

Formulation and Evaluation of Polyherbal Antifungal Cream Using Plant Extracts of *Azadirachta indica*, *Lantana camara* and *Murrayakoenigii*

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Abstract: Fungal skin infections are among the most common microbial infections affecting human health. The present study aimed to formulate and evaluate a polyherbal antifungal cream containing extracts of *Azadirachta indica*, *Lantana camara* and *Murrayakoenigii*. The plant leaves were collected, authenticated, shade dried, powdered and extracted using ethanol. Phytochemical screening revealed the presence of alkaloids, flavonoids, tannins, terpenoids, saponins and glycosides. The extracts were incorporated into an oil-in-water cream base and evaluated for physicochemical parameters such as colour, odour, pH, spreadability, washability, viscosity and irritancy. The formulated cream exhibited satisfactory characteristics with pH 5–6, spreadability 5.2 cm, viscosity 8930 cP and no signs of skin irritation. Antifungal activity against *Candida albicans* showed concentration-dependent inhibition. Among the formulations, F2 demonstrated higher antifungal activity with a zone of inhibition of 25 mm at 10 mg/ml concentration. The study suggests that the formulated polyherbal cream may serve as a safe and effective herbal alternative for fungal skin infections.

Keywords: Polyherbal cream, Antifungal activity, *Azadirachta indica*, *Lantana camara*, *Murrayakoenigii*, *Candida albicans*

I. INTRODUCTION

Fungal infections of the skin are common health problems affecting people of all age groups. These infections are mainly caused by various pathogenic fungi and may result in itching, irritation, redness, inflammation, and discomfort. Although several synthetic antifungal drugs are available for treatment, their prolonged use may lead to adverse effects, drug resistance, and increased treatment costs. Therefore, the development of safe, effective, and affordable herbal alternatives has gained considerable attention in recent years.

Medicinal plants have been used in traditional healthcare systems for centuries due to their therapeutic potential. Plant-derived products contain a wide variety of bioactive phytochemicals such as alkaloids, flavonoids, tannins, terpenoids, glycosides, and phenolic compounds, which are known to exhibit antimicrobial, antioxidant, anti-inflammatory, and antifungal activities. These natural constituents can contribute to the prevention and management of microbial infections while minimizing the side effects commonly associated with synthetic medications.

Azadirachta indica (Neem) is a well-known medicinal plant widely recognized for its antimicrobial, antifungal, anti-inflammatory, and wound-healing properties. Neem leaves contain important bioactive compounds including nimbidin, azadirachtin, flavonoids, and tannins that may help inhibit the growth of pathogenic microorganisms. Similarly, *Lantana camara* is a medicinal shrub rich in triterpenoids, flavonoids, and essential oils, which have been reported to possess significant antimicrobial and antifungal activities. *Murrayakoenigii* (Curry leaves) is another valuable



medicinal plant containing carbazole alkaloids, vitamins, and antioxidant compounds that contribute to its antimicrobial and therapeutic effects.

The combination of multiple medicinal plant extracts in a single formulation may provide synergistic activity, resulting in improved therapeutic efficacy compared to individual plant extracts. Polyherbal formulations are increasingly preferred because they utilize the combined action of various phytoconstituents and may offer enhanced effectiveness with reduced toxicity.

In the present study, a polyherbal antifungal cream was formulated using extracts of *Azadirachta indica*, *Lantana camara*, and *Murrayakoenigii*. The prepared formulation was evaluated for its physicochemical characteristics and antifungal activity against *Candida albicans*. The study aims to explore the potential of these medicinal plants as a natural and effective alternative for the management of fungal skin infections.

Material And Method :

Plant Material Collection and Authentication



Fig.1. *Azadirachta indica*, *Lantana camara* leaves and *Murrayakoenigii*

Fresh leaves of *Azadirachta indica* (Neem), *Lantana camara* (Lantana), and *Murrayakoenigii* (Curry leaves) were collected from local areas of Maharashtra, India. The collected plant materials were authenticated by the Department of Pharmacognosy, Shri Ganpati Institute of Pharmaceutical Sciences and Research, Tembhurni. Healthy and disease-free leaves were selected for the study.

Preparation of Plant Material

The collected leaves were thoroughly washed with distilled water to remove dust and other foreign matter. The leaves were shade-dried at room temperature for seven days to preserve thermolabile phytoconstituents. After complete drying, the leaves were powdered using a mechanical grinder and stored in airtight containers until further use.

