



# International Journal of Engineering, Science and Humanities

An international peer reviewed, refereed, open-access journal  
Impact Factor 8.3 [www.ijesh.com](http://www.ijesh.com) ISSN: 2250-3552

## **Formulation and Evaluation of Herbal Hair Serum using Fenugreek Seeds**

**Vandana Malviya**

NRI Institute of Pharmacy, Bhopal

**Shahvez Khan**

NRI Institute of Pharmacy, Bhopal

**MD Kaish**

NRI Institute of Pharmacy, Bhopal

**Abhishek Dangi**

NRI Institute of Pharmacy, Bhopal

### **ABSTRACT**

The increasing demand for natural and chemical-free cosmetic products has led to the development of herbal formulations for hair care. This study focuses on the formulation and evaluation of a herbal hair serum using fenugreek seeds (*Trigonella foenum-graecum*), known for their rich content of proteins, nicotinic acid, and lecithin, which promote hair growth and strengthen hair follicles. The serum was prepared using fenugreek seed extract combined with suitable natural ingredients and a non-greasy base to ensure easy application and enhanced absorption.

The formulated herbal hair serum was evaluated for various physicochemical parameters including pH, viscosity, spreadability, homogeneity, and stability. Additionally, its performance was assessed based on parameters such as hair smoothness, shine, and reduction in hair fall. The pH of the formulation was found to be compatible with scalp conditions, while viscosity and spreadability indicated good applicability. Stability studies showed no significant changes in color, odor, or consistency over time, confirming the formulation's stability.

The presence of bioactive compounds in fenugreek contributed to improved hair texture, reduced dandruff, and minimized hair breakage. The serum demonstrated effective conditioning properties without causing irritation or adverse effects. Overall, the study concludes that the formulated herbal hair serum using fenugreek seeds is safe, effective, and suitable for regular use, offering a promising alternative to synthetic hair care products.

**Keywords:** Herbal Hair Serum, Fenugreek Seeds (*Trigonella foenum-graecum*), Hair Growth, Natural Cosmetics, Hair Fall Control

### **1. INTRODUCTION**

In recent years, there has been a significant shift toward the use of herbal and natural products in personal care, particularly in hair care formulations. This trend is largely driven by growing awareness of the adverse effects associated with synthetic chemicals present in conventional hair



# International Journal of Engineering, Science and Humanities

An international peer reviewed, refereed, open-access journal  
Impact Factor 8.3 [www.ijesh.com](http://www.ijesh.com) ISSN: 2250-3552

products, such as parabens, sulfates, and silicones. These chemicals may lead to scalp irritation, hair damage, and long-term health concerns. As a result, consumers are increasingly opting for safer, eco-friendly, and plant-based alternatives. Herbal hair serums have emerged as an effective solution, offering nourishment, protection, and improved hair health without harmful side effects.

Hair serum is a liquid-based formulation designed to coat the surface of the hair, providing smoothness, shine, and protection against environmental damage. Unlike traditional oils, serums are typically non-greasy and lightweight, making them suitable for daily use. They help in managing frizz, detangling hair, and protecting against heat and pollution. Incorporating herbal ingredients into hair serums enhances their therapeutic value by delivering essential nutrients directly to the scalp and hair follicles.

Fenugreek seeds (*Trigonella foenum-graecum*) are one of the most widely used herbal ingredients in traditional medicine and cosmetic formulations. They are rich in proteins, amino acids, nicotinic acid, lecithin, iron, and vitamins, which play a crucial role in promoting hair growth and strengthening hair structure. Fenugreek is also known for its anti-inflammatory, antifungal, and antioxidant properties, making it highly beneficial in treating dandruff, scalp irritation, and hair thinning. The presence of mucilage in fenugreek seeds provides natural conditioning, improving hair texture and reducing dryness.

The formulation of a herbal hair serum using fenugreek seeds aims to harness these beneficial properties in a convenient and effective form. By extracting the active constituents of fenugreek and incorporating them into a suitable serum base, it is possible to develop a product that not only enhances hair appearance but also improves overall scalp health. The use of natural additives such as essential oils, humectants, and stabilizers further enhances the efficacy and shelf life of the formulation.

