Formulation And Evaluation of Herbal Hair Oil: A Comprehensive Study

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Abstract

This study investigates the formulation and evaluation of three herbal hair oil formulations (F1, F2, and F3) aimed at promoting natural hair growth and addressing common hair concerns such as hair fall and fizziness. The formulations were meticulously developed using selected herbs known for their beneficial properties, with active ingredients extracted and formulated into oils. The evaluation encompassed a range of tests to assess their quality and usability. Organoleptic assessments revealed that all formulations exhibited a consistent greenish-brown color, characteristic herbal scent, smooth texture without grittiness, and no sedimentation after resting overnight. These properties contribute to the sensory appeal and user experience of the hair oils. pH testing indicated values ranging from 6.4 to 6.9 across the formulations, aligning closely with the scalp's natural pH. This suggests that the oils are gentle and unlikely to cause irritation, enhancing their suitability for regular scalp application. Washability tests demonstrated that all formulations rinsed out easily with tap water, leaving no greasy residue, which enhances convenience and user satisfaction post-application. Additionally, acid value measurements were conducted to assess freshness and stability, with values for F1, F2, and F3 recorded at 4.3, 3.5, and 3.9 respectively. These results indicate a low risk of rancidity and suggest a favourable shelf life for the hair oils. Overall, the findings highlight the potential of the formulated herbal hair oils as effective and user-friendly products for hair care. Their pleasant sensory attributes, scalp compatibility, easy washability, and stability indicate suitability for promoting healthy hair growth and managing hair conditions naturally. While these initial evaluations are promising, further studies could explore their efficacy in specific hair treatments and long-term hair health maintenance. The evaluated formulations (F1, F2, and F3) demonstrate comprehensive qualities that make them viable candidates for herbal hair care regimens. Their formulation characteristics and performance across multiple parameters underscore their potential contribution to maintaining healthy, lustrous hair through natural means. Future research endeavours may delve deeper into their therapeutic benefits and broader applications in hair care practices.

Keywords: Herbal hair oil, Hair care, formulation, evaluation.

INTRODUCTION

Hair has numerous beneficial features in the animal kingdom. It forms a protective cushion around the head and other delicate parts of the body. Hair oil is formulated to present the hair with precise shine and gloss by applying a thin continuous film of an oily material on the hair surface without causing stickiness. Many herbs that are utilized in hair oil include Amla, Almond, and Hibiscus. Hair oil is preferred as it promotes hair growth, improves the elegance of hair, and prevents hair fall【1,2】.

Hair loss is a distressing condition for an increasing number of men and women, making it crucial to develop new therapies for its treatment【3】. It is a dermatologic disorder, and the search for natural products with hair growth-promoting potential is ongoing. Hair loss, or alopecia, is a common patient complaint and a source of significant psychological and physical distress. Androgens are considered to be one of the most important causes of alopecia, apart from a variety of other factors【4,5】. Natural products in the form of herbal formulations are available in the market and are used as hair tonics, hair growth promoters, hair conditioners,

hair-cleansing agents, antidandruff agents, as well as for the treatment of alopecia, dandruff, and lice infection. Several herbal products have been acclaimed for hair growth-promoting activity【6】.

Hair performs a critical role in human life. In India, the traditional method involves the preparation of hair oils with various hair growth-promoting herbs. Indian women are known for their long, shiny, and healthy hair, so it is not surprising that hair care features prominently in their self-care rituals【7】. The Charaka Samhita describes the importance of oiling the hair and scalp to maintain good hair health and prevent hair loss. Daily hair oiling is recommended with suitable herbs to treat various dandruff, hair fall, split ends, and other issues【8】. Hair oil preparations are used to cool the scalp and promote luxurious hair growth in both women and men【9,10】.

Various types of oils like coconut oil, almond oil, castor oil, and onion oil are applied to the scalp in admixture with appropriate herbal drugs. Among these, coconut oil is the most preferred base due to its better absorption into hair strands and affordability compared to other oils【11】. Herbal hair oils are rich in vitamins, minerals, and fatty acids, which are essential for healthy scalp and hair. Applying herbal hair oils allows these essential nutrients to absorb well into the scalp and hair, promoting healthy regeneration of the scalp and strong, healthy hair growth【12】.

