

Formulation and Evaluation of Herbal Antifungal Lotion by Using Night Blooming Jasmine and Neem

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ABSTRACT :

The escalating incidence of fungal infections and the growing resistance to conventional antifungal agents have spurred interest in alternative herbal remedies. This study aims to formulate and evaluate a herbal Antifungal lotion using the synergistic properties of Night Blooming Jasmine (*Cestrum nocturnum*) and Neem (*Azadirachta indica*).

Night Blooming Jasmine, known for its potent antimicrobial and anti-inflammatory properties, is combined with Neem, a well-established medicinal plant with broad-spectrum antifungal and antibacterial activities. The lotion is formulated using a standardized extraction process to harness the maximum therapeutic potential of the active compounds present in these botanicals.

The formulation undergoes a comprehensive evaluation process, including physicochemical analysis, stability studies, and microbiological assays, to ensure its efficacy, safety, and shelf-life.

Keyword : Night Blooming Jasmine, Neem, Herbal Antifungal lotion.

I. INTRODUCTION :

The therapeutic potential of herbal formulations for a range of skincare applications, including the treatment of fungal infections, has drawn increasing attention in recent years. Because of their apparent safety, low occurrence of adverse effects, and sustainable nature, herbal treatments derived from plant sources are frequently favored. The incorporation of Night Blooming Jasmine (*Cestrum nocturnum*) and Neem (*Azadirachta indica*), two botanicals well-known for their therapeutic qualities, into a topical antifungal lotion shows potential for successfully treating fungal skin infections.

Night Blooming Jasmine (*Cestrum nocturnum*)
: Because of its aromatic and therapeutic qualities,

Night Blooming Jasmine, sometimes referred to as "Raat Rani" or "Queen of the Night," has long been utilized in many traditional medical systems. This plant, which is abundant in flavonoids, alkaloids, and essential oils, has antibacterial, anti-inflammatory, and antioxidant characteristics. . The soothing aroma of Night Blooming Jasmine also contributes to its potential in skin care formulations.

Neem (*Azadirachta indica*) : Neem, often referred to as the 'Village Pharmacy,' is a versatile herb with a long history in Ayurveda. Its potent antifungal, antibacterial, and anti-inflammatory properties make it a valuable ingredient in skincare products. Neem contains compounds like nimbin, nimbidin, and azadirachtin, which contribute to its therapeutic effects. Incorporating Neem into skincare formulations has shown efficacy in addressing various skin conditions, including fungal infections.

Reason for Antifungal Lotion: Fungal skin infections are a serious public health risk, including candidiasis and dermatophytosis. In order to provide a natural and efficient treatment for certain skin diseases, a lotion containing Night Blooming Jasmine and Neem is intended to maximize their complementary antifungal qualities.

Herbal Lotion :

The therapy options available to doctors are numerous and include liquid dose formulation, semisolid dosage preparation, and solid dosage preparation. Clear lotions are one of the topical formulations that are most commonly used in cosmetics and pharmaceuticals. Humans have been using medicinal plant materials since the Vedic era to either cure or effectively treat various diseases. This demonstrates the significance of a plant or component in herbal therapy. A skin lotion's purpose is to protect the skin from various weather conditions and environmental factors while also providing a calming effect. Typically, herbal

lotions are applied smoothly. Since patches that approach colloidal confines are more effective and calming to inflammatory areas, the insoluble substance should be finely divided.

Advantages of herbal system of medicines :

- Less chance of adverse reactions.
- Broad accessibility.
- Low cost effectiveness make them all the more alluring
- Effectives with chronic medicine.
- Herbal medicine effectively promotes the body's natural detoxification process

Disadvantages of herbal system of medicines :

- Bulk dosing.
- Poor stability in higher acidic pH, liver metabolism etc.
- Large molecular size limiting the absorption via passive diffusion.
- High amount of raw material is required for processing the medicine.

- A large quantity of raw materials are needed to process the medication.
- The medicinal efficacy of a whole herbal extract may be partially or completely lost when specific components are separated and purified.

These limitation lead to reduced bioavailability and hence, low therapeutic index of plant active constituents. Often, the natural synergy is gone which is due to chemically related constituents present in herbal extract. Hence considerable attention has been given to development of novel drug delivery system for herbal drug.

