

Medicinal Plant Having Antifungal Property

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ABSTRACT: -

Due to increased use of antifungal agent in recent years has resulted in the development of resistance to fungal infection area address in this include mechanism of antifungal agent and list of agent available synthetic and herbal formulation. This paper also gives focus on species of fungal infection. this paper also reviews the drug with their sideeffect. Fungal infections pose a significant threat to global public health, with a rising incidence of resistance to conventional antifungal agents. As a result, there is an urgent need to explore alternative sources of antifungal compounds. This review aims to provide a comprehensive overview of medicinal plants known for their potent antifungal properties, shedding light on their phytochemical constituents and mechanisms of action. The phytochemical profiling of these plants reveals a diverse array of secondary metabolites, such as alkaloids, flavonoids, terpenoids, and essential oils, that contribute to their antifungal efficacy. The study involves an extensive survey of the existing literature, encompassing scientific databases, ethnobotanical records, and traditional medicinal knowledge. Medicinal plants from various geographical regions and cultural backgrounds are included in the analysis, emphasizing their historical uses and contemporary relevance in combating fungal infections.

KEYWORDS: -Medicinal plants, Antifungal properties, Phytochemical constituents, Fungal infections, alkaloids, flavonoids, terpenoids.

I. INTRODUCTION: -

Fungal infections are caused by fungi, which are microscopic organisms that can live on the skin, nails, or membranes. They can affect various parts of the body, including the skin, nails, scalp, and genitals. Common types of fungal infections include athlete's foot, ringworm, yeast infections, and nail fungus. Fungi thrive in warm, moist environments and can spread through direct contact with an infected person or contaminated surfaces [1]. Symptoms of fungal infections can

vary depending on the type and location but may include itching, redness, rash, scaling, or discharge[2]. Treatment for fungal infections typically involves antifungal medications, either in the form of topical creams, oral medications, or sometimes a combination of both. It's important to practice good hygiene, keep the affected areas clean and dry, and avoid sharing personal items to prevent the spread of fungal infections [3]. If you suspect you have a fungal infection, it's best to consult with a healthcare professional for an accurate diagnosis and appropriate treatment. They can provide guidance on the most effective course of action to help you recover.[4]

There are several herbal plants that have been used for their antifungal properties. Some commonly used ones include tea tree oil, garlic, oregano oil, neem, and turmeric. These plants contain natural compounds that can help fight against fungal infections [5]. However, it's always a good idea to consult with a healthcare professional before using herbal remedies. Depending on scenario regarding fungal diseases and antifungal drugs are taken into consideration it has been seen that the development of resistance of fungus towards the presently used antifungal drugs has increased. With the challenges like morbidity and mortality there always lies difficulty in antifungal treatment for patients receiving therapy for AIDS, diabetes, chemotherapy or organ transplant as some of the molecular processes of fungus are similar to humans, so toxicity to fungal cells could affect human cells .[6]

SPECIES OF FUNGAL INFECTION: -

- Tinea corporis: This is a fungal infection commonly known as ringworm. It affects the skin and appears as a red, circular rash.

Figure no. 1. Tinea corporis

- Tinea pedis: Also known as athlete's foot, this fungal infection affects the feet. It can cause itching, redness, and peeling of the skin.

Figure no. 2. Tinea pedis

- **Tinea cruris:** This type of fungal infection, also called jock itch, affects the groin area. It can cause a red, itchy rash and discomfort.



Figure no.3. Tinea cruris

- **Onychomycosis:** This is a fungal infection of the nails, usually caused by dermatophytes. It can lead to thickened, discolored, and brittle nails.



Figure no.4. Onychomycosis

- **Candidiasis:** Candida is a type of yeast that can cause infections in various parts of the

body, including the mouth (oral thrush), vagina (yeast infection), and skin folds.