Apart from hydrating the scalp and stimulating hair growth, hair oiling strengthens the hair and provides essential minerals and vitamins for the scalp. This prevents external damage and strengthens the hair【13】. The primary purpose of oiling is to condition the scalp. An oil massage also increases hair growth by stimulating hair follicles and improving blood circulation to the scalp. Herbal hair oil is made entirely from natural sources derived from plants. It is applied to the hair as a conditioner, styling aid, restorative, and tonic【14】. Various types of hair oils are used for different purposes, such as promoting hair growth, improving hair health, treating dryness, and addressing scalp issues like dandruff and split ends【15】.

Hair oils are integral to hair care, serving as treatments for hair loss, discoloration, and dryness. Proper application of hair oil provides a cooling effect to the brain, enhances hair luster, and softens the hair【16】. Herbal hair oils are particularly preferred for their ability to promote hair growth and provide necessary moisture to the scalp, thereby rendering beautiful hair【17】.

Natural cosmetics, including herbal hair oils, are in high demand due to their effectiveness and minimal side effects. Herbal hair oils offer essential nutrients that support the normal function of sebaceous glands and promote natural hair growth【18】. These formulations, enriched with flavonoids, polyphenols, saponins, tannins, vitamins, proteins, and minerals, contribute significantly to hair growth and overall hair health【19】.

Different types of herbal hair oils available in the market include Amla hair oil, Coconut hair oil, Bhringraj hair oil, Jasmine hair oil, Brahmi hair oil, Cantharidine hair oil, and Onion hair oil【20,21】. The increasing interest in herbal cosmetics is driven by their proven efficacy and safety, making them a preferred choice for hair care【22】.

Despite the availability of various herbal hair oils, there remains a need for comprehensive scientific evaluation of their effectiveness. This study aims to fill this gap by systematically assessing the organoleptic properties, pH levels, washability, and acid values of three newly formulated herbal hair oils. Through this research, we aim to establish a foundation for further studies on the efficacy of these formulations in promoting hair growth and treating specific hair conditions. This will ultimately contribute to the development of more effective and user-friendly herbal hair care products.

In today’s polluted environment, which poses numerous challenges to hair health, herbal hair oils offer a natural remedy. These oils, typically composed of blends like coconut oil, almond oil, hibiscus, jasmine, and other beneficial herbs, provide a host of advantages. They are rich in essential vitamins and micronutrients that nourish the hair and scalp, addressing issues such as premature graying, hair loss, and frizz. Regular use helps maintain scalp hydration, promotes hair growth, and protects against damage like breakage and split

ends. Additionally, herbal oils prevent dandruff, enhance shine, and improve overall hair texture. Unlike conventional products, herbal oils penetrate deeply to offer comprehensive nourishment and support, making them an effective and holistic approach to maintaining healthy, lustrous hair.

The primary objective of this study is to formulate and evaluate herbal hair oil blends that promote natural hair growth and address common hair issues such as hair fall, premature graying, and frizz. By selecting and combining various herbs known for their beneficial properties, the study aims to create formulations that are both effective and safe for regular use. The evaluation includes assessing the organoleptic properties, pH levels, washability, and stability of the formulations to ensure their quality and efficacy. This research seeks to validate the effectiveness of these herbal hair oils in improving hair health and provide a reliable, natural alternative to synthetic hair care products.

MATERIAL AND METHODS

The materials utilized in the formulation of the herbal hair oil include various plant-derived oils and extracts, each contributing unique benefits to hair care. Coconut Oil (Cocos nucifera L., Arecaceae), extracted from the kernel, is renowned for its moisturizing effects due to active constituents such as lauric acid, capric acid, and myristic acid. Almond Oil (Prunus dulcis, Rosaceae), derived from dried almond kernels, contains palmitic acid, linoleic acid, and oleic acid, which are known for strengthening hair and providing sun protection. Jasmine Oil (Jasminum officinale, Oleaceae), obtained from flowers, primarily serves to impart fragrance and relaxation benefits, with key components including benzyl acetate,