Physiology of normal skin

The skin is composed of three layers,

- Epidermis (50–100 μm),
- Dermis (1–2 mm)
- Hypodermis (1–2 mm)

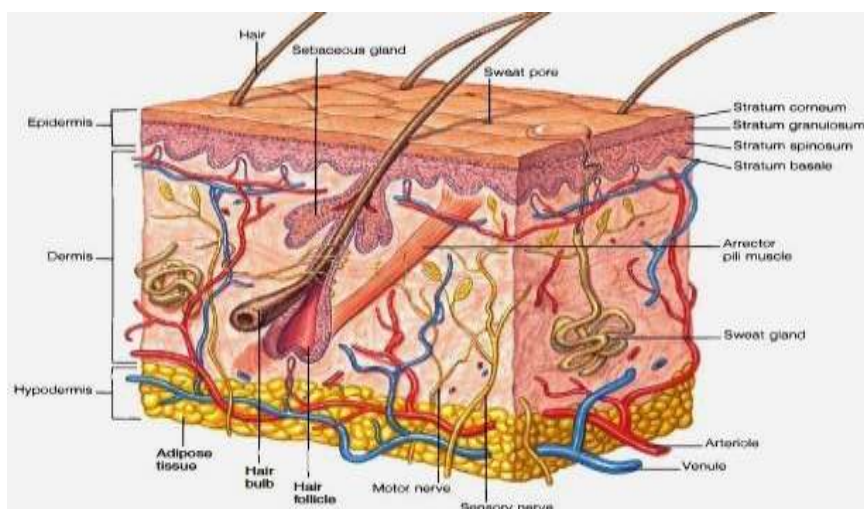


Fig. 1: The anatomical layers of the cutaneous tissue

The most superficial layer of the epidermis, the stratum corneum, contains the barrier to percutaneous absorption. In general, the stratum corneum serves as a permeability barrier to the environment, minimizes water loss, and offers defense against microbes and abrasive action. A multilayer layer of flat, polyhedral-shaped, 2–3 μm thick, non-nucleated cells called corneocytes makes up the stratum corneum, which has a thickness of 10–20 μm . The main component of corneocytes is insoluble bundled keratin, which is encased in a

cell envelope supported by covalently attached lipids and cross-linked proteins. Membrane connections known as corneodesmosomes link corneocytes and support the cohesiveness of the stratum corneum. Lipids derived mostly from lamellar body exocytosis during keratinocyte terminal differentiation make up the intercellular gap between corneocytes.

There are 10–20 layers of cells that make up the epidermis. Melanocytes, which are involved in skin coloring, and Langerhans' cells, which are

involved in antigen presentation and immunological responses, are also found in this pluristratified epithelium. Like any other epithelium, the epidermis gets its nourishment from the dermal vascular network. The epidermis is a dynamic structure, and intricate regulatory systems of cellular differentiation govern the regeneration of the stratum corneum. The following investigations of the epidermal reactions to disruptions of the skin barrier have provided current understanding of the function of the stratum corneum :

- a) Chemically-induced irritation.
- b) Skin lipid extraction using an apolar solvent
- c) Removing the stratum corneum physically using adhesive tape

Overview of Fungal Skin Infection:

Typically, fungi live in moist places on the body where skin surfaces contact, such as below the breasts, in the vaginal area, and between the toes. Yeasts (like *Candida* or *Malassezia furfur*) or dermatophytes (such as *Epidermophyton*, *Microsporum*, and *Trichophyton*) are the common causes of fungal skin infections. Many of these fungi are restricted to the stratum corneum, the outermost layer of the epidermis, and do not grow deeper. Because an illness in one area of the body might result in rashes in other areas of the body that are not diseased, obese persons are more susceptible to these infections. For instance, an itchy, bumpy rash on the fingers may result from a fungal infection on the foot.

Symptoms :

- Itching.
- Changes in the skin, including as redness and possible peeling or cracking.

Causes of fungal skin infection : Imbalance of bacteria is due to following reasons:

- An imbalance of hormones
- as a result of using antibiotics.
- Unhealthy eating habits

Diagnosis :

When a patient presents with a rash that is red, itchy, or scaly in one of the frequently affected locations, doctors may suspect a fungal infection. By removing a small piece of skin and examining it under a microscope or putting it in a culture medium where the particular fungus can grow and

be identified, they can typically confirm the diagnosis of a fungal skin infection.

