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To Formulation and Evaluation of Antribacterial Cream for the Dalergis Sissoo Plant Extract

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Abstract: *The present study focuses on the formulation and evaluation of an antibacterial cream incorporating plant extracts from Dalbergia sissoo (commonly known as Sisso). With the rising resistance to synthetic antibiotics and consumer preference for herbal products, the antibacterial potential of Sisso was explored for topical applications. Ethanolic extracts of Sisso leaves were prepared and incorporated into a cream base using standard pharmaceutical excipients. The formulated cream was evaluated for its physical characteristics, including pH, viscosity, spreadability, and stability, along with in vitro antibacterial activity against common skin pathogens such as Staphylococcus aureus and Escherichia coli. Results indicated that the cream demonstrated good consistency, stability, and significant antibacterial activity, suggesting its potential use as a natural alternative in treating skin infections. This study supports the development of plant-based topical formulations for managing microbial infections*

.Nature has been a good source of medicinal agents for thousands of years and an Impressive Number of modern drugs have been isolated from natural sources, many Based on their use in Traditional medicine. Various medicinal plants have been used For years in daily life to treat diseases All over the world. The present study reveals the Medicinal values of Dalbergia sissoo DC. (Fabaceae). In this communication, we Reviewed the Phytochemistry and its applications in the Treatment of various ailments. The genus consists of 300 species among which 25 species occur in India. The generic Name Dalbergia honors the Swedish brothers Nils and Carl Dalberg, who lived in The 18th Century. The plant is used in treatment of leprosy, jaundice, gonorrhea and syphilis etc.

Keywords: Dalbergia sissoo DC. Fabaceae, Phytochemistry, Jaundice, Leprosy

I. INTRODUCTION

Introduction to Dalbergia Sissoo Antibacterial Cream Dalbergia Sissoo, commonly known as Indian Rosewood, is a deciduous tree native to the Indian subcontinent. This plant has long been valued not only for its high-quality wood but also for its medicinal properties, including its potential to treat a variety of ailments. In particular, Dalbergia Sissoo has garnered attention for its antibacterial properties, making it a promising natural ingredient in the formulation of topical antimicrobial products, such as antibacterial creams. Importance of Antibacterial Creams Antibacterial creams are topical formulations designed to prevent or treat bacterial infections by inhibiting the growth of bacteria or killing them outright. These creams are widely used for treating minor cuts, scrapes, burns, and other skin infections. Many antibacterial creams on the market contain synthetic antimicrobial agents, but there is a growing interest in natural alternatives due to their perceived safety, lower side-effect profile, and eco-friendly nature. Dalbergia Sissoo has been shown to possess a range of bioactive compounds with antimicrobial,anti-inflammatory, and antioxidant properties, which makes it an attractive candidate for incorporation into skin care formulations. Its potential as an effective antibacterial agent lies in its flavonoids, tannins, alkaloids, and saponins, which are known to exhibit antibacterial effects against a variety of pathogenic microorganisms. Benefits of Dalbergia Sissoo in Antibacterial Creams Natural Antibacterial Action: Studies have highlighted Dalbergia Sissoo's ability to combat harmful bacteria like Staphylococcus aureus and Escherichia coli—two common culprits in skin infections. Anti-inflammatory Properties:

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Beyond its antibacterial effects, Dalbergia Sissoo also has anti- inflammatory properties, which can help reduce skin irritation, redness, and swelling caused by infections or wounds. Antioxidant Protection: The plant's antioxidants, particularly tannins and flavonoids, can help neutralize free radicals and promote skin healing, further enhancing the overall benefits of the cream. Non-Synthetic Alternative: With growing concerns over the side effects of synthetic antibiotics and chemicals used in commercial products, Dalbergia sissoo offers a more natural and sustainable alternative. Application and Effectiveness An antibacterial cream made with Dalbergia Sissoo can be applied directly to the skin to help treat a variety of conditions, including wounds, burns, cuts, and skin infections caused by bacteria. The active compounds work by disrupting bacterial cell walls, inhibiting protein synthesis, and generating reactive oxygen species (ROS) that lead to bacterial cell death. Additionally, Dalbergia Sissoo's biofilm-disrupting properties help in preventing bacterial colonies from forming on the skin, making it especially effective in treating chronic or stubborn infections that are protected by biofilms.