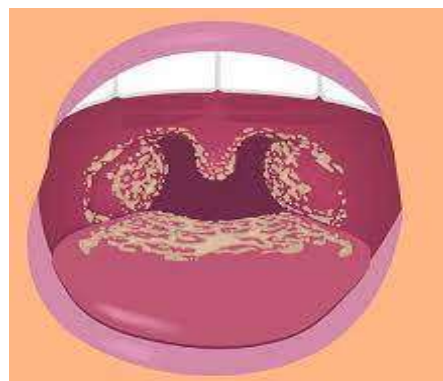


Figure no. 5. Candidiasis

ANTIFUNGAL AGENTS: -

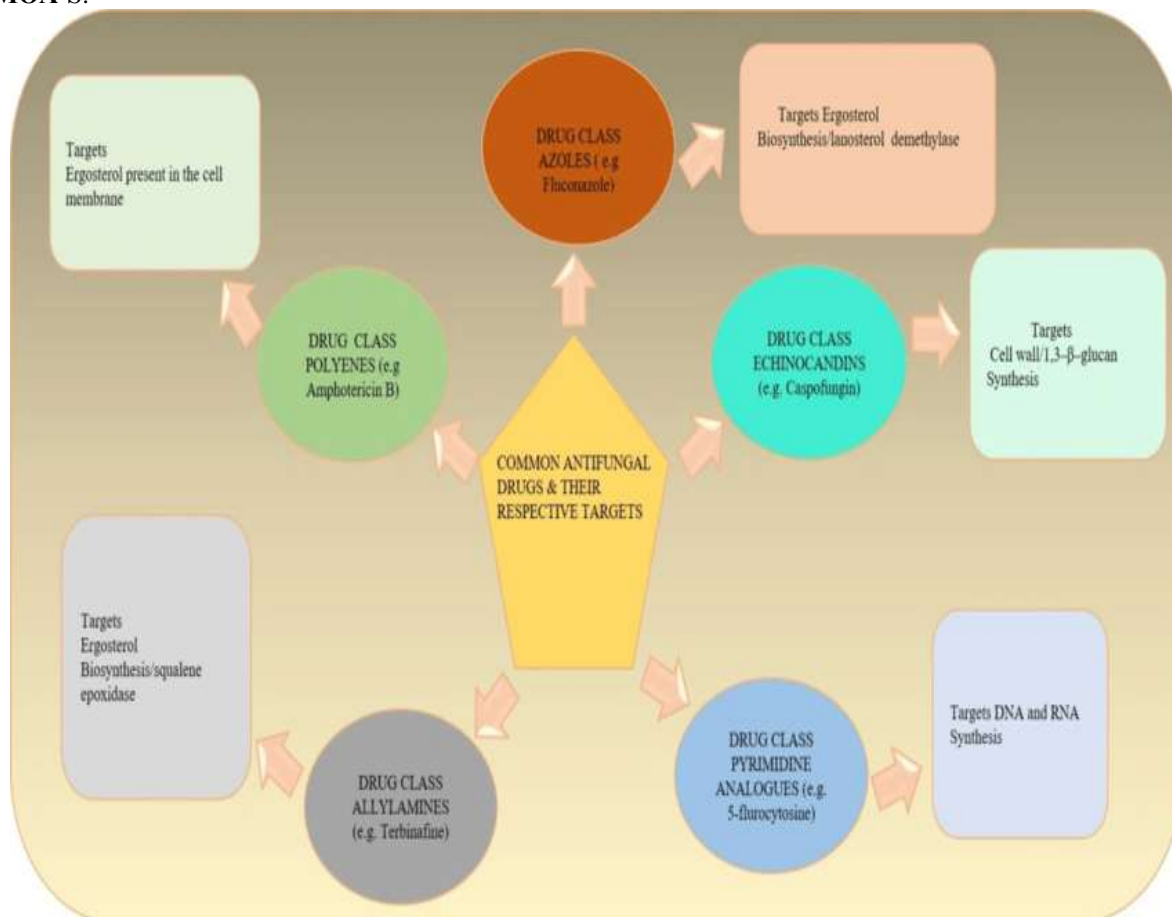
Antifungal agents are essential in combating fungal infections. They target the fungi by disrupting their cell walls or interfering with their metabolic processes. Some commonly used antifungal agents include azoles, polyenes, and echinocandins. Azoles, like fluconazole and ketoconazole, work by inhibiting the synthesis of ergosterol, a vital component of fungal cell membranes [12]. Polyenes, such as amphotericin B, bind to the fungal cell membranes, causing them to become leaky and leading to cell death. Echinocandins, like caspofungin and micafungin, inhibit the production of beta-glucan, a key component of fungal cell walls.