Treatment :

- Antifungal drugs
- Measures to prevent moisture
- Antifungal medications are commonly used to treat fungal infections; these medications are primarily topical, meaning they are given directly to the diseased area. Shampoos, gels, lotions, creams, and solutions are examples of topical medications. Antifungal medications can also be consumed orally.
- In addition to medications, users may use dressings, powders, or open-toed shoes to keep the afflicted regions dry.
- To reduce swelling and irritation associated with certain infections, physicians prescribe corticosteroids.

Fungi :

“Fungi are a kingdom of usually multicellular eukaryotic organism that are heterotrops and have important role in nutrient cycling in an ecosystem”.

Characteristics of fungi :

While some fungi have many cells, others are single-celled. Yeasts are single-celled fungus. Depending on the stage of their life cycle, certain fungi switch between multicellular and single-celled yeast forms. Similar to plant and animal cells, fungi too have organelles and a nucleus. Chitin, a hard material also present in the exoskeletons of insects and other arthropods like crustaceans, is found in the cell walls of fungi. The substance that typically makes up plant cell walls, cellulose, is absent from them. Multicellular fungi have a large number of branching filaments called hyphae. Hyphae are tubular in shape and have septa, or walls, dividing them into compartments that resemble cells. These cells are capable of having several nuclei, and organelles can migrate back and forth between them.

Characteristics of fungi :

Types of Fungi :

- Chytridiomycota
- Zygomycota
- Glomeromycota
- Ascomycota.

Chytridiomycota : The creatures that make up the Chytridiomycota family, known as chytrids, are mostly asexual and use tiny appendages resembling

tails to create spores. It can burrow under frogs' skin and infect them with fungus.

Zygomycota : The majority of these are terrestrial. They develop on human limited sources and pose problems.

➤ **Ex:** *Rhizopus stolonifer* a bread mold.

Glomeromycota : Soil contains them. After taking sugar from the plant, the fungi breakdown the minerals in the soil to give the plant nutrition. Moreover, this fungus reproduces asexually

Ascomycota . : These are the pathogens that affect both plants and animals, including people. They can cause infections like ringworm, athlete's foot, and ergotism, which can result in hallucinations, vomiting, and convulsions and occasionally even demise

AIM : Formulation and Evaluation of Herbal Antifungal lotion by using Night Blooming Jasmine and Neem .

OBJECTIVE :

1. To formulate a herbal antifungal lotion incorporating Night Blooming Jasmine and Neem extracts.
2. To evaluate the physical characteristics, stability, and sensory attributes of the formulated lotion.
3. To Protect the infection caused by fungus or bacteria.
4. To determine the skin compatibility and safety profile of the lotion through dermatological testing.

PLANT PROFILE

1) NIGHT BLOOMING JASMINE

Night-blooming jasmine (*Cestrum nocturnum*) is a fast-growing woody shrub. Part of the Solanaceae family, which also includes potatoes and tomatoes, the plant isn't a true jasmine. It gets its name from the tubular greenish-white or yellow flowers that emit a highly fragrant scent at night and are attractive to butterflies and other pollinators. The shrub has a long bloom period, repeatedly flowering through the summer.



FIG.2 :- NIGHT BLOOMING JASMINE

- Scientific name : *Cestrum nocturnum*
- Other Common Names : Parijata, Harsingar, Parijathak
- Kingdom : Plantae
- Division : Magnoliophyta
- Class : Magnoliopsida
- Order : Solanales

CHEMICAL CONSTITUENTS

- The leaves of Harsingar contains fructose, glucose, carotene, amorphous resin, methyl salicylate, ascorbic acid, benzoic acid, tannic acid, oleanolic acid and flavanol glycosides.
- The bark of this plant is useful due to its alkaloids and glycosides content. The flowers are extremely beneficial as it contains essential oils and glycosides which possesses antifungal and antiviral properties while the seeds of this plant contain palmitic, oleic and myristic acids. Parijat also showcases antileishmanial, hepatoprotective and immunostimulant qualities.

