

# Formulation and Evaluation of Herbal Hair Serum by Using Guava Leaves

**Mr. Pramod B. Chikkodi and Mr. Ketan Popat Awale**

Department of Pharmaceutics.

Nootan College of Pharmacy, Kavathe Mahankal, India

**Abstract:** *The increasing demand for natural and safe personal care product has driven the development of herbal formulation with minimal side effect. This study focuses on the formulation and evaluation of a herbal hair serum composed of plant- based ingredients known for their hair- nourishing, strengthening, and growth- promoting properties. The serum incorporates extracts from herbs such as Aloe vera , Bhringraj (Eclipta alba), Amla (Embolica officinalis), Neem (Azadirachta indica), and essential oils like rosemary and tea tree oil. These ingredients are selected for their antioxidant, antimicrobial, and scalp- soothing qualities. The serum underwent evaluation for properties such as pH, consistency, stability, and consumer appeal. Findings suggest that the herbal serum effectively strengthens hair, reduces shedding and promotes growth, all while being gentle on the scalp. This natural formula offers a safer and eco- friendly alternative to chemical- based hair treatments. The herbal hair serum with growing preference for natural and safe personal care products, the development of herbal hair serum has gained significant attention. This research centre on creating and analysing a hair serum made from botanical ingredients know to support hair health, enhance growth, and reduce damage.*

**Keywords:** Herbal Hair Serum, Guava leaves extract, Formulation, Dandruff, Polyherbal, Nourishing, Anti-microbial

## I. INTRODUCTION

Herbal hair serum is a plant-based, nutrient-dense blend created to nourish, restore, and shield hair by harnessing the natural benefits of botanical ingredients. Infused with essential oils, vitamins, and plant-based ingredients, this serum nourishes the scalp, strengthens hair roots, reduces frizz, and promotes healthy, shiny hair. Unlike chemical- based products, herbal hair serum is free from harmful additives, making it safe for all hair types and ideal for daily use. Whether you're combating dryness, split ends, or hair fall, herbal serum offer a gentle yet effective solution rooted in nature.

Guava leaves contain a wealth of bioactive compounds, especially phenolic substances like catechin, gallic acid, and quercetin, which are known for their powerful antioxidant and anti-inflammatory effects. These compounds play a crucial role in neutralizing free radicals and reducing oxidative stress, thereby protecting hair follicles from damage and promoting a healthy scalp environment. Furthermore, guava leaf extract has been shown to downregulate the expression of 5 $\alpha$ -reductase enzymes (SRD5A1, SRD5A2, and SRD5A3) in human prostate cancer cells, suggesting its potential to inhibit the synthesis of dihydrotestosterone (DHT), a potent androgen associated with hair loss in conditions like androgenetic alopecia

Incorporating guava leaf extract into herbal hair serums offers a natural approach to address common hair concerns such as thinning, dandruff, and scalp irritation.



## II. MATERIAL AND METHOD: INGREDIENTS



**Fig No.1 : Ingredients**

### Guava leaves:



**Fig. No.: Guava leave**

They contains essential nutrients like Vitamin C, and potassium, offering a wide range of health benefits. They support healthy digestion, help regulate blood sugar levels, strengthen the immune system, enhance skin health, and may even aid in stimulating hair growth. Guava leaves, along with the pulp and seed, are used to treat certain respiratory disorder and to increase platelets in patients suffering from dengue fever.

### Hibiscus flower powder

Hibiscus serum provides a lightweight, that enhances the shine and protects hair from damage. Combine hibiscus flower with a few drops of essential oils for such as lavender or rosemary, then apply to damp hair to enhance its natural shine.

### Citrus powder.

Smooths cuticles to reduce frizz. Enhances moisture retention to combat dryness, minimizes breakage, increases strand elasticity, and adds a healthy, radiant shine to the hair

### Aloe Vera.

Strengthens and repairs hair strands Aloe vera contains vitamins A, C, and E. This three vitamins support to encouraging vibrant hair growth and natural shine. Aloe vera gel also contains vitamin B12 and folic acid, which help prevent hair loss and support overall scalp health.

