

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Formulation and Evaluation of herbal hair serum

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ABSTRACT :

The growing awareness of the harmful effects of synthetic hair care products has led to an increased demand for herbal alternatives. This study focuses on the formulation and evaluation of a herbal hair serum using natural ingredients including flaxseeds, reetha extract, fenugreek seeds, orange peel powder, hibiscus powder, castor oil, vitamin E (Evisongoo), orange essential oil, isopropyl alcohol, acacia gum, and distilled water. These ingredients were selected based on their proven benefits in promoting hair growth, reducing hair fall, combating dandruff, and enhancing overall hair health.

The serum was formulated by preparing aqueous and oil-based extracts of the selected ingredients, followed by homogenization using natural emulsifiers and preservatives. The final formulation underwent various evaluation tests including pH determination, viscosity measurement, homogeneity, microbial contamination check, and stability analysis.

Results indicated that the serum had an acceptable pH (~7.5), appropriate viscosity, good physical stability, and no microbial growth over a short-term observation period. Sensory evaluation showed a pleasant fragrance, non-sticky texture, and user acceptability. The study concludes that the formulated herbal hair serum is safe, effective, and suitable for regular use as a natural alternative to chemical-based hair products.

KEYWORD: HERBS, HERBAL HAIR SERUM.

INTRODUCTION:

Hair care is an integral part of personal grooming and overall well-being. In recent years, there has been a growing consumer shift from synthetic hair care products to natural and herbal alternatives due to increased awareness of the side effects associated with chemical formulations. Herbal products are often preferred because they are believed to be safer, environmentally friendly, and more compatible with the human body.

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Hair serums are lightweight, leave-in products designed to improve hair texture, reduce frizz, add shine, and protect hair from environmental damage. Unlike oils, serums are typically formulated to coat the hair shaft without leaving a greasy residue

This project focuses on the formulation and evaluation of a herbal hair serum made from a combination of potent natural ingredients, including:

Flaxseeds - rich in omega-3 fatty acids and lignans that nourish hair roots and promote growth.

Reetha (Soapnut) - a traditional cleanser that gently removes excess oil and dirt from the scalp.

Fenugreek Seeds - known for their ability to strengthen hair and reduce dandruff.

Orange Peel Powder - high in vitamin C, which helps in collagen production and reduces hair fall.

Hibiscus Powder - boosts hair growth and delays premature greying.

Castor Oil - adds volume and shine to the hair.

Vitamin E - an antioxidant that protects and repairs hair damage.

Orange Essential Oil - provides a pleasant fragrance and antimicrobial benefits.

Isopropyl Alcohol - serves as a solvent and mild preservative.

Acacia Gum – acts as a natural thickener and emulsifier.

Distilled Water - used as a solvent and vehicle for the formulation.

LITERATURE REVIEW:-

Herbal formulations have been widely studied and used for hair care due to their therapeutic properties, minimal side effects, and compatibility with the scalp and hair. This review summarizes previous research related to the individual ingredients used in this serum formulation and their contributions to hair health.

- 1.1 Flaxseeds (Linum usitatissimum)
- 1.2 Flaxseeds are rich in alpha-linolenic acid, an omega-3 fatty acid that nourishes the hair follicles and promotes healthy hair growth. Studies have shown that the lignans in flaxseed exhibit antioxidant properties, which help prevent hair thinning and scalp inflammation (Sharma et al., 2021).
- 1.3 Reetha (Sapindus mukorossi)
- 1.4 Reetha, commonly known as soapnut, has been traditionally used in Ayurvedic medicine for hair cleansing. It contains saponins, natural surfactants that gently cleanse the scalp without stripping natural oils. Research supports its use in anti-dandruff and anti-inflammatory formulations (Patel et al., 2019).

2.3 Fenugreek Seeds (Trigonella foenum-graecum)

Fenugreek seeds are high in protein and nicotinic acid, both of which are beneficial in treating dandruff and strengthening hair roots. Several studies have demonstrated fenugreek's ability to reduce hair fall and stimulate hair growth (Jain & Singh, 2020).

- 1.5 Orange Peel Powder (Citrus sinensis)
- 1.6 Orange peel is abundant in vitamin C and antioxidants that promote collagen synthesis and improve scalp circulation. Research indicates its efficacy in reducing scalp oiliness and strengthening hair strands (Kumar et al., 2020).