Evaluation of the formulated serum is an essential step to ensure its quality, safety, and performance. Various physicochemical parameters such as pH, viscosity, spreadability, homogeneity, and stability are assessed to determine the suitability of the product for topical application. Additionally, performance evaluation based on parameters like hair smoothness, shine, and reduction in hair fall provides insights into its practical effectiveness.

Thus, the present study focuses on the formulation and evaluation of a herbal hair serum using fenugreek seeds as a key ingredient. The objective is to develop a safe, stable, and effective hair care product that meets the growing demand for natural cosmetics while addressing common hair problems such as hair fall, dryness, and scalp disorders.

## 2. HERBAL HAIR SERUM

A herbal hair serum is a natural, plant-based cosmetic formulation designed to improve the overall health, appearance, and manageability of hair. Unlike conventional serums that often



# International Journal of Engineering, Science and Humanities

An international peer reviewed, refereed, open-access journal  
Impact Factor 8.3 [www.ijesh.com](http://www.ijesh.com) ISSN: 2250-3552

contain synthetic chemicals such as silicones and artificial fragrances, herbal hair serums are prepared using natural extracts, essential oils, and herbal ingredients that provide nourishment without causing harmful side effects.

Herbal hair serums are typically lightweight, non-greasy formulations that form a protective layer over the hair shaft. This helps in reducing frizz, adding shine, and protecting hair from environmental damage such as dust, pollution, and heat. The presence of herbal extracts enhances the therapeutic value of the serum by supplying essential nutrients to the scalp and hair follicles, thereby promoting healthy hair growth.

Common ingredients used in herbal hair serums include fenugreek seeds (*Trigonella foenum-graecum*), aloe vera, amla, hibiscus, coconut oil, and various essential oils. Among these, fenugreek seeds are particularly effective due to their high protein and lecithin content, which strengthen hair roots, reduce hair fall, and improve hair texture. Aloe vera provides hydration and soothes the scalp, while amla and hibiscus contribute to hair growth and natural conditioning.

The use of herbal hair serums offers multiple benefits such as improved hair strength, reduced dandruff, enhanced shine, and better scalp health. Additionally, these formulations are generally safe, eco-friendly, and suitable for long-term use. Due to increasing awareness regarding the harmful effects of chemical-based products, herbal hair serums are gaining popularity in the cosmetic and personal care industry.

### 3. FENUGREEK SEEDS

Fenugreek seeds are small, yellowish-brown seeds obtained from the plant *Trigonella foenum-graecum*, which belongs to the family Fabaceae. They have been widely used in traditional medicine systems such as Ayurveda and Unani for their numerous health and cosmetic benefits. Fenugreek seeds are particularly valued in hair care formulations due to their rich nutritional and medicinal properties.

These seeds are an excellent source of proteins, amino acids, fiber, iron, potassium, and vitamins such as vitamin A, C, and B-complex. One of the key components of fenugreek seeds is lecithin, which helps in moisturizing and strengthening the hair. Additionally, they contain nicotinic acid, which plays an important role in promoting hair growth and preventing hair loss. The presence of mucilage in fenugreek seeds provides a natural conditioning effect, making hair smooth, soft, and manageable.

Fenugreek seeds also possess antifungal, antibacterial, and anti-inflammatory properties, which help in maintaining scalp health. They are effective in treating dandruff, reducing scalp irritation, and preventing infections. The antioxidants present in fenugreek protect hair from environmental damage and premature graying.



# International Journal of Engineering, Science and Humanities

An international peer reviewed, refereed, open-access journal  
Impact Factor 8.3 [www.ijesh.com](http://www.ijesh.com) ISSN: 2250-3552

In herbal hair serum formulations, fenugreek seeds are typically used in the form of extracts or soaked and ground paste to release their active constituents. These extracts are incorporated into a suitable base to create a non-greasy and easily applicable serum. Regular use of fenugreek-based hair products can lead to stronger hair roots, reduced hair fall, improved hair texture, and enhanced shine.

Overall, fenugreek seeds serve as a powerful natural ingredient in herbal cosmetics, especially in hair care products, due to their ability to nourish, protect, and revitalize both hair and scalp.

