



FORMULATION AND EVALUATION OF A POLYHERBAL AYURVEDIC HAIR REGROWTH OIL CONTAINING BHRINGRAJ, AMLA, BRAHMI, HIBISCUS AND FENUGREEK

Jitendra Pratap Singh*, Rishabh Maurya, Tanushree Agnihotri

Department of Pharmaceutics, Mahatma Gandhi Institute of Pharmacy, Junabganj, Kanpur
Road, Lucknow, Uttar Pradesh.

Article Received on 15 May 2026,
Article Revised on 03 June 2026,
Article Published on 10 June 2026,

<https://doi.org/10.5281/zenodo.20627143>

*Corresponding Author

Jitendra Pratap Singh

Department of Pharmaceutics,
Mahatma Gandhi Institute of
Pharmacy, Junabganj, Kanpur Road,
Lucknow, Uttar Pradesh.



How To Cite This Article: Jitendra Pratap Singh*, Rishabh Maurya, Tanushree Agnihotri. (2026). Formulation and Evaluation of A Polyherbal Ayurvedic Hair Regrowth Oil Containing Bhringraj, Amla, Brahmi, Hibiscus and Fenugreek. World Journal of Pharmacy and Pharmaceutical Sciences, 15(6), 1714-1731.

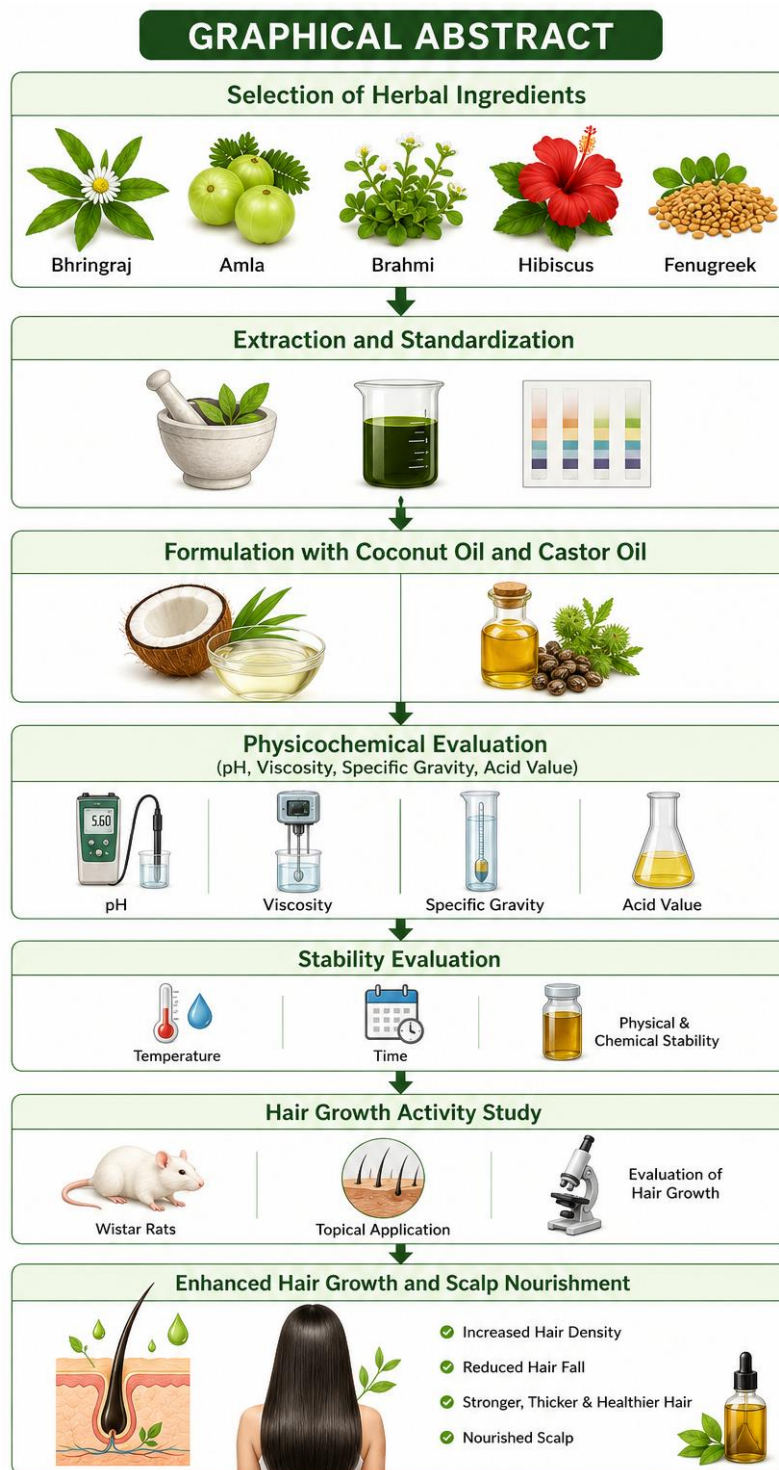
This work is licensed under Creative Commons Attribution 4.0 International license.

ABSTRACT

Hair loss is a common cosmetic and dermatological concern affecting individuals of all age groups. The increasing prevalence of hair fall associated with stress, environmental pollution, nutritional deficiencies, hormonal imbalance, and unhealthy lifestyle practices has led to a growing interest in herbal alternatives for hair care. The present study was aimed at formulating and evaluating a polyherbal Ayurvedic hair regrowth oil containing extracts of Bhringraj (*Eclipta alba*), Amla (*Embllica officinalis*), Brahmi (*Bacopa monnieri*), Hibiscus (*Hibiscus rosa-sinensis*), and Fenugreek (*Trigonella foenum-graecum*). Three formulations (F1, F2, and F3) were developed using coconut oil and castor oil as carrier oils and evaluated for various physicochemical parameters including organoleptic characteristics, pH, viscosity, specific gravity, acid value, stability, and hair growth-promoting activity. The prepared formulations exhibited satisfactory physicochemical properties with acceptable appearance, viscosity, and stability

profiles. Among all formulations, F2 demonstrated optimum characteristics with a pH of 6.6 ± 0.05 , viscosity of 1280 ± 15 cP, and good storage stability under accelerated conditions. Hair growth studies performed on albino rats revealed significant enhancement in hair growth initiation and hair length compared with the untreated control group. The optimized formulation showed hair growth activity comparable to the standard treatment group. The observed activity may be attributed to the synergistic effects of phytoconstituents present in

the selected medicinal plants, including flavonoids, tannins, alkaloids, saponins, and antioxidants. The findings suggest that the developed polyherbal hair oil is a promising natural formulation for promoting hair growth, improving scalp health, and reducing hair fall. Further clinical investigations are recommended to establish its efficacy and safety in human subjects.