Table No.1: Different Ingredients Used in Formulation of Herbal Hair Oil

Sr.No.	Ingredients	Properties
1.	Coconut Oil	Moisture dry hair
2.	Almond Oil	Treat hair loss
3.	Jasmine Oil	Fragrance
4.	Alovera	Boosting scalp health
5.	Hibiscus	thickening of hair
6.	Curry Leaves	Soothes the itchy scalps
7.	Fenugreek	Hair Growth
8.	Shikakai	Anti-dandruff
9.	Amla	Hair Conditioner
10.	Vitamin E	Preservative

linalool, and benzyl alcohol. Aloe Vera (Aloe barbadensis, Xanthorrhoeaceae) is valued for its soothing and moisturizing properties, enriched with vitamins A, C, E, and various minerals and enzymes beneficial for scalp health. Hibiscus (Hibiscus rosa-sinensis, Malvaceae), including flowers and leaves, is known for nourishing hair and promoting thickness due to its flavonoids and anthocyanins. Curry Leaves (Murraya koenigii, Rutaceae) are included for their ability to strengthen hair roots and promote growth, with active constituents such as bismahanine and murrayanine. Fenugreek (Trigonella foenum-graecum, Fabaceae) seeds are chosen for their dandruff-reducing and hair growth-promoting properties, containing trimethylamine and trigonelline. Shikakai (Acacia concinna, Fabaceae) pods and leaves are used for their cleansing properties, with saponins and tannins as principal active components. Finally, Amla (Phyllanthus emblica, Phyllanthaceae) fruit is included for conditioning hair and treating scalp ailments, featuring vitamin C and ellagic acid.

The preparation of herbal hair oil involves a series of carefully executed steps. The process begins with the selection and weighing of dried herbs, including Hibiscus, Fenugreek, Curry Leaves, Shikakai, Amla, and Aloe Vera. These herbs are then powdered using a mortar and pestle until a fine consistency is achieved. The powdered herbs are mixed with coconut oil in a suitable container, which is then heated on a stove for

approximately 15 minutes to allow for proper infusion. After heating, the mixture is allowed to cool overnight to enhance potency.

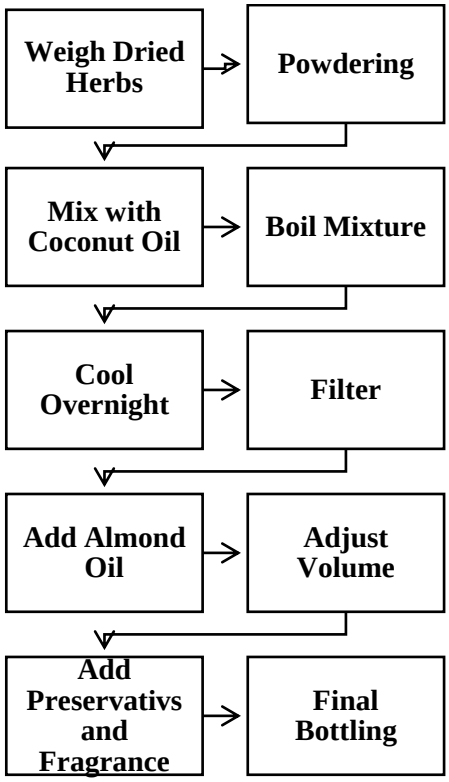

Figure 1: Flow chart of preparation of Herbal Hair Oil

Table No. 2: Formulation 1 for Herbal Hair Oil

Sr.no.	Ingredients	Quantity (ml)
1	Coconut oil	24
2	Almond oil	6
3	Jasmine oil	0.8
4	Aloe vera	2
5	Hibiscus	1.2
6	Curry leaves	1.2
7	Fenugreek	1.6
8	Shikakai	1.2
9	Amla	1.2
10	Vitamin E	0.8

Figure 2: Herbal Hair Oil

Table No. 3: Formulation 2 for Herbal Hair Oil

Sr.no.	Ingredients	Quantity (ml)
1	Coconut oil	24
2	Almond oil	6
3	Jasmine oil	0.8
4	Aloe vera	2
5	Hibiscus	1.2
6	Curry leaves	1.2
7	Fenugreek	1.6
8	Shikakai	1.2
9	Amla	1.2
10	Vitamin E	0.8

Table No. 4: Formulation 3 for Herbal Hair Oil

Sr.no.	Ingredients	Quantity (ml)
1	Coconut oil	24
2	Almond oil	6
3	Jasmine oil	0.8
4	Aloe vera	2
5	Hibiscus	1.2
6	Curry leaves	1.2
7	Fenugreek	1.6
8	Shikakai	1.2
9	Amla	1.2
10	Vitamin E	0.8