USES

Antibacterial
Anti oxidant
Anti cancer
Anti Fungal
Anti Malarial

2) NEEM

Azadirachta indica, commonly known as neem, margosa, nimtree or Indian lilac, is a tree in the mahogany family Meliaceae. It is one of two species in the genus *Azadirachta*. It is native to

the Indian subcontinent and to parts of Southeast Asia, but is naturalized and grown around the world in tropical and subtropical areas. Its fruits and seeds are the source of neem oil. Nim is a Hindustani noun derived from Sanskrit nimbi.



FIG.3 : NEEM

Scientific name : *Azadirachta indica*
Other Common Name : margosa, nimtree or Indian lilac.
Family : Meliaceae
Kingdom : Plantae
Genus : *Azadirachta*
Species : *A. indica*
Order : Sapindales

CHEMICAL CONSTITUENTS

The major phytochemicals present in Neem are glycoproteins, triterpenes, limonoids, flavonoids, phenols, tannins, nimbins, saponins, catechins, azadirachtin and gallic acid.

USES

Anti - inflammantory
Analgesic, Antipyretic
Anti - Malarial
Anti fungal
Anti bacterial

EXTRACTION : MATERIAL AND METHOD :

1. **A Collection, Drying of Plant Material :**
The leaves were collect form the plant then they dried in shade, coarsely powdered get formed after crushing with grinder. The dried powder stored in wellstoppered container. The dried material of Night jasmine and Neem was then used further work.

2. **Material :** Mature plants of Night Blooming Jasmine and Neem leaves were used for this preparation and were collected. The analytical balance was used for weighed Night Blooming Jasmine and Neem powder. Sieve was used for separate fine particles from Night jasmine and Neem powder.

3. Method for extraction of night jasmine and Neem extract :

The Powdered were macerated with ethanol to extract their separate extracts. In a separate conical flask with 62 ml of ethanol, 15 gm of dried Night Blooming Jasmine and powdered neem were macerated for 24 hours at room temperature with periodic shaking. The combination was filtered out using a straightforward filtration technique after 24 hours, and the filtrates were gathered in different vessels. A rotary vacuum evaporator operating at 45–50°C was used to extract the solvent from the filtrate under reduced pressure in order to produce the extract



FIG.4 - Extraction of Night Blooming Jasmine and Neem

IDENTIFICATION TEST :

1) Feeric chloride Test

1. Prepare a Alcoholic extract of Drug
2. Add 1% of Feeric chloride solution

3. Observe the appearance of Brownish green colour
 Indicating the presence of Tannins.

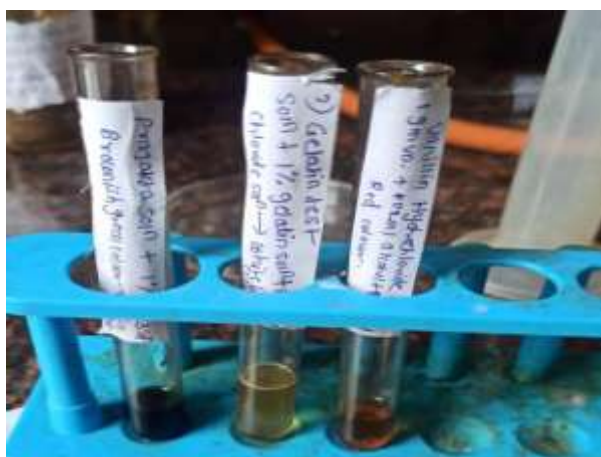
2) Gelatin Test

1. Prepare the Aqueous solution of drug
2. Add 1% of Gelatin +10% of Sodium Chloride solution
3. Formation of a White buff precipitated

Indicates the presence of Tannins.

3) Vanillin Hydrochloride Test :

1. Prepare the Aqueous Solution of drug
2. Add 1gm of Vanillin +10ml of Alcohol +10ml of conc.Hydrochloric Acid
3. Observe the appearance of Red or Pink colour
 Indicating the presence of Tannins.



Night Blooming Jasmine



Neem

FORMULATION OF HERBAL LOTION :

- The stearic acid and other oil soluble components Cetyl alcohol, lanoline was dissolved as the oil phase (Part A) by heated up to 75° C.
- The preservatives and other water-soluble components Methyl paraben, Triethanolamine, glycerol, rose water, aloe vera gel was

dissolved as the aqueous phase (Part B) and heated up to 75° C.

