, formulation procedure, evaluation parameter, and quality control methods used in cosmetic formulation

### INTRODUCTION

Hair is an essential component of the human body that contributes significantly to aesthetic appearance and psychological confidence. Healthy hair is considered as sign of overall well-being and good health. However, hair disorders such as alopecia, dandruff, scalp irritation, and premature hair loss are common

problems affecting both men and women worldwide. Hair loss can occur due to multiple factors including genetic predisposition, hormonal imbalance, oxidative stress, microbial infection, nutritional deficiency, and environmental pollution. Among these factors, oxidative stress and inflammation are major contributors to hair follicle damage. Modern lifestyles, stress, and

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excessive use of chemical hair care products further aggravate these conditions.

Synthetic drugs such as minoxidil and finasteride are commonly used for treating hair loss. However, prolonged use of these medications may cause side effects including scalp irritation, itching, dryness, and dermatitis. Therefore, herbal formulations have gained increasing popularity as safe alternatives for hair care management.

Herbal cosmetics are cosmetic products that contain active plant-derived ingredients. These formulations are widely accepted due to their natural origin, minimal toxicity, and multiple therapeutic properties. Polyherbal formulations containing multiple medicinal plants often provide synergistic effects which enhance the efficacy of the product. Fenugreek, hibiscus, and kalonji are medicinal plants traditionally used in Ayurvedic and herbal medicine for promoting hair growth and maintaining scalp health. These plants contain numerous bioactive phytochemicals that nourish hair follicles, improve scalp circulation, and prevent hair fall. The development of herbal hair serum using hydroalcoholic extracts of these plants provides a promising approach for natural hair care management. In recent years, herbal cosmetic preparation have gained considerable attention due to their safety profile and therapeutic benefits. Among different dosage forms, hair serum has emerged as a population formulation because of its non-greasy nature, ease of application and rapid action on hair shafts. Herbal hair serum formulation contain plant extracts and conditioning agents which help in nourishing

scalp, improving hair strength and enhancing shine. Scientific formulation and standardization of herbal hair serum is necessary to ensure uniformity, stability and effectiveness. Evaluation parameters such as pH, viscosity, spreadability and stability studies are important in determining the quality of finished products.

## ANATOMY AND PHYSIOLOGY OF HAIR

Hair is a filamentous structure composed mainly of keratin protein. It originates from hair follicles present in the dermal layer of the skin. The hair follicle is a complex mini-organ responsible for hair growth and regeneration.

### **Table 1: The major components of the hair follicle**

**Hair shaft – visible portion of hair above the skin surface.**

**Hair root – portion of hair embedded within the follicle.**

**Dermal papilla – contains blood vessels that supply nutrients to the hair follicle.**

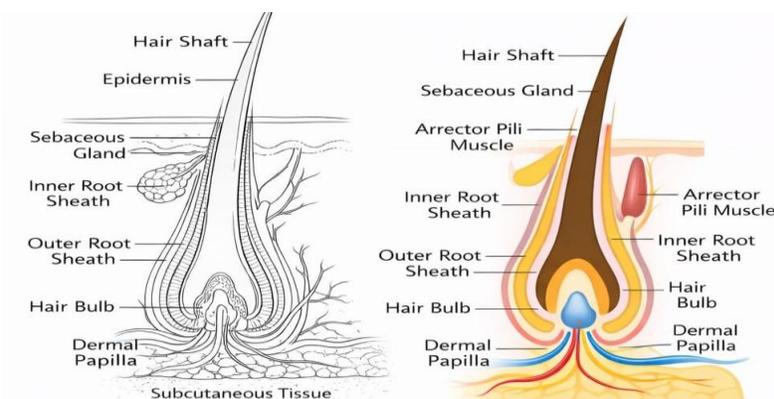
**Sebaceous glands – produce sebum which lubricates the hair.**

**Arrector pili muscle – responsible for hair erection.**

**Proper functioning of the hair follicle is essential**

### **Structure of hair follicle**

The hair follicle is a dynamic mini-organ responsible for hair growth. It consists of the hair shaft, hair bulb, dermal papilla, and sebaceous gland.



**Fig 1. Schematic representation of the anatomical structural of the human hair follicle.**

### B. Hair Growth cycle

Hair growth occurs through cyclic phases including anagen (growth phase), catagen (transition phase), and telogen (resting phase).

**Table 2 : Phases of Hair growth cycle**

Phase	Duration	Function
Anagen	2–6 years	Active hair growth
Catagen	2–3 weeks	Transition phase
Telogen	3–4 months	Hair shedding phase

### C. Causes of Hair Loss

Hair loss may result from multiple biological and environmental factors including hormonal

imbalance, stress, nutritional deficiency, and genetic variations.