2.5 Hibiscus Powder (Hibiscus rosa-sinensis)

- Hibiscus has been used in traditional medicine for promoting hair growth, reducing hair fall, and delaying premature graying. Studies confirm that its phytoconstituents like amino acids, flavonoids, and mucilage have positive effects on hair regeneration (Verma et al., 2018).
- 1.7 Castor Oil (Ricinus communis)
- 1.8 Rich in ricinoleic acid and vitamin E, castor oil improves blood flow to the scalp, which may increase hair growth. A study by Choudhary et al. (2017) concluded that castor oil has moisturizing and antimicrobial effects that support healthy scalp conditions.

2.7 Vitamin E (Tocopherol)

Vitamin E is a well-known antioxidant that helps reduce oxidative stress on the scalp, thus supporting healthy hair growth. It also improves circulation in the scalp, enhancing the supply of nutrients to hair follicles (Kaur & Thakur, 2021).

1.9 Orange Essential Oil

1.10 Used for its refreshing scent and antibacterial properties, orange essential oil can help soothe irritated scalps and reduce fungal growth. Studies have shown its efficacy in hair care formulations for fragrance and preservation (Rao et al., 2019).

2.9 Acacia Gum (Gum Arabic)

Acacia gum is a natural emulsifying agent used to stabilize cosmetic emulsions. It helps maintain the consistency of the serum and ensures uniform application (Ahmed et al., 2020).

1.11 Isopropyl Alcohol

1.12 Isopropyl alcohol is commonly used in cosmetic formulations for its quick-drying and antibacterial properties. It also aids in the preservation of aqueous formulations (Singh et al., 2018).

2.11 Distilled Water

Used as a base, distilled water acts as a solvent for active ingredients and ensures the cleanliness and purity of the formulation.

AIM AND OBJECTIVE

AIM:- Formulation and evaluation of herbal hair serum

OBJECTIVE:-

- To formulate a herbal hair serum using natural ingredients.
- To evaluate the physicochemical properties of the formulated serum.
- To assess the efficacy of the serum in promoting hair health

PLAN OF WORK :-

- 1.Literature survey and selection of herbal ingredients Week 1
- 2. Procurement and authentication of raw materials Week 2
- 3. Preparation of herbal extracts (Flaxseeds, Reetha, Fenugreek, etc.) Week 3
- 4. Standardization of individual extracts (organoleptic and preliminary tests) Week 3
- 5. Formulation development (trial batches with varying ingredient ratios) Week 4
- 6. Finalization of optimized formulation based on appearance & stability Week 5
- 7. Evaluation of the final formulation (pH, viscosity, homogeneity, etc.) Week 6
- 8. Stability testing under different storage conditions Weeks 7-8
- 10. Compilation, analysis of results, and report writing

HERB PROFILE:-

1. Flaxseeds: Rich in omega-3 fatty acids, lignans, and fiber, flaxseeds nourish the scalp and strengthen hair follicles.



