



Formulation and Evaluation of Anti-Dandruff Shampoo Using Tamarind Leaf Extract and Rice Water Extract

R Uma Prabha, Tejashwini N, Varshitha A, Manohar K, Tharun K, Mithun K

The Oxford College Of Pharmacy, India.

Received: 18 January 2026

Revised: 30 January 2026

Accepted: 19 February 2026

ABSTRACT

Dandruff is one of the most prevalent scalp conditions worldwide, affecting individuals across all demographics. Current synthetic anti-dandruff formulations are associated with scalp irritation, dryness, and environmental concerns, necessitating the development of safer herbal alternatives. This study describes the formulation and evaluation of five herbal anti-dandruff shampoo preparations (F1–F5) incorporating graded concentrations of tamarind leaf extract (*Tamarindus indica* L.) (1%–5%) alongside rice water extract, glycerine, sodium lauryl sulfate (SLS), lavender oil, and methyl paraben as preservative. All formulations were assessed for physicochemical parameters, including pH, viscosity, wetting time, surface tension, foam stability, dirt dispersion, and accelerated stability. Antifungal activity against *Candida albicans* was evaluated by agar well diffusion. Formulation F3 (3% tamarind leaf extract) demonstrated the most balanced physicochemical profile with a pH of 5.00, viscosity of 3000 cP, initial foam height of 50 mm, and foam stability of 40 mm. FTIR analysis confirmed the presence of key functional groups (phenols, flavonoids, alkaloids) in both extracts. The tamarind leaf extract exhibited a zone of inhibition of 9 mm against *C. albicans* compared to 13 mm for the standard ketoconazole (100 µg/ml), indicating significant antifungal potential. The results suggest that F3 is a promising natural anti-dandruff formulation meriting further clinical investigation.

Keywords: Anti-dandruff shampoo; *Tamarindus indica*; Rice water extract; Herbal cosmetics; *Candida albicans*; FTIR; Antifungal activity; Scalp health

1. INTRODUCTION

Hair constitutes one of the most defining physical characteristics contributing to perceived beauty and is often considered an indicator of overall health and vitality. Shampoo is the primary product used for cleansing hair and scalp by removing accumulated dirt, sebum, and environmental pollutants. Beyond cleansing, modern shampoo formulations are expected to address specific scalp disorders, improve manageability, and minimise post-wash flyaway.

Dandruff (pityriasis capitis) is a chronic, relapsing scalp condition affecting more than 50% of the global population at some point during their lives, irrespective of gender or geographic location. The condition is characterised by excessive shedding of dead scalp skin cells, accompanied by varying degrees of itching, erythema, and scalp irritation. The word "dandruff" is of Anglo-Saxon origin, derived from the combination of 'tan' (tetter) and 'drof' (dirty). Although the precise aetiology remains incompletely understood, *Malassezia* yeast overgrowth, sebaceous gland hyperactivity, and individual immune responses are widely implicated as contributing factors. Seasonality also plays a role, with exacerbations more common during winter months.

The majority of commercially available anti-dandruff shampoos rely on synthetic active agents such as ketoconazole, selenium sulfide, zinc pyrithione, and coal tar. While effective, these compounds are associated with scalp dryness, hair damage, keratin loss, and long-term environmental concerns. The rising global trend of 'green consumerism' has driven substantial interest in herbal alternatives that combine efficacy with improved safety profiles. Natural plant extracts offer a broad spectrum of bioactive compounds, including flavonoids, tannins, alkaloids, and phenolic acids, many of which demonstrate documented antimicrobial, antifungal, anti-inflammatory, and antioxidant properties.

Tamarindus indica L. (tamarind) is a medium-sized tree of the family Fabaceae with extensive ethnobotanical use in Asia, Africa, and Latin America. Its leaves are rich in luteolin, apigenin, orientin, vitexin, caffeic acid, and vitamin C, and have been reported to possess significant antibacterial and antifungal activity. Rice water, the aqueous extract obtained by soaking or cooking rice, contains



B vitamins, inositol, ferulic acid, gamma oryzanol, essential amino acids, and starch, all of which contribute to scalp nourishment, hair strengthening, and reduction of dandruff-associated inflammation.

The main purpose of this study is to formulate and evaluate a herbal anti-dandruff shampoo using extracts of *Tamarindus indica* leaves and rice water, and to assess its physicochemical properties, stability, and antifungal activity against *Candida albicans*, with the aim of developing a safe and effective natural alternative for the management of Pityriasis capitis (dandruff).