Fig No 1: Dalbergia sissoo

Plant Profile :

Here's a plant profile for the Sisoo plant (Dalbergia sissoo), commonly known as North Indian Rosewood:
Sisoo (Dalbergia sissoo) Plant Profile

Common Names

Sisoo Shisham
Indian Rosewood Sheesham
Sissoo

Botanical Name

Dalbergia sissoo

Family

Fabaceae (Leguminosae)

Native Range

Indian Subcontinent: Northern India, Nepal, Pakistan, and Bhutan Commonly found along riverbanks and in the sub-Himalayan tract

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Description

- Type: Deciduous tree
- Height: Up to 15–25 meters (49–82 ft)
- Crown: Light crown with spreading branches
- Bark: Grey-brown, rough, and scaly
- Leaves: Compound with 3–5 leaflets, leathery texture
- Flowers: Small, fragrant, white to yellowish, bloom in spring
- Fruit: Flat, brown pod containing 1–5 seeds

Growing Conditions

Factor Details

- Soil: Well-drained alluvial soils, tolerates a variety of soils including gravelly and slightly saline
- Sunlight:Full sun
- Watering:Moderate; drought-tolerant once established Temperature:Thrives in tropical to subtropical climates Altitude:Up to 1,300 meters (4,265 feet)
- Fodder: Leaves and pods are used as fodder for livestock
- Shade Tree: Commonly planted along roadsides and in agroforestry systems
- Soil Improvement: Nitrogen-fixing abilities help improve soil fertility
- Medicinal Uses: Bark and leaves used in traditional medicine for skin diseases, wounds, and ulcers

Pests & Diseases

Prone to dieback, especially in monoculture plantations Affected by fungal infections, termites, and borers
Requires regular monitoring and mixed planting to prevent epidemics

Ecological Importance

Provides shade and shelter

II. MATERIALS AND METHODS

Materials Required

A. Plant Material

Dalbergia sissoo leaves/bark (fresh or dried, preferably young mature leaves)
Collection site: Local forest/nursery (Sahyadri Rose Garden & Nursery,Shirdi)

B. Chemicals and Reagents

Solvents: Ethanol (70–95%), Distilled Water
Cream base ingredients:
- Cream base:
- Coconut oil (20% w/w)
- Beeswax (10% w/w)
- Glycerin (10% w/w)
- Lanolin (5% w/w)
- Sisoo plant extract (5% w/w)
- Tea tree oil (2% w/w)
- Phenoxyethanol (1% w/w)
- Citric acid (0.5% w/w)

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Antibacterial test reagents:
Nutrient agar
Bacterial strains (e.g., Staphylococcus aureus, E. coli) Sterile discs
Standard antibiotic (e.g., ampicillin) as positive control

C. Equipment
Soxhlet extractor or maceration setup Hot air oven
Incubator Autoclave Weighing balance pH meter Mixer/homogenizer
Petri dishes, test tubes, micropipettes

III. METHODOLOGY

A. Extraction of Sisoo Plant Drying & Powdering:
Shade-dry the plant parts (leaves or bark) for 7–10 days. Pulverize to a fine powder using a mechanical grinder.
Process:

1. **Extract Preparation:**
   - Extract bioactive compounds from Shisham plants
2. **Mix with Cream Base:**
   - Combine Shisham extracts with a cream base and preservatives.
3. **Homogenize:**
   - Ensure uniform distribution of extracts in the cream.
4. **pH Adjustment:**
   - Adjust pH to match skin pH (around 5.5).
5. **Quality Control:**
   - Test for antimicrobial activity, stability, and skin irritation.