SYNTHETIC DRUG AND SIDE EFFECTS: -

Sr.no.	Drug	Side effects
1	Voriconazole	Non-melanoma skin cancer prolonged therapy
2	Ketoconazole, Clotrimazole,	Fever, chills
3	Amphotericin B,	Anemia
4	Fluconazole, Flucytosine	Headache
5	Anidulafungin C, Micafungin	Dark urine, clay-colored stools,
6	Flucytosine, Isavuconazole	Abdominal pain
7	Caspofungin	Decreased renal function
8	Flucytosine	Leukopenia, Thrombocytopenia
9	Coltrimazole	Rash

Table no. 1 [Synthetic drug and side effects] [13]

MOA'S: -



PLANT HAVING ANTIFUNGAL ACTIVITY:

The increased use of antifungal drugs has led to the development of resistance to these drugs. The spread of multidrug-resistant fungal strains and the decrease in available drugs require the discovery of new classes of antifungal drugs from natural products, including medicinal plants. Medicinal plants have also been reported in

traditional medical systems to treat mycoses in both humans and animals and are considered a valuable source for the discovery of new antifungal drugs [15]. Many books also covered and recorded the use of medicinal herbs in the traditional system of medicine. Therefore, here we mainly focused on antifungal plants and their use against pathogenic fungi. Plants associated with antifungal activity are described.

PHYTOCHEMICALS: -

Sr.no	Plant	Plant part	Phytochemicals
1	Datura metel	Whole plant	Alkaloids
2	Aegle marmelos	Leave	Essential oil
3	Alpinia galangal	seeds	Diterpenes
4	Ananas comosus	Leaves	Protein
5	Blumea balsanifera	Leaves	Flavonoids luteolin
6	Cassia tora	Whole plant	Emodin, physcion and rhein

7	<i>Capsicum frutescens</i>	Whole plant	Tirterpene saponin
8	<i>Ocimum gratissimum</i>	Bark	Essential oil
9	<i>Pinus pinaster</i>	Leaves	Pinosylvin
10	<i>Polygonum punctatum</i>	Whole plant	Sesquiterpene
11	<i>Smilax Medica</i>	Root	Saponins
12	<i>Solanum tuberosum</i>	Tubers	Protein
13	<i>Zingiber officinalis</i>	Rhizome	Protein
14	<i>Trigonella graecum</i>	Whole plant	Peptide
15	<i>Thymus vulgaris</i>	Whole plant	Essential oil
16	<i>Haloxylon salicornium</i>	Aerial part	Alkaloids
17	<i>Khaya ivorensis</i>	Steam bark	Triterpenes

Table no. 2 [plant and there phytochemical][16]