- After heating, oil phase was added in portions to the aqueous phase with continuous stirring until homogeneous lotion is formed.
- Night jasmine and Neem cold extract is taken and levigates in geometric proportion form a homogeneous lotion.





FIG .6 - Formulated Herbal Lotion

TABLE 1 : FORMULATION TABLE :

Sr. No	Ingredients	Quantities (gm)			Uses
		F1	F2	F3	
1	Night jasmine Extract	2ml	3ml	4ml	Anti-Fungal Activity
2	Neem Extract	1.5ml	2ml	2.5ml	Anti-Microbial Activity
3	Steric acid	1.5gm	1.5gm	2gm	Lubricating Agent, Emulsifier
4	Cetyl alcohol	0.25gm	0.10g m	0.30gm	Moisturizer
5	Lanoline	0.4gm	0.5gm	0.6gm	Emollient
6	Methyl Paraben	0.05g m	0.05gm	0.05gm	Preservative
7	Propylene glycol	6ml	4ml	3ml	Softening agent
8	Triethanolamine	0.3ml	0.35ml	0.4ml	Surface-active Agent
9	Rose water	2ml	1.5ml	1.5ml	Skin-Whitening Agent
10	Aloe Vera gel	1ml	1ml	1ml	Anti-oxidant
11	Rose oil	1ml	1ml	1ml	Fragrance
12	Water	q.s	q.s	q.s	Vehicle

EVALUATION OF HERBAL LOTION :

- a) **Organoleptic Evaluation** : Color, texture, and smell were among the parameters that were measured. Texture and color were assessed using touch and vision, respectively. To investigate the scent, the formulation was sensed.
- b) **Appearance and Homogeneity** : It was estimated by visual examination.
- c) **Spreadability test** : 0.1g Sample was applied between two glass slides and was compressed to uniform thickness by placing 100gm weight for 5minutes. Weight was added to the pan. The Spread ability was calculated by using radius of circle formed by compressed slide.
- d) **Washability** : The ease of removal of the lotion applied was examined by washing the applied part with tap water.
- e) **Viscosity** : The Viscosity of of Herbal Lotion Determine by using Ostwald Viscometer.
- f) **PH** : PH of 1% aqueous solution of the formulation was measured by using a

calibrated digital pH meter at constant Temperature.

- g) **Stability** : studies on the stability of the formulation of herbal lotions were carried out by storing them for a week at various temperatures, including 40°C, 25°C, and 37°C. The produced lotion did not exhibit any color change or phase separation during the stability tests.
- h) **Skin Irritation Test** : Herbal lotion was applied to the skin and allowed to sit for 30 minutes in order to conduct the Skin Irritation Test. After 30 minutes, use a sensory and visual examination to check the skin for any redness, rashes, or itching.

II. RESULT :

The Formulation of herbal antifungal lotion by using night blooming jasmine and Neem was prepared, and further evaluation test are also performed.

EVALUATION PARAMETER	F1	F2	F3
Color	White	White	White
Odour	Rose	Rose	Rose
Dilution	O/W	O/W	O/W
Appearance	Homogeneous	Homogeneous	Homogeneous
Grittiness	Non gritty	Non gritty	Non gritty
PH	6.1	6.7	7.0
Viscosity	21243cps	23773cps	22732cps
Spreadability	6cm	7.0cm	7.3cm
Stability (370C)	Stable	Stable	Stable

III. SUMMARY AND CONCLUSION

It is Feasible to produce lotion using botanical extracts. Traditional Indian medicine uses night blooming jasmine for its antifungal properties, indicating that the plant's leaf extract can be beneficial. The formulations demonstrated good spreadability, no phase separation, and consistent results throughout the testing period. The

investigation found no significant changes in stability criteria such as visual appearance, natural variation, or scent of the formulations. These lotions created with Night Blooming Jasmine are effective and have minimal adverse effects. The phytochemicals include alkaloids, phytosteroids, flavonoids, saponins, tannins, phenols, and glycosides. In the current study, night blooming

jasmine leaf have shown antifungal activity. The leaf can be used as herbal antifungal lotion that is caused by fungi and bacteria.

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