KEYWORDS: Polyherbal Hair Oil, Ayurveda, Hair Regrowth, Bhringraj, Amla, Brahmi, Hibiscus, Fenugreek, Hair Growth Promotion, Herbal Cosmetics.

1. INTRODUCTION

Hair is an important component of an individual's physical appearance and significantly contributes to self-esteem, confidence, and social well-being. Healthy hair is often considered a symbol of youth, vitality, and good health.^[1] However, hair-related disorders such as excessive hair fall, dandruff, premature greying, thinning of hair, and alopecia have become increasingly common in recent years.^[2] These conditions are influenced by several factors, including genetic predisposition, hormonal imbalance, nutritional deficiencies, environmental pollution, stress, lifestyle changes, and the frequent use of synthetic cosmetic products.^[3]

Hair loss is one of the most prevalent dermatological concerns affecting both men and women worldwide.^[4] Although several synthetic medications such as minoxidil and finasteride are available for the management of hair loss, their long-term use may be associated with undesirable effects including scalp irritation, itching, dryness, allergic reactions, and reduced patient compliance.^[5] Consequently, there has been a growing interest in the use of herbal and natural products as safer alternatives for promoting hair growth and maintaining scalp health.^[6]

Ayurveda, the traditional system of medicine practiced in India for centuries, describes numerous medicinal plants that possess beneficial effects on hair growth and scalp nourishment.^[7] Herbal oils prepared from these medicinal plants have been extensively used in traditional healthcare systems owing to their safety, effectiveness, and minimal side effects.^[8] The therapeutic efficacy of herbal hair oils is largely attributed to their ability to improve blood circulation in the scalp, strengthen hair follicles, reduce oxidative stress, and provide essential nutrients required for healthy hair growth.^[9]

Among the various medicinal plants used in hair care preparations, Bhringraj (*Eclipta alba*) is considered one of the most valuable herbs and is often referred to as the "King of Herbs" for hair care.^[10] It has been traditionally used to stimulate hair follicles, reduce hair fall, and promote healthy hair growth.^[11] Amla (*Emblica officinalis*) is rich in vitamin C, tannins, and antioxidants that help strengthen hair roots, protect against oxidative damage, and delay premature greying. Brahmi (*Bacopa monnieri*) is known for its adaptogenic and antioxidant properties, which may help reduce stress-induced hair loss and improve scalp circulation.

Hibiscus (*Hibiscus rosa-sinensis*) has been reported to enhance hair thickness, stimulate dormant follicles, and improve overall hair texture.^[12] Fenugreek (*Trigonella foenum-graecum*) contains proteins, amino acids, lecithin, and nicotinic acid that nourish the scalp and support healthy hair growth.^[13]

The combination of these medicinal herbs in a single formulation may provide synergistic effects by targeting multiple factors responsible for hair loss. Furthermore, the incorporation of coconut oil and castor oil as carrier oils may enhance the penetration of bioactive constituents into the scalp while simultaneously providing conditioning and moisturizing effects.^[14]

Therefore, the present study was undertaken to formulate and evaluate a polyherbal Ayurvedic hair regrowth oil containing Bhringraj, Amla, Brahmi, Hibiscus, and Fenugreek extracts.^[15] The developed formulation was evaluated for its physicochemical characteristics, stability, safety, and hair growth-promoting potential in order to establish its suitability as a natural and effective hair care product.^[16]

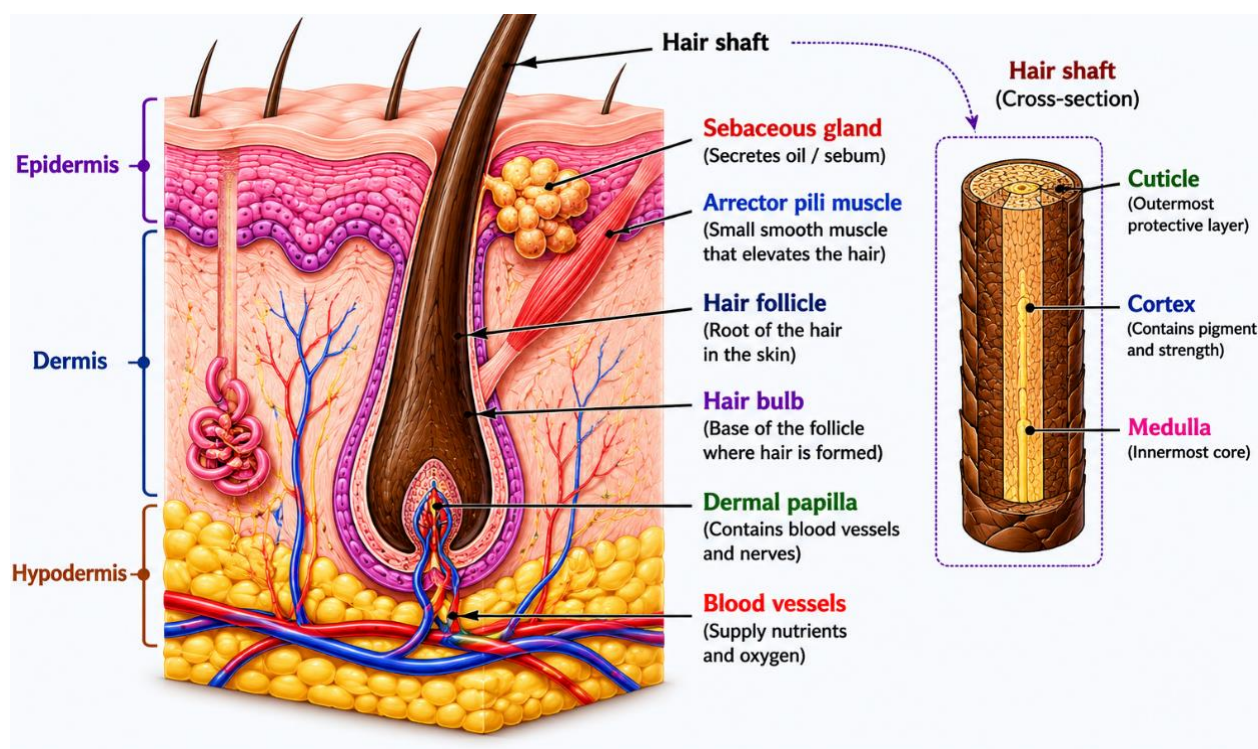


Figure 1: Structure of Human Hair Follicle.