The present study was undertaken to formulate and evaluate herbal anti-dandruff shampoos using tamarind leaf extract and rice water extract at varying concentrations, and to assess their physicochemical properties and antifungal efficacy against *Candida albicans*, a common opportunistic fungus implicated in scalp disorders.

2. AIM OF THE STUDY

This study aimed to investigate the potential of tamarind leaf extract and rice water extract as key ingredients in a herbal anti-dandruff shampoo formulation, and to explore the unique properties and benefits of these natural agents for hair care applications.

3. OBJECTIVES OF THE STUDY

- To develop and formulate five herbal anti-dandruff shampoo preparations (F1–F5) with varying concentrations of tamarind leaf extract (1%–5%) combined with rice water extract.
- To evaluate the physicochemical parameters of all prepared shampoo formulations, including pH, viscosity, surface tension, wetting time, foam stability, dirt dispersion, and accelerated stability.
- To characterise the chemical functional groups present in tamarind leaf extract and rice water extract by Fourier Transform Infrared (FTIR) spectroscopy.
- To evaluate the antifungal activity of the optimised formulation against *Candida albicans* using the agar well diffusion method.

4. MATERIALS AND METHODS

4.1 Plant Materials and Extracts

Tamarind leaf extract (*Tamarindus indica* L.) and rice water extract were procured from Nava Shakthi Herbal Labs, Bengaluru, India. All other chemicals and reagents were of analytical grade.

4.2 Drug and Ingredient Profiles

4.2.1 Tamarind Leaf (*Tamarindus indica* L.)

Tamarindus indica L. is a medium-to-large deciduous tree belonging to the family Fabaceae, subfamily Faboideae. The leaves are characterised by small, oblong leaflets with rounded edges arranged pinnately along a central stem. The upper surface is bright green while the underside is dusty red-brown in colour. Leaves are tender when young and become increasingly fibrous upon maturation, exhibiting a subtle tart, tangy flavour. The fig.01 depicts the tamarind leaves.

Chemical constituents of tamarind leaves include alkaloids, glycosides, flavonoids (luteolin, apigenin, isorientin, orientin, vitexin, isovitexin), phenolic acids (caffeic acid), terpenes (limonene, caryophyllene, p-cymene), sterols (β -sitosterol), and vitamin C. The flavonoids and tannins represent the principal bioactive classes responsible for the plant's documented antimicrobial, antifungal, anti-inflammatory, and antioxidant activities.



Fig.01 TAMARIND LEAVES

4.2.2 Rice Water Extract

Rice water is the aqueous extract obtained by soaking or rinsing rice grains. It is a versatile cosmetic ingredient with a rich nutrient profile including B vitamins (B1, B2, B3, B5, B6), vitamin E, minerals (magnesium, zinc, iron, potassium), essential amino acids, antioxidants (ferulic acid, gamma oryzanol), inositol, and starches. These constituents collectively contribute to scalp nourishment, hair strengthening, reduced dandruff, and improved hair texture. Fig.02 shows the rice water extract.



Fig.02 RICE WATER EXTRACT

4.2.3 Excipients

- Sodium Lauryl Sulfate (SLS): Anionic surfactant providing cleansing action, lather formation, and uniform distribution of the shampoo.
- Glycerine: Humectant and moisturiser that attracts atmospheric moisture to the scalp and hair, improving texture and soothing irritation.
- Lavender Oil: Provides antimicrobial and anti-inflammatory activity, promotes hair growth via improved scalp circulation, and imparts a pleasant fragrance.
- Methyl Paraben: Broad-spectrum antimicrobial preservative used at concentrations $\leq 0.8\%$ to prevent microbial contamination and extend shelf life.
- Distilled Water: Vehicle and primary solvent.

4.3 Formulation Design

Five formulations (F1–F5) were prepared with incrementally increasing concentrations of tamarind leaf extract (1%–5% v/v), maintaining constant amounts of all other ingredients as shown in table.1.

**Table 1: Composition of Anti-Dandruff Shampoo Formulations (F1–F5)**

INGREDIENTS	F1[1%]	F2[2%]	F3[3%]	F4[4%]	F5[5%]
SODIUM LAURYL SULFATE	0.3gm	0.3gm	0.3gm	0.3gm	0.3gm
WATER	14ml	13ml	12ml	11ml	10ml
TAMARIND LEAF EXTRACT	1ml	2ml	3ml	4ml	5ml
RICE WATER EXTRACT	1ml	1ml	1ml	1ml	1ml
GLYCERINE	1ml	1ml	1ml	1ml	1ml
LAVENDER OIL	2-3 drops				
PRESERVATIVE, METHYL PARABEN	QS	QS	QS	QS	QS

4.4 Preparation Procedure

All five formulations were prepared by the following standardised procedure: Sodium lauryl sulfate (0.3 g) was gradually dissolved in measured distilled water under continuous stirring at room temperature. Once completely dissolved, the requisite volume of tamarind leaf extract was added and mixed thoroughly, followed by the addition of rice water extract (1 ml) and glycerine (1 ml), with mixing between each addition. Lavender oil (2–3 drops) was incorporated for fragrance. Methyl paraben (q.s.) was dissolved and added as a preservative. Final pH was measured using a calibrated digital pH meter (target range: 5.5–6.5). Each formulation was stirred until homogeneous, then packed in amber glass containers and labelled.

