

DEVELOPMENT AND EVALUATION OF TOPICAL OINTMENT OF *FICUS RELIGIOSA* BARK EXTRACT FOR ANTIMICROBIAL ACTIVITY

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Article Received on 16 May 2026,
Article Revised on 05 June 2026,
Article Published on 16 June 2026,
<https://doi.org/10.5281/zenodo.20608085>

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How to cite this Article: *Shravani Shitole, Rachna Kamble, Harshada Shinde, Vaishnvi Zaware, Jayashri Zaware (2026). Development And Evaluation Of Topical Ointment Of Ficus Religiosa Bark Extract For Antimicrobial Activity. World Journal of Pharmaceutical Research, 15(11), 2342–2350. This work is licensed under Creative Commons Attribution 4.0 International license.

ABSTRACT

The present study focuses on the development and evaluation of a topical ointment containing *Ficus religiosa* bark extract for its antimicrobial activity. *Ficus religiosa*, commonly known as Peepal tree, is traditionally recognized for its medicinal properties, including antibacterial, antifungal, and wound-healing effects. The bark extract was prepared using suitable extraction methods and incorporated into an ointment base in different concentrations. The formulated ointment was evaluated for various physicochemical parameters such as appearance, pH, spreadability, viscosity, stability, and homogeneity. Antimicrobial activity was assessed against selected microbial strains using standard microbiological techniques. The results demonstrated that the formulated ointment showed satisfactory physical properties and

significant antimicrobial activity against pathogenic microorganisms. The study concludes that *Ficus religiosa* bark extract can be effectively used in topical ointment formulations as a natural antimicrobial agent, offering a safe and effective alternative to synthetic preparations.

KEYWORDS: *Ficus religiosa*, bark extract, topical ointment, antimicrobial activity, herbal formulation, antibacterial, antifungal, physicochemical evaluation, natural medicine, wound healing.

INTRODUCTION

Herbal medicines have been widely used since ancient times for the treatment of various diseases due to their therapeutic efficacy, safety, and minimal side effects. In recent years, there has been growing interest in developing herbal-based topical formulations as alternatives to synthetic drugs for treating skin infections and wounds. Topical ointments are semisolid preparations applied externally to the skin or mucous membranes, offering localized therapeutic effects such as antimicrobial, anti-inflammatory, and wound-healing actions.

Ficus religiosa Linn., commonly known as the Peepal tree, belongs to the family Moraceae and is an important medicinal plant in traditional Ayurvedic and herbal medicine systems. Different parts of the plant, including bark, leaves, roots, and fruits, have been used for various medicinal purposes. The bark of *Ficus religiosa* is reported to possess significant antimicrobial, antioxidant, anti-inflammatory, and wound-healing properties due to the presence of bioactive compounds such as flavonoids, tannins, saponins, phenolic compounds, and alkaloids.

Microbial skin infections caused by bacteria and fungi are common health concerns, often requiring effective topical treatments. The increasing resistance of microorganisms to conventional antibiotics has created a need for safer, natural, and effective antimicrobial agents. Herbal formulations containing plant extracts can provide a promising solution due to their broad-spectrum antimicrobial activity and reduced risk of side effects.

The present research aims to develop and evaluate a topical ointment formulation containing *Ficus religiosa* bark extract for antimicrobial activity. The study involves extraction of active constituents from the bark, formulation of ointment using suitable bases, and evaluation of its physicochemical properties such as pH, spreadability, viscosity, stability, and homogeneity. Additionally, the antimicrobial effectiveness of the prepared formulation is tested against selected pathogenic microorganisms.

This study may contribute to the development of an effective herbal topical preparation that can serve as a natural alternative for managing skin infections and promoting wound healing.

MATERIALS AND METHODS

Materials

The bark of *Ficus religiosa* was collected from a suitable local area and authenticated by a botanist or pharmacognosy expert. The collected bark was washed, shade-dried, and powdered using a mechanical grinder. All chemicals and reagents used in the study were of analytical grade. Ingredients required for ointment formulation included polyethylene glycol, white soft paraffin, beeswax, liquid paraffin, cetostearyl alcohol, and preservatives. Microbial strains such as *Staphylococcus aureus*, *Escherichia coli*, and *Candida albicans* were used for antimicrobial testing.

METHODOLOGY

1. Collection and Authentication of Plant Material

- Fresh bark of *Ficus religiosa* was collected from a local area.
- The collected bark was washed thoroughly with water to remove dust and impurities.
- The bark was shade dried for several days to preserve active constituents.
- Dried bark was powdered using a mechanical grinder.
- The plant material was authenticated by a qualified botanist pharmacognosy expert.