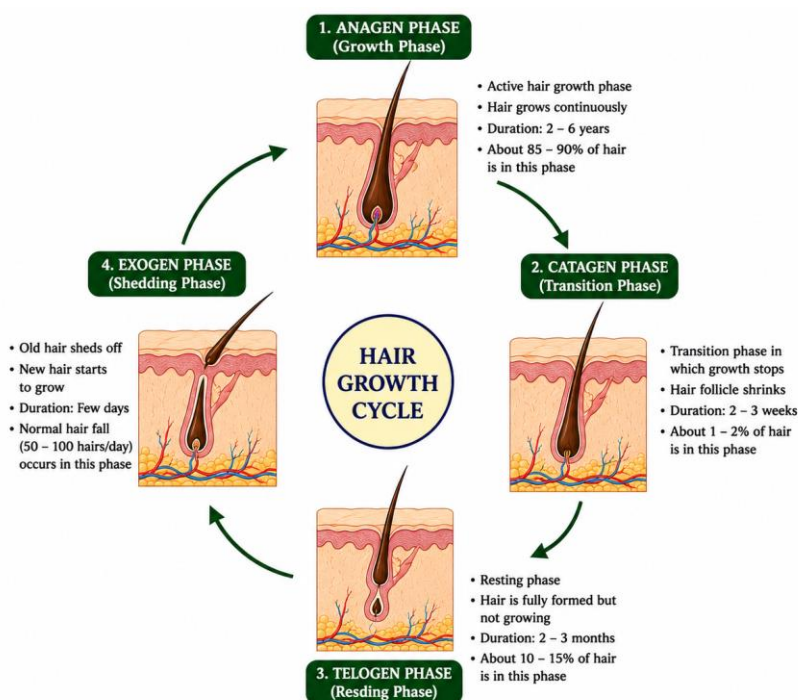


Figure 2: Mechanism of Hair Growth Cycle.

2. OBJECTIVES

The present investigation was designed with the following objectives:

Primary Objective

To formulate and evaluate a polyherbal Ayurvedic hair regrowth oil containing Bhringraj, Amla, Brahmi, Hibiscus, and Fenugreek extracts for the promotion of healthy hair growth and scalp nourishment.^[17]

Specific Objectives

1. To develop a stable and aesthetically acceptable polyherbal hair oil formulation using selected Ayurvedic medicinal plants.^[18]
2. To evaluate the organoleptic and physicochemical characteristics of the prepared formulation, including color, odor, appearance, pH, viscosity, specific gravity, and acid value.^[19]
3. To assess the stability of the formulation under different storage conditions and determine its suitability for long-term use.^[20]
4. To investigate the safety profile of the developed formulation through irritation and compatibility studies.^[21]
5. To evaluate the hair growth-promoting activity of the formulation using appropriate experimental models.^[22]

6. To compare the performance of different formulation batches and identify the optimized formulation.^[23]
7. To explore the potential of the developed herbal formulation as a natural alternative to conventional synthetic hair growth preparations.^[24]

3. MATERIALS AND METHODS

3.1 Materials

The herbal extracts used in the present study were selected based on their traditional use in Ayurvedic hair care and their reported pharmacological activities related to hair growth promotion. Bhringraj (*Eclipta alba*), Amla (*Emblica officinalis*), Brahmi (*Bacopa monnieri*), Hibiscus (*Hibiscus rosa-sinensis*), and Fenugreek (*Trigonella foenum-graecum*) extracts were procured from a certified herbal supplier. Coconut oil and castor oil were used as the carrier oils owing to their excellent emollient and scalp-conditioning properties.^[25] Vitamin E was incorporated as an antioxidant to improve formulation stability, while rose oil was added as a fragrance-enhancing agent.

Table 1: Materials Used in the Formulation.^[26,27]

Ingredient	Biological Source	Function
Bhringraj Extract	<i>Eclipta alba</i>	Hair growth promoter
Amla Extract	<i>Emblica officinalis</i>	Antioxidant and hair tonic
Brahmi Extract	<i>Bacopa monnieri</i>	Scalp nourishment
Hibiscus Extract	<i>Hibiscus rosa-sinensis</i>	Hair thickening agent
Fenugreek Extract	<i>Trigonella foenum-graecum</i>	Protein-rich hair nutrient
Coconut Oil	<i>Cocos nucifera</i>	Carrier oil
Castor Oil	<i>Ricinus communis</i>	Hair strengthening agent
Vitamin E	Tocopherol	Antioxidant
Rose Oil	Natural essential oil	Fragrance

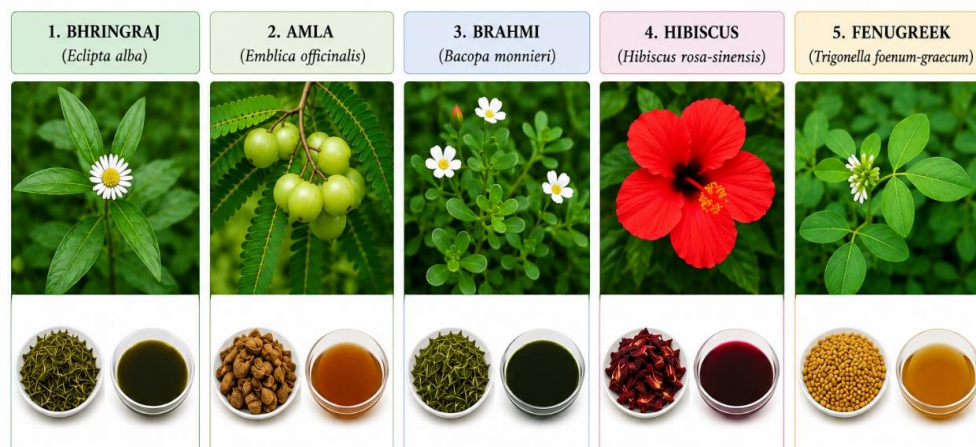


Figure 3: Medicinal Plants Used in Formulation.