4.5 Evaluation Parameters

4.5.1 Physical Appearance — All formulations were assessed organoleptically for colour, odour, texture, clarity, foam-producing ability, and fluidity.

4.5.2 pH Determination — A 10% v/v shampoo solution was prepared in distilled water. The pH was measured using a calibrated digital pH meter at room temperature ($30 \pm 2^\circ\text{C}$). Acceptable range: 4.0–6.5.

4.5.3 Wetting Time — A cotton ball weighing approximately 0.44 g was placed in a container containing the shampoo formulation. The time required for the cotton ball to sink to the bottom was recorded as wetting time. Acceptable range: 10–25 seconds.

4.5.4 Surface Tension — Measured using a stalagmometer on a 10% v/v aqueous shampoo solution using the formula: $\gamma = (\text{Number of drops} \times \text{Calibration factor}) / (\text{Volume} \times \text{Density})$. Acceptable range: 30–40 mN/m.

4.5.5 Viscosity — Determined using a Brookfield Viscometer DV-II+ Pro at room temperature ($30 \pm 2^\circ\text{C}$). Results reported in centipoise (cP). Acceptable range: 2500–3200 cP.

4.5.6 Foam Formation and Stability — Using the cylinder shake method, 50 ml of 1% shampoo solution was shaken for 10 minutes. Initial foam height (IFH) recorded at 1 minute; foam stability (FS) at 5 minutes. Acceptable IFH range: 45–55 mm; FS range: 30–40 mm.

4.5.7 Dirt Dispersion — Two drops of shampoo were added to 10 ml of distilled water in a Falcon tube with one drop of India ink, shaken 10 times. Ink distribution is assessed as None, Light, Moderate, or Heavy.

4.5.8 Stability Study — All formulations were stored at 25–30°C for four weeks and assessed periodically for changes in colour, odour, texture, and pH.

4.6 FTIR Compatibility Study

FTIR spectroscopy was performed on tamarind leaf extract, rice water extract, and their combination across the range 400–4000 cm^{-1} to confirm functional group presence and assess physicochemical compatibility.

4.7 Antifungal Activity — Agar Well Diffusion Method

Antifungal activity was evaluated against *Candida albicans* using PDA agar (HiMedia, Cat. No. MCD096). Spore suspensions were adjusted to $1-2 \times 10^6$ spores/ml. Wells (5 mm) were loaded with test sample F3 (25 μ l) and standard ketoconazole (100 μ g/ml, 50 μ l). Plates were incubated at 24–30°C for 24–72 hours and zones of inhibition recorded.

5. FTIR ANALYSIS RESULTS

FTIR REPORT FOR TAMARIND LEAF EXTRACT:

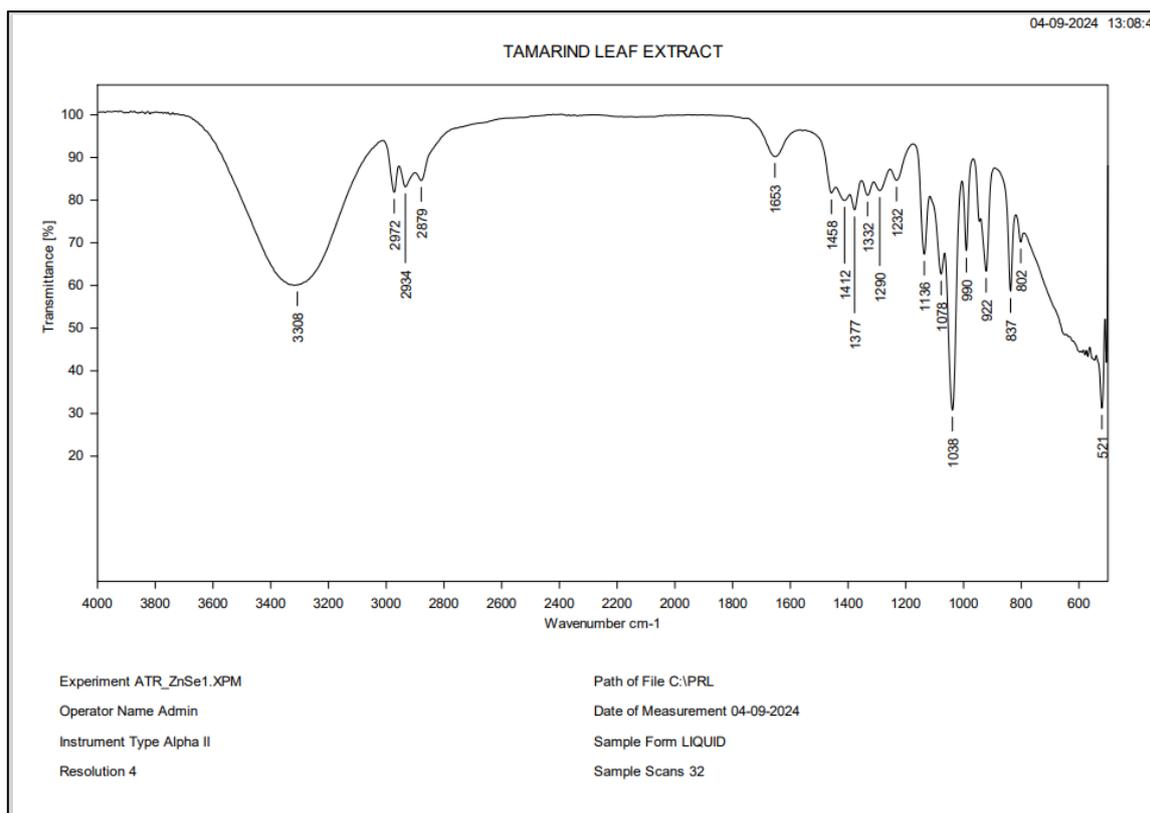


Table 2: FTIR Functional Group Analysis — Tamarind Leaf Extract

SL.NO	FREQUENCY RANGE (CM ⁻¹)	FUNCTIONAL GROUP
1	3400-3200	Primary amines
2	3000-2800	Alkanes
3	1800-1600	Aromatic compound
4	1600-1400	Ammonium molecules
5	1400-1200	Alcohols, ester
6	1200-1000	Alkene
7	1000-800	CH-Aromatic amine
8	800-100	Alkyl halide

FTIR REPORT FOR RICE WATER EXTRACT:

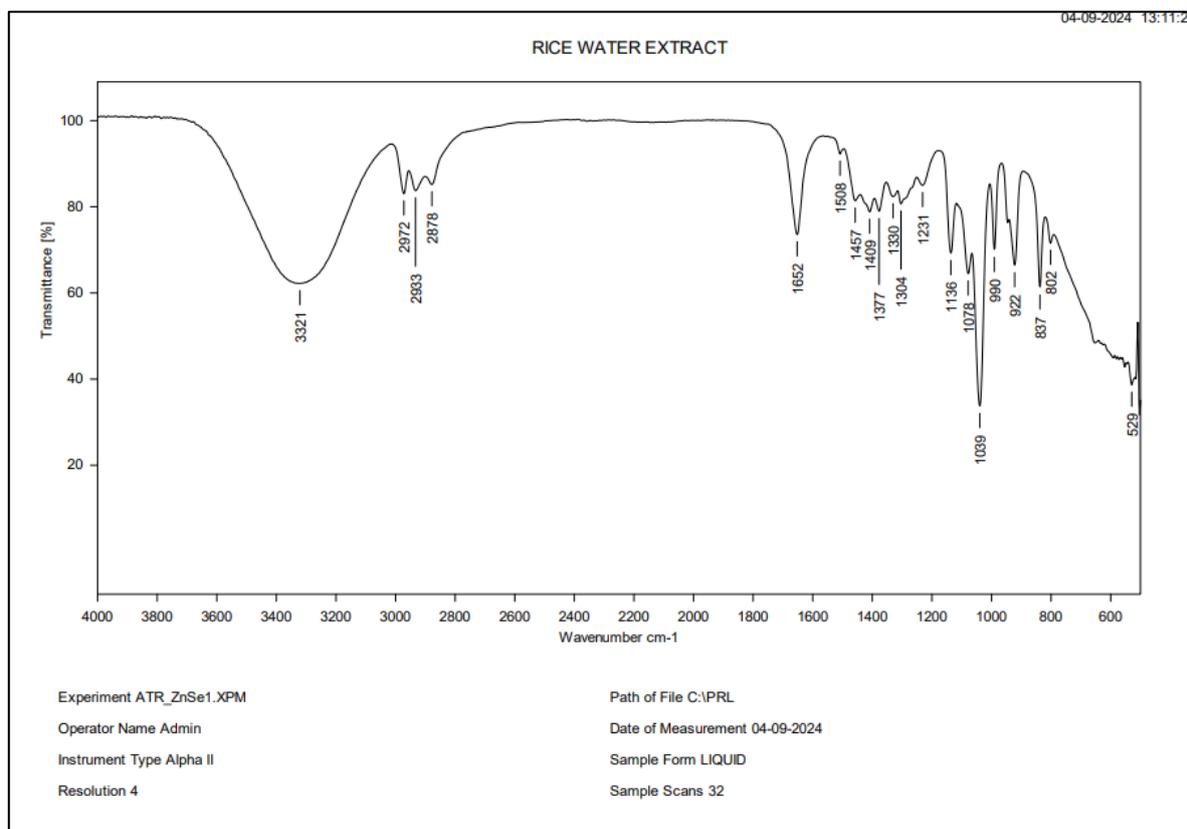


Fig.,(4.2)

Table 3: FTIR Functional Group Analysis — Rice Water Extract

SL.NO	FREQUENCY RANGE (CM ⁻¹)	FUNCTIONAL GROUP
1	3500-3200	Alcohols
2	3200-2900	Alkanes
3	2900-2600	Aromatic compounds
4	1800-1600	Ammonium molecules
5	1600-1400	Alcohols, ester
6	1400-1000	Alkene
7	1000-800	CH-Aromatic amine
8	800-100	Alkyl halide

Comparative FTIR analysis demonstrated broad compatibility between the two extracts, with overlapping absorption bands in the hydroxyl (O–H) and C–H stretching regions as shown in the fig.03. The absence of new or shifted peaks in the combined spectrum indicates no significant chemical interaction, confirming their suitability for co-formulation.