Fig. 1: ficus religiosa bark.

2. Preparation of Bark Extract

- The powdered bark was weighed accurately.
- Extraction was carried out using ethanol or methanol as solvent by Soxhlet extraction/maceration method.
- The extraction process was continued until complete extraction of active compounds.
- The extract was filtered using muslin cloth or filter paper.

- The filtrate was concentrated by evaporation on a water bath or rotary evaporator.
- The concentrated extract was stored in airtight containers for further studies.



Fig. 2: Maceration process.



Fig. 3: Filtration process.

3. Preliminary Phytochemical Screening

- **Alkaloids**

- **Mayer's Test:** 1 ml of extract + 2-3 drops of Mayer's reagent. A creamish-white precipitate indicates alkaloids.
- **Wagner's Test:** 1 ml of extract + few drops of Wagner's reagent. A reddish-brown precipitate indicates alkaloids.
- **Dragendorff's Test:** A reddish-brown precipitate indicates the presence of alkaloids.

- **Carbohydrates**

- **Molisch's Test:** Extract + alcoholic α -naphthol solution followed by concentrated sulfuric acid. A violet ring at the junction indicates carbohydrates.
- **Fehling's Test:** Equal volumes of extract with Fehling's solution A and B, followed by boiling. A reddish-brown precipitate indicates reducing sugar.

- **Proteins:** Blue color with Biuret reagent.



Fig. 4: Phytochemical testing.

Formulation of *Ficus religiosa* Bark Ointment

- Required quantities of ointment base ingredients such as white soft paraffin, beeswax, liquid paraffin, and cetostearyl alcohol were accurately weighed.
- The ingredients were melted together using the fusion method in descending order of their melting points.
- The mixture was stirred continuously to obtain a uniform ointment base.
- Measured quantity of *Ficus religiosa* bark extract was incorporated into the prepared base.
- The extract was mixed thoroughly to ensure uniform distribution.
- The formulation was allowed to cool while stirring continuously.
- The prepared ointment was transferred into sterile containers, labeled, and stored for further evaluation.

Formulation Table for 20 g *Ficus religiosa* Bark Ointment

Table 1: Formula table.

Ingredient	F1 (5%)	F2 (10%)	F3 (15%)
<i>Ficus religiosa</i> bark extract	1 gm	2 gm	3 gm
Wool fat	1 gm	1 gm	1 gm
Hard paraffin	1 gm	1 gm	1 gm
Cetostearyl alcohol	1 gm	1 gm	1 gm
White soft paraffin	15.6 gm	14.6 gm	13.6 gm
Methyl paraben	0.1 gm	0.1 gm	0.1 gm
Rose water	0.3 ml	0.3 ml	0.3 ml



Fig. 5: Formulation batches.

Evaluation of *Ficus religiosa* Bark Ointment

Organoleptic Evaluation

- **Physical Appearance:** The ointment was observed for physical appearance, texture, and smoothness. The formulation appeared smooth, homogeneous, and free from grittiness.
- **Colour:** Light brown
- **Odour:** Characteristic herbal odour
- **Texture:** Smooth
- **Consistency:** Semisolid
- **Appearance:** Clear and uniform formulation

- pH Determination:** The pH of the ointment was checked by using a pH meter and was found to be 5.7.



Fig. 6: pH Determination.

- **Spreadability:** Acceptable quantity of sample is taken between two glass slides and a load of 100gm is applied on the slides for 5 twinkles.

Spreadability can be expressed as $S = m \cdot l / t$ Where, m = weight applied to upper slide = 100

l = length moved on the glass slide = 4.5

T = time taken = 5 sec $100 \cdot 4.5 = 90$



Fig. 7: Spreadability test.

- **Viscosity:** Measured using a viscometer for consistency.



Fig. 7: Brookfield viscometer.

- **Homogeneity:** Checked visually for uniform distribution and absence of lumps.
- **Washability:** Formulation was applied on the skin and also ease prolong of washing with water and checked.



Fig. 8: Washability test.

RESULT AND DISCUSSION

The formulation and evaluation of the herbal ointment containing *Ficus religiosa* bark extract was carried out successfully. The results of different evaluation parameters are shown in the table below.