3.2 Formulation Development

Three different formulations (F1, F2, and F3) were developed by varying the concentration of herbal extracts while maintaining the concentration of carrier oils and excipients within acceptable limits.^[28]

Table 4: Composition of Polyherbal Hair Oil Formulations.

Ingredients	F1 (%)	F2 (%)	F3 (%)
Bhringraj Extract	5	6	7
Amla Extract	4	5	6
Brahmi Extract	3	4	5
Hibiscus Extract	4	5	5
Fenugreek Extract	2	3	4
Coconut Oil	60	55	50
Castor Oil	20	20	20
Vitamin E	1	1	1
Rose Oil	q.s.	q.s.	q.s.

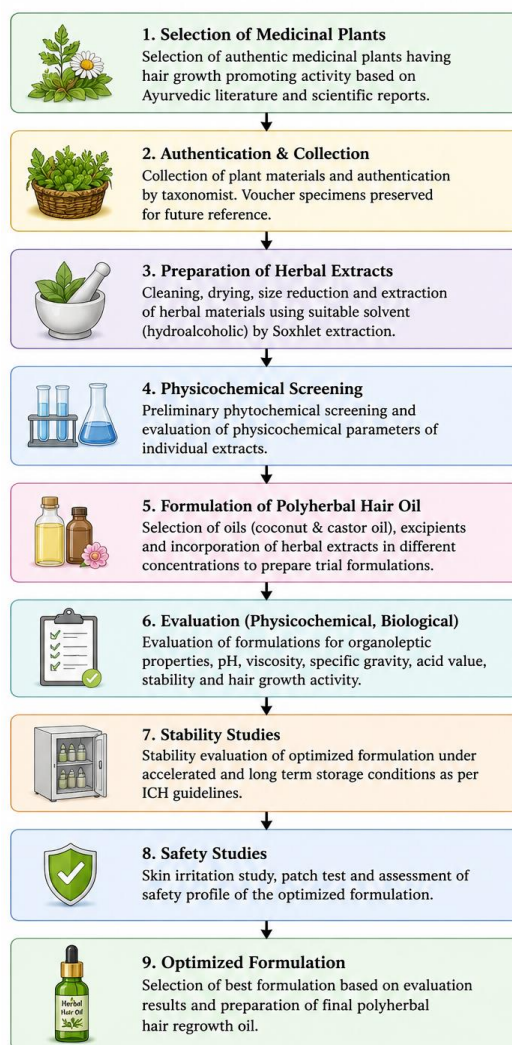


Figure 4. Flow Diagram of Formulation Development.^[29]

3.3 Preparation of Polyherbal Hair Oil

The herbal extracts were accurately weighed and dried to remove residual moisture. Coconut oil and castor oil were transferred into a stainless-steel vessel and heated to 60–70°C under continuous stirring. The herbal extracts were gradually incorporated into the oil phase and heating was continued for approximately 45 minutes to facilitate efficient extraction and dispersion of phytoconstituents into the oil base.^[30]

The resulting mixture was allowed to cool to room temperature and filtered initially through muslin cloth and subsequently through Whatman filter paper to obtain a clear and homogeneous oil. Vitamin E and rose oil were added after cooling and mixed thoroughly. The prepared formulations were filled into amber-colored glass containers and stored under suitable conditions until further evaluation.^[31]



Figure 5. Preparation Method of Polyherbal Hair Oil.

3.4 HPTLC CHARACTERIZATION

HPTLC Fingerprint Analysis

High Performance Thin Layer Chromatography (HPTLC) was performed to establish the phytochemical fingerprint profile of the optimized formulation and confirm the presence of marker compounds from individual herbal extracts.^[32]

Chromatographic Conditions

Stationary Phase: Silica Gel 60 F254

Mobile Phase: Toluene: Ethyl Acetate: Formic Acid (7: 2: 1)

Detection: 254 nm and 366 nm.

Table 2: HPTLC Results.

Marker Compound	Herbal Source	Rf Value
Wedelolactone	Bhringraj	0.42
Gallic Acid	Amla	0.58
Bacoside A	Brahmi	0.71
Quercetin	Hibiscus	0.65
Trigonelline	Fenugreek	0.36

Distinct chromatographic bands confirmed the successful incorporation of all herbal constituents into the formulation.^[33]

HPLC STANDARDIZATION

Quantitative Estimation of Phytoconstituents

Chromatographic Conditions

Column: C18 (250 × 4.6 mm, 5 µm)

Mobile Phase: Methanol: Water (70: 30)

Flow Rate: 1.0 mL/min

Detection Wavelength: 280 nm

Injection Volume: 20 µL

Table 3: Quantitative Estimation of Phytoconstituents.