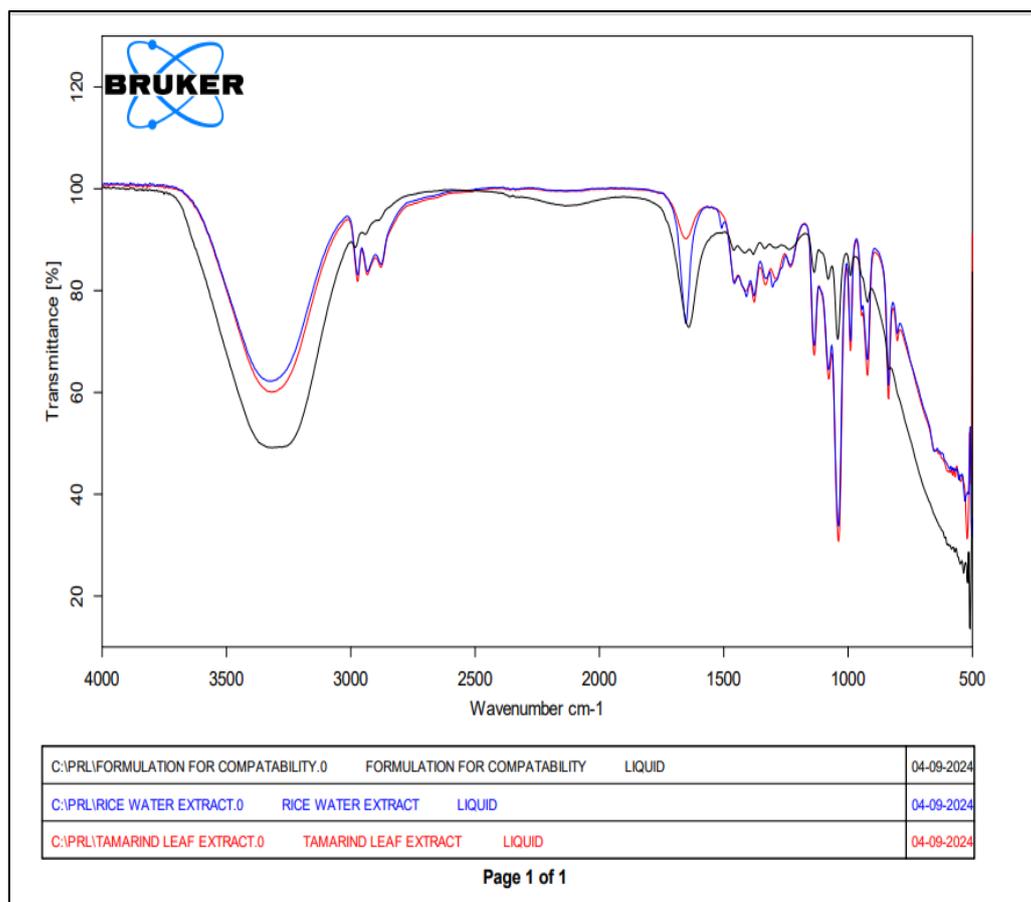


Fig.03 COMPARATIVE FTIR REPORT

6. RESULTS AND DISCUSSION

6.1 Physical Appearance

All five formulations (F1–F5) presented as buff-coloured, viscous liquids with a pleasant odour attributable to lavender oil. Colour was consistent across all concentrations as shown in Fig.04, reflecting stable incorporation of tamarind leaf extract. Formulation F3 was identified as having the most balanced texture and workability. The results are given in the table.4.

FORMULATION	COLOUR	ODOUR	TEXTURE
F1	Buff colour	Pleasant	Viscous
F2	Buff colour	Pleasant	Viscous
F3	Buff colour	Pleasant	Viscous
F4	Buff colour	Pleasant	Viscous
F5	Buff colour	Pleasant	Viscous

Table 4: Physical Appearance of Shampoo Formulations



Fig.04 PHYSICAL APPEARANCE OF SHAMPOO

6.2 pH

pH values ranged from 4.14 to 5.94 across formulations, all within the acceptable range of 4.0–6.5. A progressive decrease in pH was observed with increasing tamarind leaf extract concentration, attributable to the acidic phenolic and organic acid constituents. Formulation F3 yielded a pH of 5.00, corresponding most closely to physiological scalp pH, and results are depicted in the table.5.

Table 5: pH Values of Shampoo Formulations

FORMULATION	PH OF THE CREAM
F1	5.94
F2	5.90
F3	5.00
F4	4.51
F5	4.14

6.3 Wetting Time

Wetting time for all formulations was approximately 15 seconds, within the acceptable range of 10–25 seconds, indicating adequate surfactant activity for efficient scalp and hair penetration.

6.4 Surface Tension

Surface tension was 35 mN/m, within the normal range of 30–40 mN/m, reflecting effective surfactant action by SLS sufficient to facilitate thorough scalp cleansing, as shown in fig.05.



Fig.05 SURFACE TENSION MEASUREMENT



6.5 Viscosity

Viscosity was 3000 cP, within the acceptable range of 2500–3200 cP, ensuring optimal spreadability and ease of application as shown in fig.06.



Fig.06 VISCOSITY MEASUREMENT

6.6 Foam Stability

Initial foam height (IFH) was 50 mm after 1 minute (target: 45–55 mm). Foam stability (FS) was 40 mm after 5 minutes (target: 30–40 mm), indicating good foam persistence and effective surfactant activity as shown in fig.07.



Fig.07 FOAM STABILITY

6.7 Dirt Dispersion

The India ink dispersion test yielded a 'Light–Fair' rating, confirming satisfactory wetting and emulsification properties for scalp cleansing as shown in fig.08.

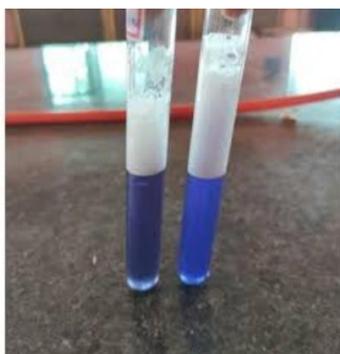


Fig.08 DIRT DISPERSION TEST

6.8 Stability Study

All formulations remained stable over four weeks at 25–30°C with no changes in colour, odour, or texture, confirming the effectiveness of methyl paraben as a preservative.

Table 6: Summary of Physicochemical Evaluation Parameters

Sl. No	Particulars	Source	Catalogue No
1	PDA Agar Base	Himedia	MCD096
2	Petri plates	Genaxy	GEN-PTD-90
3	96-well plate	Thermo Scientific	167425
4	L-spreader	Himedia	PW1085-1x20N0
5	1000µl tips	Genaxy	GENUT 1000C
6	200µl tips	Genaxy	GENUT 200C
7	Micro centrifuge tubes	X pet	MCT-1.7-B

7. ANTIFUNGAL ACTIVITY

Formulation F3 was selected for antifungal evaluation based on its optimal physicochemical profile. Agar well diffusion against *Candida albicans* demonstrated a zone of inhibition of 9 mm for the tamarind leaf extract sample as shown in fig.09, compared to 13 mm for the ketoconazole standard (100 µg/ml). The results are shown in table.7.