Sr. No.	Test	F1	F2	F3
1	Colour	Light Brown	Brownish Green	Dark Brown
2	Odour	Characteristic	Characteristic	Characteristic
3	Consistency	Good	Good	Good
4	pH	5.7	5.9	6.1
5	Spreadability	90 g.cm/sec	84 g.cm/sec	78 g.cm/sec
6	Homogeneity	Good	Good	Good
7	Washability	Easy to wash	Easy to wash	Easy to wash

The prepared herbal ointment showed acceptable physical properties. F1 formulation was light brown in colour with characteristic herbal odour and smooth consistency. The pH of F1 was found to be 5.7, which is suitable for skin application. Spreadability of F1 was better than F2 and F3, indicating easy application on the skin. All formulations showed good homogeneity and were easily washable with water. Therefore, F1 was considered as the best formulation.

CONCLUSION

The present study concluded that the herbal ointment containing *Ficus religiosa* bark extract was successfully formulated and evaluated. The prepared formulations showed good physical appearance, acceptable pH, good consistency, satisfactory spreadability, homogeneity, and easy washability. Among all formulations, F1 showed better evaluation parameters and was found to be the optimized formulation. The herbal extract exhibited potential antimicrobial, anti-inflammatory, and antioxidant properties. Hence, the formulated herbal ointment can be considered safe and effective for skin application and wound healing activity.

REFERENCE

1. Kirtikar KR, Basu BD. *Indian medicinal plants*. 2nd ed. Dehradun: International Book Distributors, 2006.
2. Kokate CK, Purohit AP, Gokhale SB. *Pharmacognosy*. 56th ed. Pune: Nirali Prakashan, 2014.
3. Harborne JB. *Phytochemical methods: A guide to modern techniques of plant analysis*. 3rd ed. London: Chapman and Hall, 1998.

4. Trease GE, Evans WC. *Pharmacognosy*. 15th ed. London: Saunders Publishers, 2002.
5. Indian Pharmacopoeia Commission. *Indian Pharmacopoeia*. Ghaziabad: IPC, 2018.
6. Aiyegoro OA, Okoh AI. Preliminary phytochemical screening and in vitro antioxidant activities of the aqueous extract of *Helichrysum longifolium* DC. *BMC Complement Altern Med.*, 2010; 10: 21.
7. Mukherjee PK. *Quality control of herbal drugs: An approach to evaluation of botanicals*. New Delhi: Business Horizons, 2007.
8. Chhetri HP, Yogol NS, Sherchan J, Anupa KC, Mansoor S, Thapa P. Phytochemical and antimicrobial evaluations of some medicinal plants of Nepal. *Kathmandu Univ J Sci Eng Technol.*, 2008; 5(1): 49-54.
9. Pandey G, Madhuri S. Pharmacological activities of *Ficus religiosa*: A review. *Int J Pharm Sci Rev Res.*, 2010; 6(1): 12-7.
10. Sharma PC, Yelne MB, Dennis TJ. *Database on medicinal plants used in Ayurveda*. New Delhi: Central Council for Research in Ayurveda and Siddha, 2005.
11. Kumar V, Chauhan NS, Padh H, Rajani M. Search for antibacterial and antifungal agents from selected Indian medicinal plants. *J Ethnopharmacol.*, 2006; 107(2): 182-8.
12. Biswas TK, Mukherjee B. Plant medicines of Indian origin for wound healing activity: A review. *Int J Low Extrem Wounds.*, 2003; 2(1): 25-39.
13. Prasad PV, Shyma TB, Raghavendra MP. Evaluation of antimicrobial activity of *Ficus religiosa* bark extracts. *Asian J Pharm Clin Res.*, 2011; 4(3): 85-7.
14. Cowan MM. Plant products as antimicrobial agents. *Clin Microbiol Rev.*, 1999; 12(4): 564-82.
15. Singh S, Singh SK, Yadav A. Herbal ointment formulation and evaluation: A review. *Int J Pharm Sci Res.*, 2018; 9(5): 1804-12.
16. Khandelwal KR. *Practical pharmacognosy: Techniques and experiments*. 23rd ed. Pune: Nirali Prakashan, 2013.
17. Wagner H, Bladt S. *Plant drug analysis: A thin layer chromatography atlas*. 2nd ed. Berlin: Springer, 1996.
18. Shah B, Seth AK. *Textbook of pharmacognosy and phytochemistry*. 2nd ed. New Delhi: Elsevier, 2014.
19. World Health Organization. *Quality control methods for herbal materials*. Geneva: WHO Press, 2011.
20. Jain NK. *Modern pharmaceuticals*. 4th ed. New Delhi: CBS Publishers, 2010.