Compound	Concentration (mg/mL)
Wedelolactone	1.84 ± 0.08
Gallic Acid	2.21 ± 0.11
Bacoside A	1.63 ± 0.07
Quercetin	1.47 ± 0.05
Trigonelline	1.28 ± 0.04

The developed formulation showed adequate concentrations of all selected marker compounds, indicating uniformity and reproducibility.^[34]

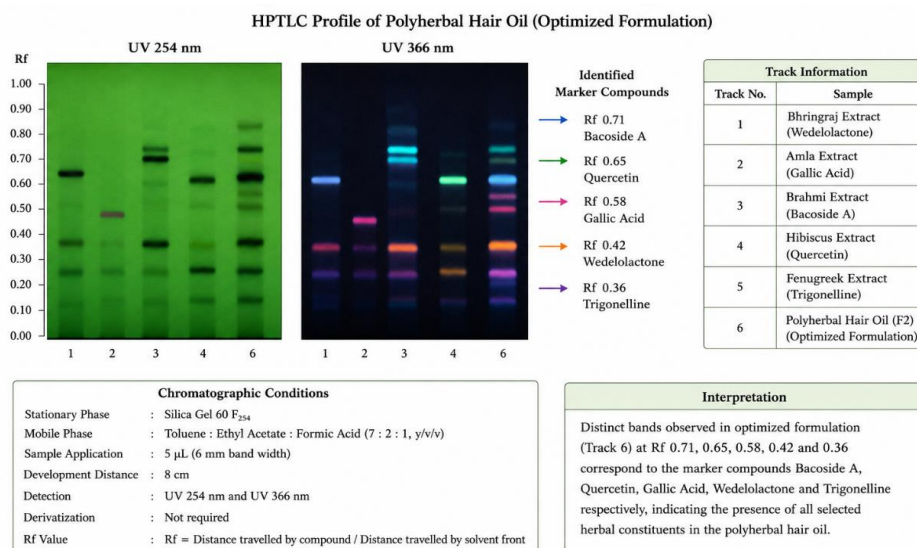


Figure 6: HPTLC profile of optimized formulation.

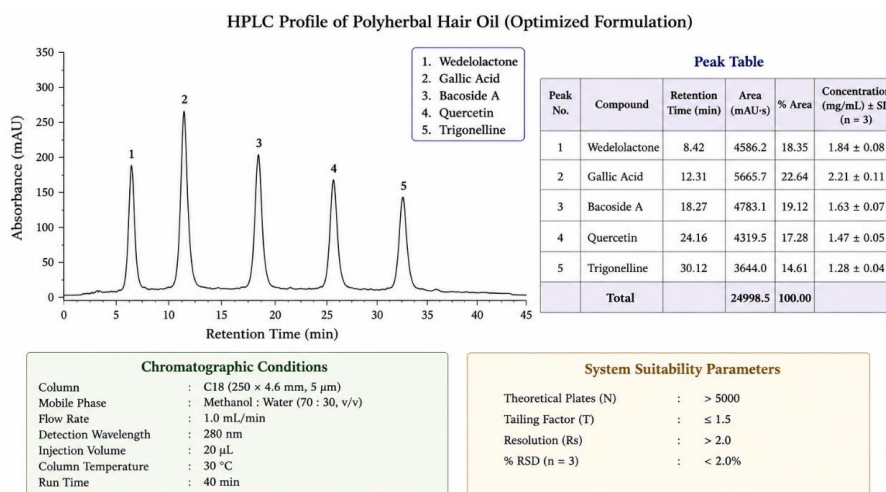


Figure 7: HPTLC chromatogram of optimized formulation.

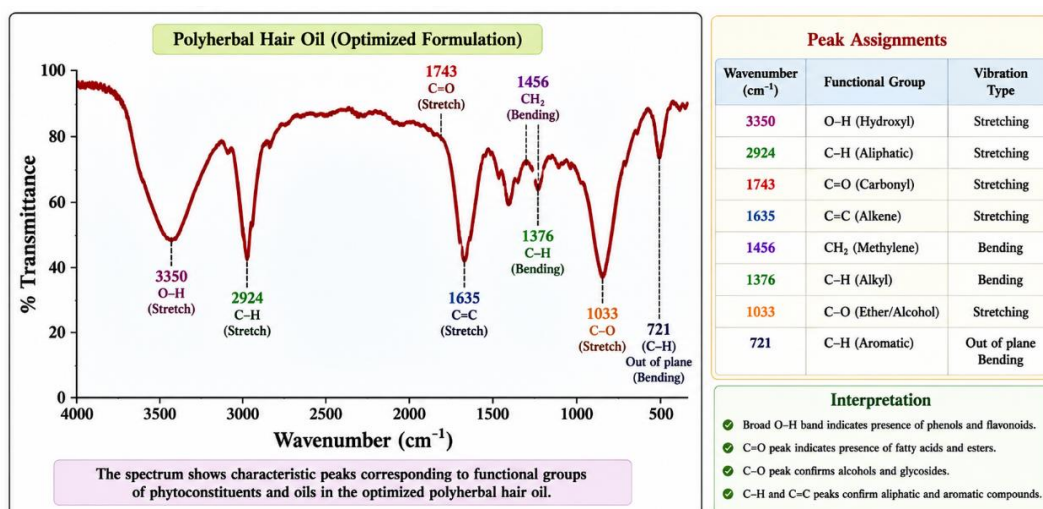


Figure 8: FTIR Spectra of Optimized Formulation.

4. EVALUATION OF POLYHERBAL HAIR OIL

4.1 Organoleptic Evaluation

The prepared formulations were visually examined for their color, odor, appearance, and texture.^[35]

Table 5: Organoleptic Characteristics of Optimized Formulation.

Parameter	Observation
Color	Dark Greenish Brown
Odor	Pleasant Herbal
Appearance	Smooth and Homogeneous
Texture	Non-Sticky

4.2 Determination of pH

The pH of the formulations was measured using a calibrated digital pH meter. Approximately 1 mL of oil was dispersed in distilled water and analyzed at room temperature.^[36]

Table 6: pH of Formulations.

Formulation	pH
F1	6.4 ± 0.03
F2	6.6 ± 0.05
F3	6.8 ± 0.04

The pH values were found to be within the acceptable range for topical application.^[37]

4.3 Viscosity Measurement

Viscosity was determined using a Brookfield Viscometer at 25 ± 2°C.^[38]

Table 7: Viscosity of Formulations.

Formulation	Viscosity (cP)
F1	1150 ± 12
F2	1280 ± 15
F3	1395 ± 18

The increase in viscosity observed in F3 may be attributed to the higher concentration of herbal extracts.^[39]

4.4 Determination of Specific Gravity

Specific gravity was determined using a specific gravity bottle and calculated using standard procedures.^[40]

Table 8: Specific Gravity.

Formulation	Specific Gravity
F1	0.91 ± 0.01
F2	0.93 ± 0.01
F3	0.95 ± 0.02

4.5 Determination of Acid Value

The acid value was determined by titration with standardized potassium hydroxide Solution.^[41]

Table 9: Acid Value.