Table 7: Antifungal Activity Against *Candida albicans* — Agar Well Diffusion

Test Organisms	Test Compounds	Conc. per well	Zone of inhibition (mm)	Figure reference number
<i>Candida albicans</i>	Ketoconazole	100 µg/ml	13	Figure 1
	Tamarind leaf extract	-	9	

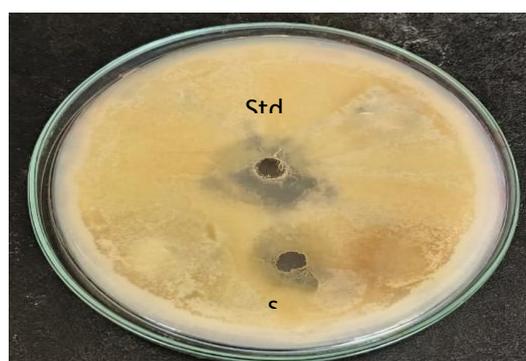


Fig.09 ANTI-FUNGAL ACTIVITY

The observed zone of inhibition (9 mm) confirms meaningful antifungal activity against *C. albicans*. This finding is consistent with prior reports implicating flavonoids and tannins — major constituents of tamarind leaf extract — as agents disrupting fungal cell wall integrity and metabolic function. Bioavailability of these compounds may be further optimised through modified extraction procedures or nanoformulation approaches in future studies.

8. SUMMARY AND CONCLUSION

Five herbal anti-dandruff shampoo formulations were successfully prepared using tamarind leaf extract (1%–5% v/v) in combination with rice water extract, glycerine, SLS, lavender oil, and methyl paraben. All formulations exhibited acceptable physicochemical properties. Formulation F3 (3% tamarind leaf extract) emerged as the most promising, demonstrating a skin-compatible pH of 5.00, optimal viscosity (3000 cP), satisfactory surface tension (35 mN/m), and excellent foam stability (IFH: 50 mm; FS: 40 mm).



FTIR analysis confirmed the presence of multiple bioactive functional groups, including phenols, flavonoids, alcohols, and aromatics, in both extracts, with no incompatibility detected upon combination. Antifungal evaluation demonstrated a zone of inhibition of 9 mm against *C. albicans*, establishing proof-of-concept for the formulation's therapeutic potential. All formulations were stable over four weeks with no changes in colour, odour, or texture.

The findings suggest that tamarind leaf extract and rice water extract represent viable, natural alternatives to synthetic anti-dandruff actives. Formulation F3 is recommended for further preclinical and clinical investigation to validate its antifungal efficacy, scalp tolerability, and long-term stability under diverse storage conditions. Future research may explore enhanced extraction techniques, optimised preservative systems, and in vivo clinical trials to translate these findings into marketable herbal anti-dandruff products.