To ensure the quality and efficacy of the herbal hair oil, several physicochemical tests are performed. Organoleptic properties are assessed, including the colour, Odor, and texture of the oil, as well as testing for any potential skin irritation and sedimentation. The pH of the oil is measured using pH paper to determine its suitability for scalp use. Specific gravity is determined to understand the density of the oil relative to water. The saponification value is tested to evaluate the presence of fatty acids and the potential cleansing properties of the oil. Washability is assessed to determine how easily the oil can be rinsed out of hair. The acid value is measured to gauge the freshness and potential for rancidity of the oil. Stability studies are conducted to monitor the oil's properties over time, ensuring its shelf life and effectiveness. Finally, viscosity is measured with an Ostwald's viscometer to evaluate the thickness and flow characteristics of the oil.

Overall, these methods ensure the formulation of a high-quality herbal hair oil, effective for hair care and treatment while maintaining stability and usability over time.

RESULT AND DISCUSSION

We evaluated three formulations (F1, F2, and F3) of our herbal hair oil to assess their visual appeal and basic properties. Here's a breakdown of the findings:

1. Organoleptic Properties: All three formulations passed the test with flying colours. They had a pleasant greenish-brown colour, a characteristic herbal scent, and a smooth texture with no grittiness. Additionally, there were no signs of separation (sedimentation) after resting overnight.

Table 4: Results of Organoleptic Properties

Sr.no.	Parameters	F1	F2	F3
1	Colour	Greenish brown	Greenish brown	Greenish brown
2	Odour	Characteristics	Characteristics	Characteristics
3	Sensitivity	No irritation	No irritation	No irritation
4	Grittiness	Smooth	Smooth	Smooth
5	Sedimentation	No sedimentation	No sedimentation	No sedimentation

2. Gentle on the Scalp (pH Level): The pH of all three formulations ranged between 6.4 and 6.9, which is close to the natural pH of your scalp. This is important because harsh products can irritate the scalp, and our hair oil seems gentle.

Table 5: Results for pH Properties

Sr.no.	Formulation	pH
1	F1	6.8
2	F2	6.4
3	F3	6.9

Table 6: Results for Acid Values Properties

Sr.no.	Formulation	Acid Value
1	F1	4.3
2	F2	3.5
3	F3	3.9

3. Easy Does It (Washability): Great news! All the formulations rinsed out easily with just tap water, so you won't have to worry about greasy hair after application.

Table 7: Results for Washability Properties

Sr.no.	Formulation	Washability
1	F1	Easily Washable
2	F2	Easily Washable
3	F3	Easily Washable

4. Freshness Check (Acid Value): The acid value of all the formulations was below 5, indicating freshness and a low risk of becoming rancid quickly. This suggests a good shelf

life for your hair oil.

Based on these tests, all three formulations (F1, F2, and F3) show promise as herbal hair oil options. They have a pleasant appearance, feel comfortable on the scalp, and wash out easily. The low acid value suggests they should stay fresh for a good amount of time.

While these initial tests are encouraging, further studies might be necessary to determine the effectiveness of the hair oil in promoting hair growth or treating specific hair conditions.

The evaluation of the three herbal hair oil formulations (F1, F2, and F3) demonstrated promising results across several key parameters. Organoleptic properties indicated that all formulations had a consistent greenish-brown colour, characteristic herbal Odor, smooth texture without grittiness, and no sedimentation. pH testing revealed values ranging from 6.4 to 6.9, aligning closely with the natural pH of the scalp, indicating the formulations are gentle and conducive to scalp health. Washability tests confirmed that all formulations were easily washable with tap water, ensuring no greasy residue post-application. The acid value measurements were all below 5, signifying the oils' freshness and stability, which suggests a good shelf life and low risk of rancidity. These combined results highlight the formulations' potential as effective, user-friendly, and stable herbal hair care products.

CONCLUSION

The herbal hair oil formulations (F1, F2, and F3) demonstrated significant promise in promoting healthy hair growth and maintaining hair health. The combination of herbal extracts in the formulations provided a synergistic effect, contributing to improved hair growth, colour restoration, and dandruff protection. Evaluation results confirmed that all formulations were stable, safe for use, and aligned with standard quality parameters. Key outcomes include effective hair nourishment, grey hair reversal, and enhanced scalp health. These formulations offer a valuable and effective option for maintaining and improving hair health.

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