Extraction of Plant Material

The powdered plant materials were subjected to Soxhlet extraction using ethanol as the extraction solvent. The extraction process was continued until complete extraction of phytoconstituents was achieved. The obtained extracts were concentrated and stored in airtight containers for further studies.

Preliminary Phytochemical Screening

The ethanolic extracts of *Azadirachta indica*, *Lantana camara*, and *Murrayakoenigii* were screened qualitatively for the presence of various phytochemical constituents. Standard phytochemical tests were performed to detect alkaloids, flavonoids, tannins, saponins,



terpenoids, and glycosides. The observations were recorded based on characteristic colour changes or precipitate formation.

Formulation of Polyherbal Antifungal Cream

A polyherbal antifungal cream was prepared using the extracts of *Azadirachta indica*, *Lantana camara*, and *Murrayakoenigii*. An oil-in-water emulsion system was selected for the formulation. The oil phase containing stearic acid, cetyl alcohol, and liquid paraffin was heated separately. The aqueous phase containing purified water, glycerin, carbopol, preservatives, and triethanolamine was prepared simultaneously. Both phases were mixed at the same temperature with continuous stirring. The herbal extracts were incorporated into the formulation and mixed thoroughly until a smooth and homogeneous cream was obtained.

Evaluation of Formulated Cream

The prepared cream was evaluated for various physicochemical parameters including colour, odour, appearance, pH, spreadability, washability, viscosity, and skin irritancy. These tests were carried out to determine the quality, stability, safety, and suitability of the formulation for topical application.

Antifungal Activity

The antifungal activity of the formulated cream was evaluated against *Candida albicans* using the agar well diffusion method. Sterile nutrient agar medium was prepared and inoculated with fungal culture. Wells were made in the agar plates and different concentrations of the formulated cream were introduced into the wells. The plates were incubated under suitable conditions, and the zone of inhibition was measured in millimetres. The antifungal activity of the formulation was compared with the standard antifungal drug Fluconazole.

Result And Discussion

1) Plant collection and Authentication

Reference No -: SGIPSRT/2025-26/290



Fig. 2. *Azadirachta indica*, *Lantana camara* and *Murraya koenigii* leaves

2) Macroscopic Characterization

Sr.No.	Character	<i>Azadirachta indica</i>	<i>Lantana camara</i>	<i>Murraya koenigii</i>
1.	Colour	Dark green	Green	Dark green
2.	Odour	Bitter	Characteristic	Aromatic
3.	Shape	Lanceolate with serrated margin	Ovate with serrated margin	Ovate to lanceolate
4.	Appearance	Dense and spreading	Dense and spreading with strong odour	Bushy appearance

Table.1. Organoleptic evaluation of selected medicinal plants



3) Microscopic Characterization

Part A: Staining with Iodine Solution :