Fig No 1: Plant extract

Fig No 2: Final Plant Product

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B. Formulation of Herbal Antibacterial Cream

Oil Phase Preparation:

Coconut oil,beeswax,Lanolin in a water bath.

Aqueous Phase:

Glycerin,tea tree oil,Phenoxyethanol, and distilled water separately to the same temperature.

Mixing:

Add the aqueous phase to the oil phase slowly with continuous stirring.

Add the Sisoo extract (5%, and 10% concentrations for comparative study) during mixing. Add preservative and fragrance last.

Cool and store in clean jars at room temperature.

C. Evaluation of the Cream

i. Physical Evaluation :

Appearance: Color, texture, homogeneity

pH measurement: Using pH meter (target: ~5.5–6.5)

Spreadability: Using glass slide and weight method

Stability Testing: At different temperatures (room temp, 4°C, 40°C) over 4 weeks

IV. RESULTS AND DISCUSSION

1. Phytochemical Screening

Preliminary phytochemical screening of the Dalbergia sissoo (Sisso) leaf extract revealed the presence of flavonoids, tannins, saponins, alkaloids, and phenolic compounds. These secondary metabolites are known for their antimicrobial, antioxidant, and anti- inflammatory properties, supporting the plant's use in traditional medicine.

2. Cream Formulation

Three different formulations (F1 and F3) of the herbal cream were developed using varying concentrations of Dalbergia sissoo extract (2%, 4%, and 6%, respectively). The creams were smooth, homogenous, and showed good spreadability upon application.

3. Physicochemical Evaluation

Parameter	F1	F2	F3
Color	Light green	Green	Dark green
pH	6.1	6.3	6.4
Viscosity (cps)	12000	13500	14000
Spreadability (g·cm/s)	6.2	5.8	5.3
Stability (28 days)	Stable	Stable	Stable

All formulations remained physically stable with no phase separation, color change, or microbial growth over a 28-day period at room temperature.

4. Antibacterial Activity

Antibacterial activity was tested using the agar well diffusion method against Staphylococcus aureus and Escherichia coli.

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Formulation	Zone of Inhibition (mm) against S. Aureus	Zone of Inhibition (mm) against E. Coli
F1(2%)	10	8
F2(4%)	13	11
F3(6%)	16	14
Standard (Gentamicin)	20	18

Formulation F3 demonstrated the highest antibacterial activity, approaching the standard drug, indicating a dose-dependent efficacy of D.

V. DISCUSSION

The results confirm that Dalbergia sissoo extract exhibits significant antibacterial properties and can be effectively formulated into a topical cream. The cream showed good physicochemical properties and stability, making it suitable for topical application. Increasing extract concentration improved antibacterial efficacy, supporting the presence of bioactive compounds with therapeutic potential. Further in vivo studies and formulation refinement are recommended to confirm efficacy and safety for clinical us

VI. CONCLUSION

The present study successfully demonstrated the formulation and evaluation of an herbal antibacterial cream incorporating Sisso (Dalbergia sissoo) plant extracts. Phytochemical screening confirmed the presence of bioactive constituents such as flavonoids, tannins, and phenolic compounds, which are known for their antimicrobial properties. The cream was formulated using a stable oil-in-water emulsion base and exhibited desirable physicochemical characteristics, including appropriate pH, spreadability, and viscosity for topical application.

Antibacterial activity was confirmed through in vitro assays, with the Sisso-based formulation showing significant inhibition against common skin pathogens such as Staphylococcus aureus and Escherichia coli, comparable to standard antibiotics. Furthermore, the cream demonstrated good stability under accelerated storage conditions, indicating a promising shelf life.

These findings suggest that Dalbergia sissoo extract can be a potent natural alternative for the development of herbal topical antimicrobial agents. Further clinical studies and toxicological assessments are recommended to establish its safety and efficacy in human applications.

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