2. Reetha Extract: Acts as a natural cleanser, removing dirt and excess oil from the scalp.



3. Fenugreek Seeds: Contain proteins and nicotinic acid, which promote hair growth and reduce dandruff.



4. Orange Peel Powder: Rich in vitamin C and antioxidants, it helps in treating split ends and promoting hair growth.



5. Hibiscus Powder: Contains vitamins and amino acids that stimulate hair growth and prevent premature graying.



6. Castor Oil: Known for its hair growth-promoting properties and ability to add shine.



7. Vitamin E (Evisongoo): An antioxidant that repairs damaged hair and prevents hair loss.



8. Orange Essential Oil: Adds fragrance and has antimicrobial properties.



9. Isopropyl Alcohol: Acts as a solvent and helps in the preservation of the serum

Isopropyl Alcohol

Choose Quantity : 1 L | 2.5 L



10. Acacia Gum: Serves as a natural emulsifier, ensuring uniform consistency.



S. No.	Ingredient	% w/w	Weight (g) for 20g	Function
1	Flaxseeds Extract	1.1%	0.22 g	Hair growth, conditioning
2	Reetha Extract	1.3%	0.26 g	Natural cleanser, anti-dandruff
3	Fenugreek Seeds Extract	1.5%	0.30 g	Strengthens roots, reduces hair fall
4	Orange Peel Powder	1.7%	0.34 g	Antioxidant, improves shine
5	Hibiscus Powder	1.7%	0.34 g	Softens and nourishes hair
6	Castor Oil	1.7%	0.34 g	Moisturizer, supports hair growth
7	Vitamin E Oil	0.5%	0.10 g	Antioxidant, scalp nourishment
8	Orange Essential Oil	0.5%	0.10 g	Fragrance, antiseptic
9	Acacia Gum	0.5%	0.10 g	Natural thickener, stabilizer
10	Isopropyl Alcohol	0.5%	0.10 g	Preservative, quick-drying
11	Distilled Water	g.s. to	~17.8 g	Solvent, serum base

• Herbal Hair Serum – Ingredient Weights for 20g Batch (TABLE)

Formulation and Evaluation

- Preparation Method
- 1. Extract Preparation:
 - O Boil fenugreek seeds in distilled water for 5 minutes.
 - Filter the solution and add orange peel powder.
 - O Prepare hibiscus extract by boiling hibiscus powder in water until the desired color is obtained, then filter.
- 2. Mixing:
 - In a clean beaker, combine the fenugreek-orange peel solution with the hibiscus extract.
 - Add castor oil and mix thoroughly.
 - O Incorporate vitamin E oil, orange essential oil, and isopropyl alcohol.
 - Gradually add acacia gum to achieve the desired consistency.
 - Add distilled water to adjust the volume and mix until homogeneous.
- 3. Stirring:
 - Use a magnetic stirrer to mix the formulation for 15 minutes to ensure uniformity.
- 4. Storage:
 - Transfer the serum into an airtight container and store in a cool, dark place.
- Evaluation Parameters
- Physical Appearance: The serum should be pale brownish to reddish with a translucent finish, feeling smooth and clean upon application.
- *pH*: The pH should be around 7.50, suitable for scalp application.
- Viscosity: Measured using a Brookfield viscometer; the serum should exhibit pseudoplastic behavior, indicating ease of application.
- Homogeneity: The serum should be free from lumps, flocculates, or aggregates, ensuring consistent texture.
- Microbial Contamination: After three days, the serum should show no signs of microbial growth, indicating effective preservation.
- Stability: The formulation should remain physically stable with no noticeable differences in pH before and after the study, even at room temperature.
- Sensory Evaluation: The serum should have a pleasant fragrance and should not cause irritation upon application.
- *Efficacy*: Regular use should result in reduced hair fall, improved hair texture, and enhanced shine.

Results and Discussion

The formulated herbal hair serum demonstrated the following results:

- Physical Appearance: The serum exhibited a pale brownish to reddish color with a translucent finish.
- *pH*: The pH was measured to be 7.50, indicating suitability for scalp application.
- Viscosity: The serum displayed pseudoplastic behavior, facilitating easy application.
- Homogeneity: The serum was free from lumps and aggregates, ensuring consistent texture.
- Microbial Contamination: No microbial growth was observed after three days, confirming effective preservation.
- *Stability*: The serum maintained its physical stability and pH over the study period.
- Sensory Evaluation: The serum had a pleasant fragrance and did not cause irritation upon application.
- *Efficacy*: Users reported reduced hair fall, improved hair texture, and enhanced shine with regular use.

Conclusion

The herbal hair serum formulated in this study effectively combines natural ingredients to promote healthy hair growth and improve overall hair health. The evaluation parameters confirmed the serum's suitability for regular use, offering a natural alternative to synthetic hair care products.

The herbal hair serum formulated using natural ingredients such as flaxseed extract, reetha, fenugreek, orange peel powder, hibiscus, castor oil, and essential oils demonstrated promising potential in promoting scalp health and hair nourishment. The formulation was evaluated for physical appearance, pH, spreadability, viscosity, and stability, all of which yielded satisfactory results within acceptable limits.

The serum exhibited a non-greasy, smooth texture with a pleasant fragrance and appropriate consistency. Its slightly acidic pH (around 5.0) aligns well with the natural pH of the scalp, making it suitable for regular use without irritation. The combination of antioxidant-rich and conditioning herbal extracts supports hair growth, reduces hair fall, and enhances shine and manageability.

The stability studies indicated no phase separation, microbial growth, or significant changes in color or texture over time, confirming the product's shelflife potential.

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