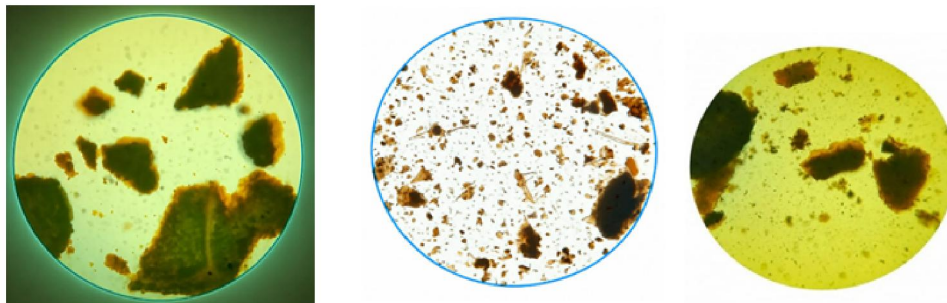


Fig.3. Microscopic Characterization of Powderd Leaves

Part B: Staining with Phloroglucinol

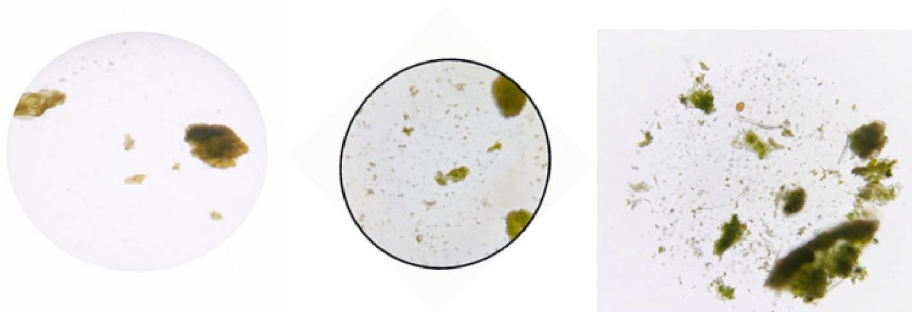


Fig.4 .Microscopic Characterization of Powderd Leaves

4) Physicochemical Study

a) Ash value :

Sr .No	Plant Name	Total Ash Value	Acid Insoluble Ash
1.	Azadirachta indica	6%	2.5%
2.	Lantana camara	6.2%	3.1%
3.	Murraya koenigii	5.8%	2.1%

Table.2. Ash value of selected medicinal plant

5) Preparation of Extract :



Fig.5.Preparation of Herbal Extract



6) Preliminary investigation of extract :

Sr.No.	Character	A.indica	L.camara	M.koenigii
1.	Nature	Liquid	Liquid	Liquid
2.	Colour	Green	Green	Green
3.	Odour	Aromatic	Aromatic	Aromatic

Table.3.Preliminary investigation of plant extract

7) Phytochemical Screening :

Observation Table :

Test	Observation	Result	Azadirachta indica	Lantana camara	Murrayakoenigii
Dragendroff test	Orange precipitate	Present	+	+	+
Flavonoid test	Bright yellow	Present	+	+	+
Tannins test	Blue /black green yellow	Present	+	+	+
Terpenoids test	Reddish brown	Present	+	+	+
Saponins test	Foam	Present	+	+	+
Glycoside	Brown ring	Present	+	-	-

Table.4 . Phytochemical screening of selected medicinal Plant



Fig.6.Phytochemical test of Azadirachta indica, Lantana camara,Murraya koenigii

8) Preparation and Evaluation of formulated cream :



Fig.7. preparation of antifungal herbal cream



Evaluation Parameters :

Sr.No.	Evaluation parameters	Observation
1.	Colour	Green
2.	Odour	Characteristic
3.	pH	5-6
4.	Appearance	Smooth
5.	Spreadability	5.2 cm
6.	Washability	Easily washable with water
7.	Viscosity	8930 cP
8.	Irritation test	No irritation

Table.5 .Evaluation parameter of polyherbal antifungal cream

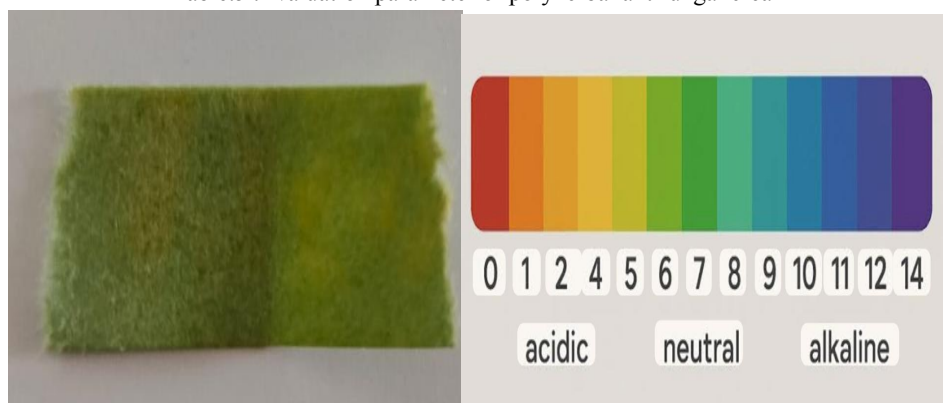


Fig.8. pH of cream



Fig.9. Irritation test





Fig.10. Viscosity of cream

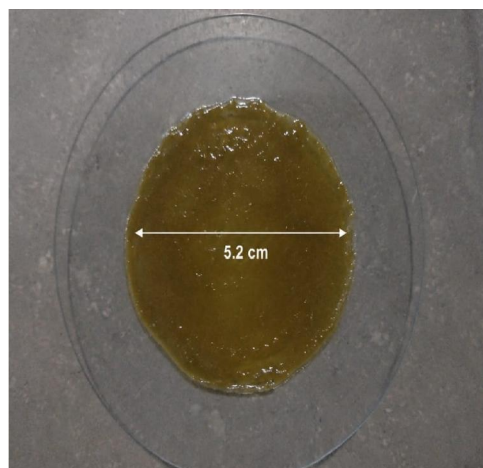


Fig.11. Spreadability

Antifungal Activity :