### Vitamin E.

One of the many vitamin E uses for hair health is hydration. By adding moisture, vitamin E can deeply condition the hair and help with elasticity, giving a visible smoothing effect to your locks. For those that experience dry or flaky scalps, added moisture also works to provide nourishment and support to your skin.



**Nigella sativa.**

Due to its proven antimicrobial, antioxidant, anti-aging, hair growth-promoting, photoprotective, and anticancer properties, *Nigella sativa* seed represents a potent and novel ingredient for innovative cosmetic formulations.

**Fenugreek seed.**

Rich in nicotinic acid, protein, and lecithin—a natural emollient—fenugreek seeds are scientifically recognized for promoting hair growth, strengthening hair, and enhancing overall hair health.

**Bhringraj powder.**

It also Known as 'Kesharaj' or 'Ruler of the Hair,' Bhringraj contain is rich in proteins, vitamins, & making it a powerful natural remedy for to promoting hair growth and preventing premature greying hair .

**Rose water.**

Rose water can be beneficial for your hair. With the natural conditioning and soothing properties, it enhances hair texture, and supports a healthier environment for hair growth

**Extraction Procedure.**

- The crushed plant material of 10gm was loaded into the thimble, which is placed inside the Soxhlet extractor.
- The thimble was filled with 250ml of Ethanol for organic solvent extraction.
- The side arm was lagged with glass wool. The solvent were heated using the mantle and the solvent were begin to evaporate, moving through the apparatus to the condenser.
- The condensate then drips into the reservoir containing the thimble. Once the level of solvent reaches the siphon it pours back into the flask and the cycle begins again.
- The process was run for a total of 8 hours.
- After the successful extraction of 7 cycles the extracted plant sample were air dried and collected into the extraction collector for further use.

**Phytochemical Test for guava leaves.**

**Flavonoids Test:**

- Take 2ml of guava leaf extract in a test tube
- Then add a few drop of 10% NaoH Solution & red-violet colour will be appear if flavonoids are present.
- Then add dilute Hcl dropwise to same test tube the yellow colour should disappear or become colourless.
- Flavonoids are present

**Alkaloids Test:**

- Take 2ml of extract in test tube
- Then add a few of Wagner's reagent.
- A reddish-brown precipitate confirms the presence of alkaloids
- Alkaloids are present

**Tannins Test**

- Take 2-3ml of guava leaves extract in test tube
- Add a few drop of 5% ferric chloride solution
- Shake the test tube & observe the colour change blue-black or greenish-black colour presence of tannin,
- Tannins are present

**Saponins Test:**

- Add 5ml of distilled water to 2ml of guava leave extract in test tube.
- Shake the mixture vigorously for about 30 sec.



- Let the tube stand undisturbed for 10-15 min formation of stable persistent forth
- Saponins test present.

#### Phenol Test;

- Add 2ml of guava leafe extraction to 2ml of chloroform in a test tube.
- Carefully add 2ml of conc. sulfuric acid along the side of test tube to form a seprate layer at bottom
- Observe the colour at interface of the two layers reddish-brown or purple ring is present.
- Phenol test are present.

#### Anthraquinones Test:

- Take 2ml guava extraction & shake it with 2ml of benzene or chloroform,
- Separate organic layer ( The top layer in case of benzene)
- Add an equal volume of dilute ammonia to organic layer.
- Shake mixture gently 7 allow it to separate a pink, red, or violet coloration in ammonia layer indicates presence of anthraquinones.
- Anthraquinones test are present

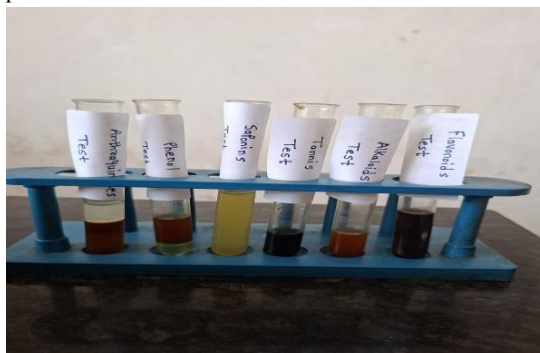


Fig. No. 3: Phytochemical Test for guava leaves.