## 4. METHODOLOGY

The methodology for the formulation and evaluation of herbal hair serum using fenugreek seeds (*Trigonella foenum-graecum*) involves systematic steps including extraction, formulation, and evaluation of the final product.

**1. Collection and Preparation of Raw Materials:** Fenugreek seeds were procured from a reliable source and cleaned thoroughly to remove impurities such as dust and debris. The seeds were then dried under shade to preserve their active constituents and coarsely powdered using a grinder for further processing.

**2. Preparation of Fenugreek Extract:** The powdered fenugreek seeds were soaked in distilled water for 24 hours to soften them and facilitate extraction of active compounds. The soaked material was then boiled for a specific duration and filtered using muslin cloth or filter paper to obtain a clear extract. This extract contains essential bioactive components like proteins, lecithin, and nicotinic acid beneficial for hair growth and conditioning.

**3. Formulation of Herbal Hair Serum:** The herbal hair serum was prepared by incorporating the fenugreek extract into a suitable base. The formulation typically included natural ingredients such as aloe vera gel (as a moisturizing agent), glycerin (as a humectant), and a few drops of essential oils (for fragrance and added therapeutic benefits). A mild preservative may be added to enhance shelf life. All ingredients were mixed in appropriate proportions under continuous stirring to obtain a homogeneous, smooth, and non-greasy serum.

**4. Evaluation of Formulated Serum;** The prepared herbal hair serum was evaluated using the following parameters:

- pH Determination: The pH of the serum was measured using a digital pH meter to ensure compatibility with scalp conditions (typically between 5–7).
- Viscosity: Measured using a viscometer to determine the flow property and consistency of the serum.
- Spreadability: Evaluated by applying a small quantity between two glass slides and measuring the ease of spreading.
- Homogeneity: Checked visually for uniformity, absence of lumps, and phase separation.



# International Journal of Engineering, Science and Humanities

An international peer reviewed, refereed, open-access journal  
Impact Factor 8.3 [www.ijesh.com](http://www.ijesh.com) ISSN: 2250-3552

- **Stability Study:** The formulation was stored under different conditions (room temperature, refrigerated conditions) and observed over time for any changes in color, odor, and consistency.
- **Irritation Test:** Applied on a small area of skin to check for any allergic reaction or irritation.

**5. Performance Evaluation:** The serum was applied to hair to assess its effectiveness based on parameters such as smoothness, shine, reduction in frizz, and control of hair fall. Observations were recorded over a specific period.

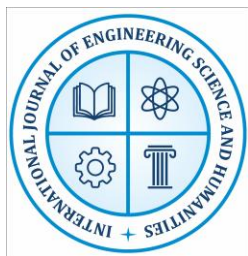
Herbal hair serum using fenugreek seeds (*Trigonella foenum-graecum*) represents an innovative and natural approach to modern hair care. With increasing awareness regarding the harmful effects of chemical-based cosmetic products, there has been a growing shift toward herbal formulations that are safer, eco-friendly, and effective. Fenugreek seeds have been widely used in traditional medicine and cosmetic applications due to their rich nutritional composition and therapeutic properties, making them an ideal ingredient for hair serum preparation.

Fenugreek seeds are a rich source of proteins, amino acids, lecithin, nicotinic acid, iron, and vitamins such as A, C, and B-complex. These nutrients play a crucial role in strengthening hair follicles, promoting hair growth, and preventing hair fall. Lecithin present in fenugreek acts as a natural emollient that deeply conditions and hydrates the hair, making it smooth and manageable. The mucilage content of the seeds provides a slippery texture, which helps in detangling hair and reducing frizz, thereby improving overall hair texture.

In the formulation of herbal hair serum, fenugreek seeds are typically processed into an extract by soaking and boiling them to release their active constituents. This extract is then incorporated into a suitable serum base consisting of ingredients such as aloe vera gel, glycerin, and essential oils. Aloe vera acts as a natural moisturizer and scalp soother, while glycerin helps in retaining moisture and preventing dryness. Essential oils not only provide fragrance but also contribute to scalp nourishment and improved blood circulation.