“The formulated cream exhibited mild antifungal activity against *Candida albicans*. Although the zone of inhibition was lower compared to the standard drug Fluconazole, the formulation showed a slight concentration-dependent response. Further optimization of extract concentration and formulation composition may improve the antifungal efficacy.”

Observation Table :

Sr.No.	Sample	Concentration	Zone of Inhibition(mm)
1.	Control (DMSO)	-	No Zone
2.	Standard (Fluconazole)	1mg/ml	29 mm
3.	Sample F1	5mg/ml	10 mm
		10mg/ml	20 mm
4.	Sample F2	5mg/ml	14 mm
		10mg/ml	25 mm

Table. 6. Zone of inhibition of formulated cream against *candida albicans*

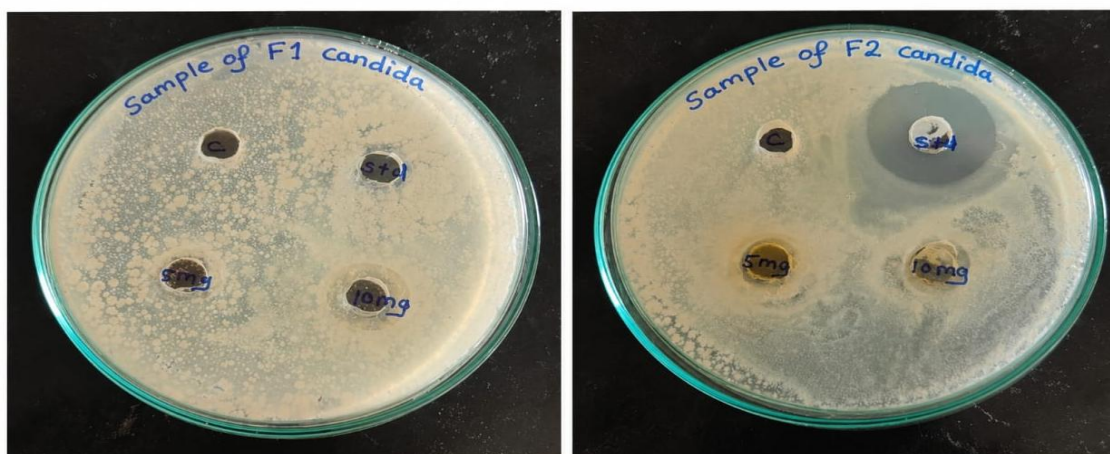


Fig.12 .Comparative antifungal activity of F1 and F2 against *candida albicans*



The formulated polyherbal cream showed effective antifungal activity against candida albicans. The zone of inhibition increased with increase in concentration, indicating concentration dependent activity. Among the formulations, sample F2 exhibited antifungal activity than sample F1. The standard drug Fluconazole showed the 29mm of zone of inhibition and F2 10mg/ml concentration shows the zone of inhibition of 25mm

II. CONCLUSION

Azadirachta indica, Lantana camara, and Murraya koenigii extracts were used to manufacture the polyherbal antifungal cream, which demonstrated showed promising antifungal activity against fungal infections including Candida albicans and satisfactory physicochemical qualities. The produced formulations showed adequate spreadability, a smooth texture, an appropriate viscosity for topical application, and an acceptable pH.

F1 and F2 demonstrated encouraging antifungal activity and stability among the generated formulations, demonstrating the efficacy of the chosen herbal extracts. These plant extracts may have antifungal properties due to the presence of bioactive phytoconstituents.

Therefore, compared to synthetic medicines, the created polyherbal antifungal cream can be regarded as a safe, efficient, and affordable herbal formulation for the treatment of fungal skin infections with fewer potential adverse effects.

Further studies including stability studies, microbial challenge tests and clinical evaluation are required to confirm the therapeutic potential of the developed formulation.

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