#### Preparation of Herbal Hair Serum.

##### Solution no. 1.

In a beaker add 2ml of Nigella sativa seed were added in 10ml distilled water and apply heat continue until solution gets concentrated , filter the solution by using filter paper. After that add the 1 capsule of vitamin E, and mix the solution by using starrier.

##### Solution no. 2.

Take a beaker and add 3gm of Fenugreek seed in 10ml distilled water and boil them. The solution was filter by using filter paper, then added 2mg of orange peel powder. Kept the solution at room temperature & additionally add the distilled water to make the solution oily nature.

##### Solution no.3.

Take a beaker and add 5mg of hibiscus flower add 10ml water and heated the solution until the colour was obtained, and filter the solution , pipetted out the 3ml liquid solution for processing.

##### Solution. no.4.

Take a beaker and add the filtrate guava solution. To the filtrated guava solution in a beaker, add Solution No.1 and Solution No.2 with continuous stirring, followed by 2–3 drops of Solution No.3 until the desired color develops. Then add 2-3 drop of rose water as perfuming agents for good smell , Then add aloe vera gel 4mg and add 2-3 drop of methyl paraben to the solution mixed the solution using starrier for 15 minutes and stored the serum in closed container.



#### Formulation Table.

Sr.no	Ingredients	Role of ingredients	Quantity
1.	Guava leaves.	Improve the cycle of hair regrowth.	5ml.
2.	Hibiscus flower powder.	Provide essential nutrients to dormant follicle and stimulates new hair growth.	3gm
3.	Citrus powder.	Help to remove from irritation in scalp.	2gm.
4.	Aloe vera.	Help the itchy scalp.	4gm
5.	Vitamin E.	It prevents remove dryness in your scalp.	1ml.
6.	Nigella sativa.	Used to treat fungal infection.	2gm.
7.	Fenugreek seed.	Increase blood flow in the scalp & make hair root strong.	3gm.
8.	Bhringraj powder.	Slow down hair greying.	2gm
9.	Rosewater.	May help to reduces oiliness and dandruff.	3ml.

#### EVAUTION TEST

##### Physical Appearance

The physical appearance was evaluated through visual observation.

The texture, color, and smell of the herbal hair serum were examined as part of the physical evaluation.

##### pH Test

The pH test was performed by the using pH paper, The pH paper was dipped into the sample of the hair serum and pH was recoded.

The ideal pH of sample is acidic pH and the range of pH is 5-6 .

##### Spreadability Test

A measured amount of hair serum was placed between two petri plates, and a weight was applied on the top plate for 6 minutes to assess spreadability through compression

##### Skin irritation Test

The sample was applied to the skin for 10 minutes and observed for any visible effects or changes.

The skin irritation are not found or not any infection.

##### Homogeneity Test

The hair serum was applied to a clean glass slide, covered with a glass plate, and its appearance and homogeneity were observed.

### III. RESULT AND DISCUSSION

#### Physical Appearance

The physical appearance the colour and texture and Homogeneity are prepared herbal hair serum are usually tested Table 2 reflected outcome

**Table No.1:** The physical appearance of herbal hair serum

Parameter	Batch F1	Batch F2	Batch F3
Colour	Pink-violet	Pink-violet	Pink-violet
Texture	Smooth	Smooth	Smooth
Homogeneity	Good	Good	Good



### **pH, Spreadability, Skin irritation.**

The pH paper is used to detect the acidity or basicity of sample for that is safe use. Spreability test for done for to detect the spread ability, the formulation was easily spreadable. The skin irritation test is performed for to detect the sensitivity of hair serum found is non-irritant.

**Table No. 3:** The Study of pH, Spreadability, Skin irritation.

Parameter	Batch F1	Batch F2	Batch F3
pH	5.2	5.6	5.5
Spreadability	Easily spreadable	Easily spreadable	Easily spreadable
Skin irritation	Nonirritant	Nonirritant	Nonirritant

### **IV. CONCLUSION**

The incorporation of guava leaf extract into a herbal hair serum formulation has demonstrated significant potential in enhancing hair health, supported by both scientific research and anecdotal evidence. Guava leaves are rich in vitamin C, which stimulates collagen production, a vital protein for hair growth. This leads to stronger and thicker hair. Guava leaves possess antifungal and anti-inflammatory properties that cleanse the scalp, reduce dandruff, and alleviate scalp irritation, creating a healthier environment for hair growth.