The herbal hair serum thus prepared is lightweight, non-greasy, and easy to apply, making it suitable for daily use. It forms a thin protective layer over the hair shaft, shielding it from environmental damage such as dust, pollution, and heat exposure. Regular application of fenugreek-based serum helps in reducing dandruff, controlling hair fall, enhancing shine, and improving hair strength. Additionally, the antifungal and anti-inflammatory properties of fenugreek contribute to maintaining a healthy scalp environment.

One of the major advantages of using herbal hair serum is its minimal side effects compared to synthetic products. It is generally safe for all hair types and does not cause irritation when prepared and used properly. Furthermore, such formulations are cost-effective and can be easily prepared using natural ingredients, making them accessible to a wide range of users.



# International Journal of Engineering, Science and Humanities

An international peer reviewed, refereed, open-access journal  
Impact Factor 8.3 [www.ijesh.com](http://www.ijesh.com) ISSN: 2250-3552

## 5. CONCLUSION

The present study successfully focused on the formulation and evaluation of a herbal hair serum using fenugreek seeds (*Trigonella foenum-graecum*) as the primary active ingredient. The developed formulation demonstrated desirable physicochemical properties such as appropriate pH, good viscosity, excellent spreadability, and uniform homogeneity, making it suitable for topical application on hair and scalp. Stability studies indicated that the serum remained stable under different storage conditions without any significant changes in color, odor, or consistency. The incorporation of fenugreek seed extract proved beneficial due to its rich content of proteins, vitamins, and bioactive compounds that contribute to hair nourishment, strengthening of hair follicles, and reduction in hair fall. The serum also exhibited conditioning effects, improving hair smoothness, shine, and manageability. Additionally, its natural composition minimized the risk of irritation and adverse effects, making it safe for regular use.

Overall, the formulated herbal hair serum offers an effective, economical, and natural alternative to synthetic hair care products. It aligns with the growing demand for herbal cosmetics and demonstrates promising potential for further development and commercialization in the cosmetic industry. Future studies can focus on clinical evaluation and incorporation of additional herbal ingredients to enhance its therapeutic efficacy.

## REFERENCES

1. Kokate, C. K., Purohit, A. P., & Gokhale, S. B. (2010). *Pharmacognosy* (46th ed.). Nirali Prakashan, Pune.
2. Sharma, P. P. (2015). *Cosmetics: Formulation, Manufacturing and Quality Control* (5th ed.). Vandana Publications, Delhi.
3. Mithal, B. M., & Saha, R. N. (2012). *A Handbook of Cosmetics*. Vallabh Prakashan, New Delhi.
4. Draelos, Z. D. (2015). *Cosmetic Dermatology: Products and Procedures* (3rd ed.). Wiley-Blackwell.
5. Gavazzoni Dias, M. F. R. (2015). Hair cosmetics: An overview. *International Journal of Trichology*, 7(1), 2–15.
6. Imtiyaz, S., & Rahman, K. (2018). Fenugreek (*Trigonella foenum-graecum*): A review of health beneficial physiological effects. *Journal of Pharmacy Research*, 12(3), 295–301.
7. Bakhru, H. K. (2000). *Herbs That Heal: Natural Remedies for Good Health*. Orient Paperbacks.
8. Kumar, S., & Pandey, A. K. (2013). Chemistry and biological activities of flavonoids: An overview. *The Scientific World Journal*, 2013, 1–16.
9. Prajapati, N. D., Purohit, S. S., Sharma, A. K., & Kumar, T. (2003). *A Handbook of Medicinal Plants*. Agrobios, India.
10. Kaur, L. P., & Guleri, T. K. (2013). Topical gel: A recent approach for novel drug delivery. *Asian Journal of Biomedical and Pharmaceutical Sciences*, 3(17), 1–5.
11. Mukherjee, P. K. (2019). *Quality Control and Evaluation of Herbal Drugs*. Elsevier.
12. Uikay, R., & Shukla, S. (2017). Formulation and evaluation of herbal hair oil. *Journal of Pharmacognosy and Phytochemistry*, 6(5), 121–123.