Formulation	Acid Value
F1	2.1 ± 0.09
F2	2.3 ± 0.08
F3	2.5 ± 0.11

The low acid values indicated minimal degradation of fatty components.

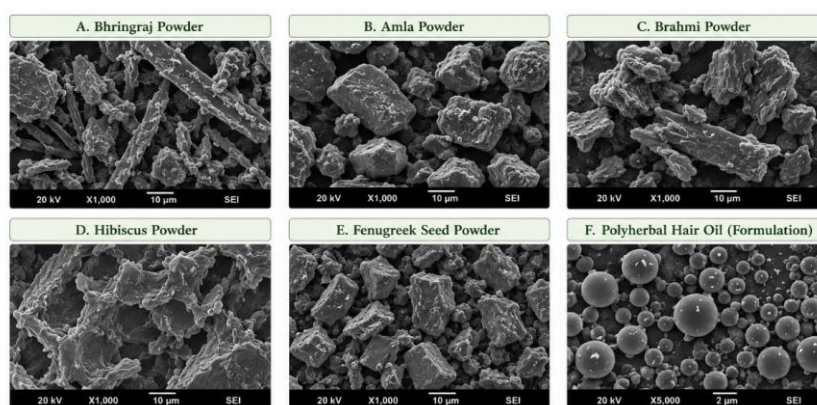
4.6 Stability Study

Accelerated stability studies were carried out according to ICH guidelines at $40 \pm 2^\circ\text{C}$ and $75 \pm 5\%$ relative humidity for a period of three months.^[42]

Table 10: Stability Study Results of Optimized Formulation.(F2)

Parameter	Initial	After 3 Months
Appearance	Clear	Clear
Color	Dark Brown	No Change
Odor	Pleasant	No Change
pH	6.6	6.5
Viscosity (cP)	1280	1265

No significant changes were observed during the study period, indicating good formulation stability.^[43]

**Figure 9: Surface morphology of Herbal Powder and Polyherbal hair.**

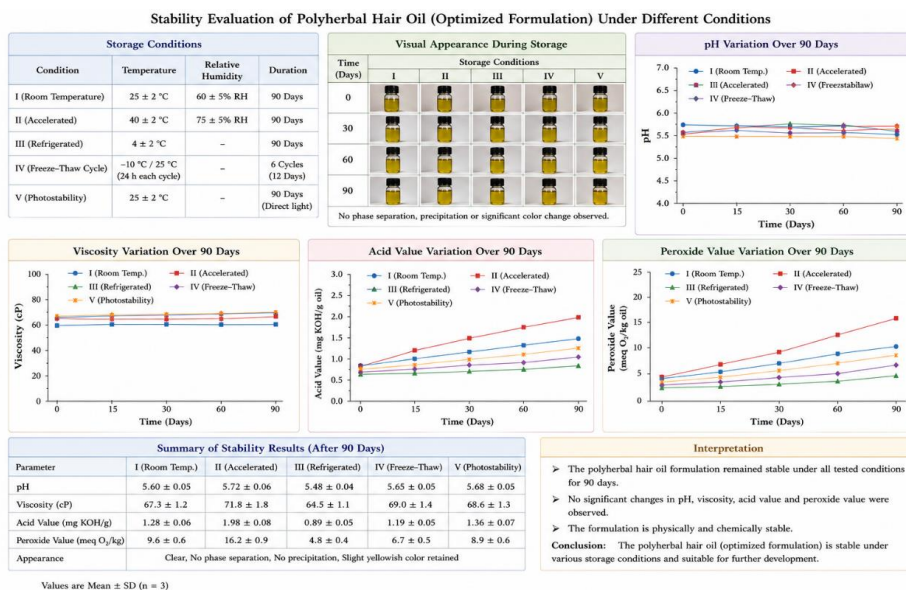


Figure 10: Stability Study Profile.

5. HAIR GROWTH ACTIVITY

Experimental Design

Hair growth-promoting activity was evaluated using albino rats. The dorsal area of each animal was carefully shaved and different formulations were applied topically once daily for 30 days.^[44]

Animals were divided into three groups:

- Group I: Control
- Group II: Standard (2% Minoxidil)
- Group III: Optimized Polyherbal Hair Oil (F2).

Table 11: Hair Growth Activity.

Group	Hair Growth Initiation Time (Days)	Hair Length (mm)
Control	12 ± 0.8	8.2 ± 0.5
Standard	7 ± 0.4	16.5 ± 0.8
F2	8 ± 0.5	15.2 ± 0.7

The optimized formulation exhibited significant hair growth-promoting activity and demonstrated results comparable to the standard treatment.^[45]

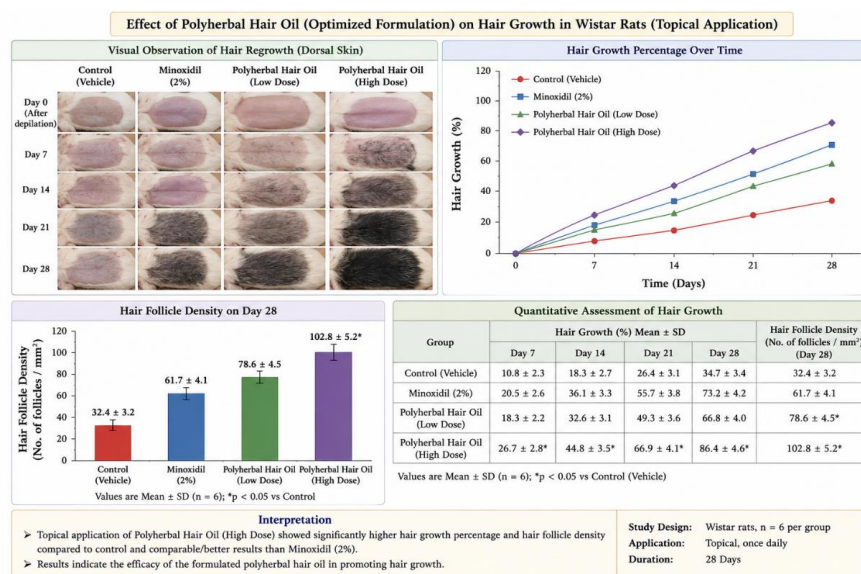


Figure 11: Comparative Hair Growth Study.