Integrating guava leaf extract into a herbal hair serum formulation presents a promising natural solution for individuals seeking to enhance hair growth, strength, and overall scalp health. Its multifaceted benefits, supported by scientific findings, make it a valuable addition to natural hair care products.

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### **REFERENCES**

- [1]. Dr. R. G. Bhoyar Institute of Pharmaceutical Education and Research Wardha-442001 Maharashtra, India.
- [2]. Shende, Harshada D., et al. "Formulation and evaluation of herbal hair serum using rosemary leaves." World J Pharma Res 13 (2024): 652-62.
- [3]. Shende, Harshada D., Ujwalkumar P. Patil, Vishwajit V. Jadhav, and Om A. Gonde. "Formulation and evaluation of herbal hair serum using rosemary leaves." World J Pharma Res 13 (2024): 652-62.
- [4]. Khadasare, Priyanka M., et al. "Formulation & Evaluation of Hair Growth Serum from Hibiscus Flowers and Leaves."
- [5]. Khadasare, Priyanka M., Shruti A. Shinde, Shruti S. Londe, Simaran A. Inamdar, and Shubham J. Kharat. "Formulation & Evaluation of Hair Growth Serum from Hibiscus Flowers and Leaves."
- [6]. Pilaji, P., Machigar, P., Mhatre, V., More, A., Pagaria, K., Pandey, S., & Patil, S. (2023). FORMULATION AND EVALUATION OF HERBAL HAIR OIL USING GUAVA LEAVES.
- [7]. Shende, H. D., Patil, U. P., Jadhav, V. V., & Gonde, O. A. (2024). Formulation and evaluation of herbal hair serum using rosemary leaves. World J Pharma Res, 13, 652-62.
- [8]. Shende, H.D., Patil, U.P., Jadhav, V.V. and Gonde, O.A., 2024. Formulation and evaluation of herbal hair serum using rosemary leaves. World J Pharma Res, 13, pp.652-62.
- [9]. Patidar, M., Deshmukh, N., Mandloi, N., Patidar, B., Solanki, L., & Pillai, D. S. (2023). Formulation and evaluation of face serum containing phytosome of gingerol oil, Carica papaya pulp extract, and aloe vera gel. World J Pharm Res, 12, 726-40.



- [10]. Deepika, K., A. Sairoja, and P. Sri Jyothi. "Creation and Assessment of Herbal Gel with Guava Leaf Extract." E3S Web of Conferences. Vol. 564. EDP Sciences, 2024.
- [11]. Shirsat, Mrunal K., et al. "FORMULATION AND EVALUATION OF HERBAL HAIR SERUM FROM LEAVES EXTRACT OF ALTERNANTHERA SESSILIS LINN.
- [12]. Smith J, Kumar R. Formulation Extraction of Guava Leaves by Soxhlet Apparatus. 2025. Available from: <https://openai.com/chatgpt/overview/>
- [13]. Avhale GJ, Mohan RS, Kawade RM. Formulation and evaluation of herbal hair serum. IJRASET. 2024;12(4):123-130. Available from: <https://www.ijraset.com/research-paper/formulation-and-evaluation-of-herbal-hair-serum>
- [14]. Rawat S, Jaybhaye SS, Vyas GV, Gaikwad BS, Rathod KS. Formulation and evaluation of herbal hair serum. EPRA Int J Res Multidiscip Stud. 2023;9(5):45-52. Available from: <https://eprajournals.com/IJSR/article/14384>
- [15]. Avhale GJ, Mohan RS, Kawade RM. Formulation and evaluation of herbal hair serum. IJRASET. 2024;12(4):123-130. Available from: <https://www.ijraset.com/research-paper/formulation-and-evaluation-of-herbal-hair-serum>