### D. Synthetic Treatments for hair Loss

**Table 3 : synthetic Drug use for the hair treatment**

Drug	Mechanism	Side effects
Monoxidil	Improves blood circulation to follicles	Scalp irritation
Finasteride	Inhibits conversion of testosterone to DHT	Hormonal side effect

### Herbal Ingredient used in hair serum

Medicinal plant are widely incorporated in hair serum formulation due to their beneficial effects on hair and scalp.

### Plants use for the formulation:

Herbs	Scientific name	Active constituent	Uses
Hibiscus leaves	Hibiscus rosa-sinensis	Flavonoids Anthocyanins Vitamin C	Stimulate hair growth Conditioning and nourishes hair
Kalonji	Nigella sativa	Thymoquinone Fixed oil Protein	Prevent hair fall Improve scalp health
Fenugreek	Trigonella foenum-graecum	Alkaloid Flavonoid	Promote hair growth Reducedandruff

### Formulation components of herbal hair serum

Base and vehicle

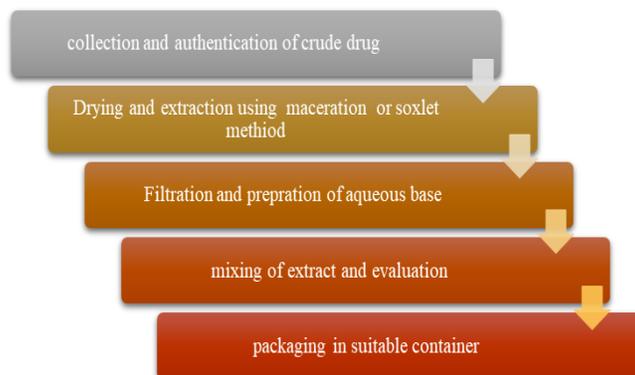
1. Distilled water
2. Ethanol

3. Glycerin
  4. Propylene glycol
- Conditioning Agents
1. Natural polymers
  2. Plant mucilage

Preservatives and fragrance

1. Vitamin E
2. Sodium benzoate
3. Essential oils

#### 4. General Method of preparation of Herbal Serum.



#### 5. Evaluation and Standardization Parameters

The evaluation and standardization processes play a crucial role in confirming the quality, safety, stability and effectiveness of herbal hair serum preparations. There are Various physicochemical and biological parameters are assessed to maintain uniformity and therapeutic performance.

##### Organoleptic evaluation

Study of the organoleptic properties such as color odor appearance and texture of the serum. All these properties are helps to determining product acceptability and detecting any physical instability during storage .

**Determination of pH** The pH of herbal hair serum should be compatible with scalp pH to avoid irritation. Generally, a slightly acidic pH is preferred as it help to maintain the smoothness.

##### Viscosity Measurement

Viscosity indicates the flow rate and consistency of the serum. Proper viscosity ensures easy application, uniform spreading on hair shafts and usefull for regular use.

##### Spreadability Test

Spreadability determines serum can be distributed on hair surface. Good spreadability enhance the

hair result and reduce the excessive use of the product.

##### Stability Studies.

Stability testing is performed to evaluate the effect of temperature, light and humidity on formulation characteristics. Changes in the color, phase separation Observation.

##### Phytochemical Screening

Qualitative tests are performed to confirm the presence of the active constituent.

#### 6. Advantages of Herbal Hair Serum

- i. Non-sticky formulation
- ii. Easy to application
- iii. Improve hair shine
- iv. Reduce hair fall
- v. Stimulate follicular cycle
- vi. Minimal Side effects

#### 7. FUTURE PROSPECTS

- i. Development of nano-herbal serum formulation
- ii. Clinical evaluation of herbal cosmetics
- iii. Advanced stability studies
- iv. Standardization using modern and standard techniques

## CONCLUSION

Herbal hair serum is one of the natural tool which promises us the healthy hair care where the enhancement of healthy and effective hair growth, this serum involves the advancement in the field of pharmaceutical and cosmetic sciences. The significance of this hair serum is constitutes the natural derivation of plants extracts which are full of vitamins, calcium and the substances which are essential for the healthy hair.

The formulation of herbal hair serum involves the measured amount of pH, concentration, spreadability, viscosity measurement and the important stability measures. Therefore, the scientific investigation and quality control in the herbal hair serum formulation plays a crucial role in reliability and advancement thus, also it is an alternative for modern hair care management.

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