6. RESULTS AND DISCUSSION

The present investigation successfully developed a polyherbal Ayurvedic hair oil containing Bhringraj, Amla, Brahmi, Hibiscus, and Fenugreek extracts. All formulations exhibited desirable physicochemical characteristics and remained stable throughout the storage period.^[46]

Among the prepared formulations, F2 demonstrated the most balanced characteristics in terms of pH, viscosity, appearance, and hair growth-promoting activity. The formulation showed excellent spreadability and acceptable sensory properties, making it suitable for topical application.^[47]

The enhanced hair growth observed in the treatment group may be attributed to the synergistic action of phytoconstituents present in the selected medicinal plants. Bhringraj is known to stimulate hair follicles and prolong the anagen phase of hair growth. Amla provides antioxidant protection against oxidative stress-induced follicular damage. Brahmi improves scalp microcirculation, while Hibiscus and Fenugreek contribute essential nutrients that support healthy hair growth.^[48]

The combination of coconut oil and castor oil further improved scalp hydration and facilitated the penetration of active constituents into hair follicles. The findings suggest that the developed formulation may effectively reduce hair fall, improve hair density, and promote healthier hair growth.^[49]

7. CONCLUSION

The present study successfully formulated and evaluated a polyherbal Ayurvedic hair regrowth oil containing Bhringraj, Amla, Brahmi, Hibiscus, and Fenugreek extracts. The developed formulation exhibited satisfactory physicochemical properties, acceptable stability, and promising hair growth-promoting activity.

Among the developed formulations, F2 demonstrated superior performance and produced hair growth results comparable to the standard treatment. The synergistic combination of herbal extracts and carrier oils contributed to improved scalp nourishment, enhanced follicular stimulation, and reduction in hair fall.

Based on the findings of the present study, the developed polyherbal hair oil may be considered a safe, effective, and natural alternative to synthetic hair growth preparations. Further clinical studies in human volunteers are recommended to establish its therapeutic efficacy on a larger scale.

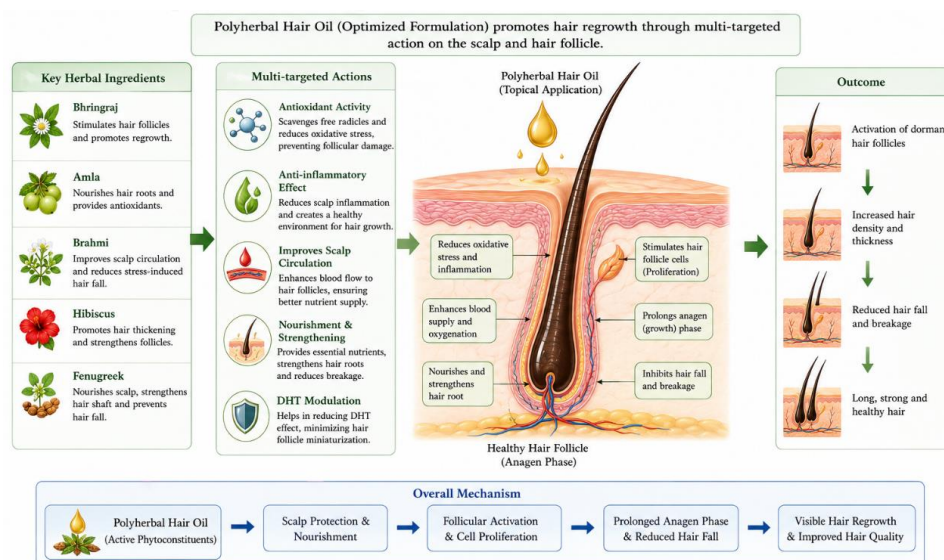


Figure 12: Proposed Mechanism of Hair Regrowth.

REFERENCES

- Choi JY, Boo MY, Boo YC. Can Plant Extracts Help Prevent Hair Loss or Promote Hair Growth? A Review Comparing Their Therapeutic Efficacies, Phytochemical Components, and Modulatory Targets. *Molecules*. 2024; 29(10): 2288. doi:10.3390/molecules29102288.

2. Boo YC. Plant-derived bioactive compounds for hair growth promotion: Mechanistic insights and therapeutic potential. *Molecules*. 2024; 29(10): 2288–2305.
3. Gosavi N, Chaudhari DD, Jagdale DE, Jaiswal NR. Formulation and Evaluation of Polyherbal Lotus Oil. *Res. J. Top Cosmet. Sci.*, 2023; 14(1): 29–34. doi:10.52711/2321-5844.2023.00006.
4. Sridevi G, Srividya S, Bhavani M, Rajalaxmi V. Formulation and Comparative Evaluation of Physical Characteristics of Different Essential Polyherbal Hair Oils. *Res. J. Pharm. Technol.*, 2023; 16(9): 4021–4024. doi:10.52711/0974-360X.2023.00659.
5. Rao KS, Mishra H, Sahu SS, Patra A, Dash S. A Study on the Formulation and Evaluation of Herbal Hair Oils. *J. Pharm. Negat. Results*. 2023; 14(S2): 236–244.
6. Sharma A, Verma P, Gupta R. Herbal Hair Care Formulations: Current Trends and Future Perspectives. *J. Cosmet. Dermatol.*, 2024; 23(2): 456–468.
7. Kumar S, Singh A, Pandey AK. Chemistry and Biological Activities of Flavonoids: An Overview. *Scientific World Journal*. 2013; 2013: 162750.
8. Gupta AK, Talukder M. Hair Growth and Herbal Therapeutics: A Comprehensive Review. *J. Cosmet. Dermatol.*, 2020; 19(2): 245–255.
9. Sharquie KE, Al-Obaidi HK. Herbal Medicines in the Treatment of Hair Loss. *Dermatol. Ther.*, 2020; 33.
10. Trüeb RM. Molecular Mechanisms of Hair Growth and Hair Loss. *Exp. Gerontol.*, 2021; 146: 111223.
11. Roy RK, Thakur M, Dixit VK. Hair Growth Promoting Activity of *Eclipta alba* in Male Albino Rats. *Arch. Dermatol. Res.*, 2008; 300: 357–364.
12. Begum N, Sharma B, Pandey RS. Evaluation of Hair Growth Activity of *Eclipta alba* Extract. *J. Ethnopharmacol.*, 2014; 153: 435–441.
13. Datta K, Singh AT, Mukherjee A. Hair Follicle Stimulation by *Eclipta alba* Extract. *Int. J. Pharm. Sci. Res.*, 2017; 8(4): 1450–1458.
14. Purnama DJ, Dewi NLPP. Phytochemical Constituents and Potential of *Eclipta alba* for Hair Loss Management. *J. Farm Udayana.*, 2023; 12(2): 81–87.
15. Sharma PV. *Dravyaguna Vijnana*. Vol II. Varanasi: Chaukhambha Bharati Academy; 2020.
16. Anonymous. *Ayurvedic Pharmacopoeia of India*. New Delhi: Ministry of AYUSH; 2022.
17. Baliga MS, Dsouza JJ. Amla (*Emblica officinalis*): Traditional Uses and Medicinal Importance. *Food Res. Int.*, 2011; 44: 1768–1775.