REFERENCES

1. Singh M, Yadav P, Maurya MK, Jaiswal S, Yadav N. A review of cosmetic products 'shampoo'. *IJCRT*. 2021;9(1). ISSN: 2320-2882.
2. D'Souza P, Rathi SK. Shampoo and conditioners: What a dermatologist should know? *Indian J Dermatol*. 2015;60(3):248–254. doi:10.4103/0019-5154.156355.
3. Huang SH. A review: Hair health, concerns of shampoo ingredients, and scalp nourishing treatments. *Int J Cosmet Sci*. 2015;16(12):1045–1052.
4. Sravanthi K, Kavitha N, Sowmya K, et al. A review on formulation and evaluation of herbal anti-dandruff shampoo. *IJPRA J*. 2021;6(3):1300–1311.
5. Gubitosa J, et al. Hair care cosmetics: From traditional shampoo to solid clay and herbal shampoo. *ResearchGate*, 2019.
6. More AG, Pote PD, Kore PS, Garhwani YD. Formulation and evaluation of polyherbal anti-dandruff shampoo. ISSN: 0976-5921.
7. Ranganathan S, Mukhopadhyay T. Dandruff: The most commercially exploited skin disease. *Indian J Dermatol*. 2010;55(2):130–134. doi:10.4103/0019-5154.62734.
8. Dandruff, seborrheic dermatitis, and psoriasis drug products for over-the-counter human use. Code of Federal Regulations, Title 21, Part 358.
9. Robbins CR. *Chemical and Physical Behaviour of Human Hair*. 4th ed. New York: Springer; 2002. doi:10.1007/978-1-4757-3898-8.
10. Khairnar NS, Hingane LD, Khade PB. Formulation and evaluation of herbal shampoo. *IJPRA J*. 2023;8(3):1869–1882. doi:10.35629/7781-080318691882.
11. Rao SA, Patel RK, Sharma V. Herbal shampoos: A natural approach to hair care cosmetics. *J Cosmet Sci*. 2024;75(3):245–258.
12. Escalona-Arranz JC, et al. Antimicrobial activity of extracts from *Tamarindus indica* L. leaves. *Pharmacognosy Magazine*. 2010;6(23):242–247. doi:10.4103/0973-1296.66944.
13. Singh R, Singh K. Traditional, pharmacological, and therapeutic properties of *Tamarindus indica*. *Int J Appl Sci*. 2024;11(1). ISSN: 2349-2805.
14. Lee SJ, Kim HY. Comprehensive analysis of rice water composition and its potential benefits in hair care products. *J Nat Cosmet*. 2023;15(3):287–301.
15. Klein K, Palefsky I. Shampoo formulation. In: *Cosmetic Science and Technology*. Vol. 1. Elsevier; 2007:277–304. doi:10.1016/B978-044451664-0/50008-5.
16. Bhati D, Quazi A, Joshi A, Sable K, Havelikar U. Formulation and evaluation of anti-dandruff shampoo. *IJESC*. 2020;10(3). ISSN: 2321-3361.
17. Singh M, et al. A review on cosmetic products 'shampoo'. *IJCRT*. 2021;9(1). ISSN: 2320-2882.
18. Sravanthi K, et al. A review on formulation and evaluation of herbal anti-dandruff shampoo. *IJPRA J*. 2021;6(3):1300–1311.
19. Sugiaman V. Effectiveness of tamarind leaf (*Tamarindus indica* L.). *Dentino*. 2019. doi:10.20527/dentino.v8i1.16089.
20. Swetha G, Hemalatha S. Physico-chemical composition of tender and mature tamarind leaves. *Int J Curr Microbiol App Sci*. 2023;12(3):46–51. doi:10.20546/ijemas.2023.1203.006.
21. Meduri TS. Formulation and evaluation of fermented rice water herbal shampoo. *J Drug Del Ther*. 2021;11(4-S). doi:10.22270/jddt.v11i4-S.4970.
22. Becker LC, Bergfeld WF. Safety assessment of glycerin as used in cosmetics. *Int J Toxicol*. 2019;38(3 Suppl). doi:10.1177/1091581819883820.
23. Pandhare S. Key ingredients for effective shampoo formulation. *LearnCanyon*; 2024.
24. The effects of lavender essential oil and its clinical implications in dentistry: A review. *Int J Clin Pediatr Dent*. 2022;15(3):385–388. doi:10.5005/jp-journals-10005-2378.
25. Sravanthi K, et al. Evaluation methods for herbal anti-dandruff shampoos. *IJPRA J*. 2021;6(3):1300–1311.
26. Vijayalakshmi A, Sangeetha S, Ranjith N. Formulation and evaluation of herbal shampoo. *Asian J Pharm Clin Res*. 2018;11(Special Issue 4). doi:10.22159/ajpcr.2018.v11s4.31713.



27. Khairnar NS. Formulation and evaluation of herbal shampoo. IJPRA J. 2023;8(3):1869–1882. doi:10.35629/7781-080318691882.

How to cite this article:

R Uma Prabha et al. Ijppr.Human, 2026; Vol. 32 (3): 198-210.

Conflict of Interest Statement: All authors have nothing else to disclose.

This is an open access article under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

Author's details:

	<p>R UMAPRABHAA – Corresponding Author Author Affiliation- ASSISTANT PROFESSOR Author Address/Institute Address – The oxford college of pharmacy. 1st Main Rd, Hongasandra, Bengaluru, Karnataka 560068</p>
	<p>Author Name : Tejashwini N (co-author) Author Affiliation : Student Author Address/Institute Address- The oxford college of pharmacy. 1st Main Rd, Hongasandra, Bengaluru, Karnataka 560068</p>
	<p>Author Name : Varshitha A(co-author) Author Affiliation : Student Author Address/Institute Address- The oxford college of pharmacy. 1st Main Rd, Hongasandra, Bengaluru, Karnataka 560068</p>
	<p>Author Name : Manohar K(co-author) Author Affiliation : Student Author Address/Institute Address -The oxford college of pharmacy. 1st Main Rd, Hongasandra, Bengaluru, Karnataka 560068</p>



	<p>Author Name :Tharun K(co-author) Author Affiliation : Student Author Address/Institute Address- The oxford college of pharmacy. 1st Main Rd, Hongasandra, Bengaluru, Karnataka 560068</p>
	<p>Author Name : Mithun N(co-author) Author Affiliation : Student Author Address/Institute Address- The oxford college of pharmacy. 1st Main Rd, Hongasandra, Bengaluru, Karnataka 560068</p>