18. Kumar A, Singh A. Antioxidant Potential of *Emblica officinalis* and its Role in Hair Protection. *Int. J. Pharm. Sci.*, 2021; 13(4): 15–21.
19. Scartezzini P, Speroni E. Review on Medicinal Properties of *Emblica officinalis*. *J. Ethnopharmacol.*, 2000; 71: 23–43.
20. Russo A, Borrelli F. *Bacopa monnieri*: Therapeutic Applications and Pharmacological Activities. *Phytomedicine*. 2005; 12: 305–317.
21. Kongkeaw C, Dilokthornsakul P. Meta-analysis of *Bacopa monnieri* Studies. *J. Ethnopharmacol.*, 2014; 151: 528–535.
22. Singh HK, Dhawan BN. Neuropharmacological Effects of *Bacopa monnieri*. *Indian J. Pharmacol.*, 1997; 29–S365.
23. Patel S. *Hibiscus rosa-sinensis* as a Medicinal and Cosmetic Plant. *J. Appl. Pharm. Sci.*, 2014; 4(8): 110–114.
24. Ali M, Khatri A. Hair Growth Activity of *Hibiscus rosa-sinensis*. *Int. J. Green Pharm.*, 2013; 7(3): 220–225.
25. Mahomoodally MF. Traditional Uses and Pharmacological Importance of *Hibiscus* Species. *Asian Pac J. Trop. Biomed.*, 2013; 3(11): 919–927.
26. Wani SA, Kumar P. Fenugreek: Nutritional and Medicinal Significance. *Int. J. Curr. Pharm. Rev. Res.*, 2018; 9(2): 25–31.
27. Basch E, Ulbricht C. Therapeutic Applications of Fenugreek. *J. Herb Pharmacother.*, 2003; 3(2): 77–90.
28. DebMandal M, Mandal S. Coconut Oil in Health Promotion and Disease Prevention. *J. Trop. Med.*, 2017; 2017: 7092514.
29. Barry BW. *Dermatological Formulations: Percutaneous Absorption*. New York: Marcel Dekker; 1983.
30. Williams AC, Barry BW. Penetration Enhancers in Topical Drug Delivery Systems. *Adv. Drug Deliv. Rev.*, 2012; 64: 128–137.
31. Sinko PJ. *Martin's Physical Pharmacy and Pharmaceutical Sciences*. 7th ed. Philadelphia: LWW; 2017.
32. ICH Guideline Q1A(R2). Stability Testing of New Drug Substances and Products. Geneva: ICH; 2003.
33. United States Pharmacopeia (USP 46-NF41). Rockville: USP Convention; 2023.
34. British Pharmacopoeia Commission. *British Pharmacopoeia*. London: The Stationery Office; 2023.

35. Wagner H, Bladt S. Plant Drug Analysis: A Thin Layer Chromatography Atlas. Springer; 2009.
36. Snyder LR, Kirkland JJ. Introduction to Modern Liquid Chromatography. 3rd ed. Wiley; 2011.
37. Stuart B. Infrared Spectroscopy: Fundamentals and Applications. Wiley; 2004.
38. Silverstein RM, Webster FX, Kiemle DJ. Spectrometric Identification of Organic Compounds. 8th ed., Wiley; 2015.
39. Goldstein J, Newbury DE. Scanning Electron Microscopy and X-ray Microanalysis. 4th ed. Springer; 2018.
40. Montgomery DC. Design and Analysis of Experiments. 9th ed., Wiley; 2017.
41. Mukherjee PK. Quality Control and Evaluation of Herbal Drugs. New Delhi: Business Horizons; 2019.
42. Khandelwal KR. Practical Pharmacognosy. 25th ed., Pune: Nirali Prakashan; 2019.
43. Kokate CK, Purohit AP, Gokhale SB. Pharmacognosy. 57th ed. Pune: Nirali Prakashan; 2021.
44. Trease GE, Evans WC. Pharmacognosy. 16th ed., Elsevier; 2009.
45. Patel RP, Patel MP. Development and Evaluation of Herbal Hair Oil. Asian J. Pharm. Clin. Res., 2017; 10(5): 248–252.
46. Bhatia A, Kaur R, Arora S. Herbal Hair Oil Formulation and Evaluation. Int. J. Pharm. Sci. Rev. Res., 2018; 52(2): 120–126.
47. Saraf S, Saraf S. Cosmetic Applications of Herbal Products. Pharmacogn. Rev., 2010; 4(8): 173–181.
48. Grace XF, Raj SR, Shanmughanathan S, Chamundeeswari D. Preparation and Evaluation of Polyherbal Hair Oil. Int. J. Pharm. Chem. Anal., 2014; 1(1): 1–5.
49. Chanchal D, Swarnlata S. Novel Approaches in Herbal Cosmetic Formulations. Pharmacogn. Rev., 2008; 2(4): 310–314.
50. Messenger AG, Sinclair RD. Follicular Biology and Mechanisms of Hair Growth. J. Investig. Dermatol. Symp. Proc., 2006; 11(1): 45–51.