USES: -

1. Tea Tree Oil: Tea tree oil obtained from the leaves of the tea tree (*Melaleuca alternifolia*) is known for its antifungal and antibacterial properties. It is often used topically for fungal infections such as athlete's foot and athlete's foot.
2. Garlic: Garlic (*Allium sativum*) contains a compound with antimicrobial properties, allicin. Some people use crushed garlic or garlic oil to treat yeast infections. Due to possible systemic effects, it is also used in diet.[17]
3. Coconut Oil: Coconut oil contains caprylic acid, which has antifungal properties. When applied topically, coconut oil is often used for conditions such as athlete's foot and athlete's foot and as a moisturizer for skin suffering from fungal infections.
4. Oil of Oregano: Oregano oil, especially *Origanum vulgare* oil, contains compounds such as carvacrol and thymol, which have been studied for antifungal properties. It can be used topically or internally, but due to its effectiveness, it must be used with caution [18].
5. Neem Oil: Neem (*Azadirachta indica*) has antifungal, antibacterial and antiviral properties. Neem oil is used topically for a variety of skin conditions, including fungal infections.
6. Calendula: Calendula (*Calendula officinalis*) has anti-inflammatory and antifungal effects. Creams or lotions containing calendula extract can be used topically for skin conditions [19].
7. Aloe Vera: Aloe vera has soothing and moisturizing properties and is sometimes used topically for skin conditions, including fungal infections.
8. Grapefruit Seed Extract: Grapefruit seed extract is believed to have antimicrobial properties, including antifungal activity. It is

available in liquid form and can be diluted for topical application. Turmeric: Curcumin, the active compound in turmeric (*Curcuma longa*), has been shown to have antifungal properties. Turmeric can be added to the diet or used topically [20].

9. Pau d'Arco: Pau d'Arco, derived from the inner bark of the *Tabebuia* tree, has traditionally been used in South American folk medicine for its antifungal properties. It is available in various forms, including tea and supplements[21]

ADVANTAGES OF HERBAL AGENT: -

- 1) Minimum development of resistance:

Some proponents of herbal medicines argue that the likelihood of developing resistance to herbal medicines may be lower compared to synthetic antifungals. This is because plant compounds often have a complex composition, which can make it difficult for fungi to develop resistance[22].

- 2) Ease of joining a daily routine:

Many herbal products are easy to incorporate into your daily skin care routine. Ointments, oils and creams can be applied directly to affected areas, making them convenient for regular use.

- 3) Availability in different formats:

Antifungal herbs are available in various forms such as lotions, creams, essential oils, teas and supplements. This option allows people to choose the shape that best suits their preferences and skin type [23].

- 4) Cultural and traditional use:

Herbal preparations have often been used in different cultures and traditional medicine to treat skin diseases. The accumulated knowledge

and experience passed down through generations increases the popularity of herbal treatments for skin problems [24].

5) Possible combination with conventional treatment methods:

Some people may choose to use herbal remedies along with conventional treatments for yeast infections. However, it is important to communicate with health professionals to ensure that there are no interactions or contraindications [25].

MARKETED FORMULATION: -

1)Jeevan Sanjeevani Kwath
Enriched with Aloe Vera, Amla juice, Giloy juice, Tulsi, Ashwagandha & 4 other herbs | Rich in Vitamin C



2)Dr Madhu Amrit
Gurmar, Vijaysar, Saptrangi, Karela, Neem, Amla, Devdar, Giloy, Kalmegh, Chiraita, Aloe Vera, Palash, Jamun, Arjun and Mulethi etc.



3)White Discharge Mints
WYN's Ayurvedic Medicine for Dysmenorrhea



RESISTANCE TO FUNGAL INFECTION: -

Fungal resistance is not compatible with bacterial resistance, the economic aspects of fungal infections are still too high. Considering the limited number of antifungal drugs available, one of the most important strategies to improve the treatment of mycoses is to overcome antifungal resistance [26]. In general, clinical resistance is defined as the persistence or progression of infection despite appropriate antimicrobial therapy. Clinical resistance to antifungal drugs was rare in the early stages of antifungal therapy. One of the earliest reported cases of drug resistance in dermatophytes was griseofulvin, Michaelides et al. in 1961. In 2003, Trichophyton rubrum reported the first resistance to terbinafine in patients with onychomycosis. A study of Candida species in AIDS patients found that 33 percent of late-stage patients had drug-resistant strains of Candida albicans in the oral cavity. Azole resistance of dermatophytes has been reported to be as high as 19% in certain regions of the world. The occurrence of antifungal resistance must be considered separately for each antifungal class and each fungal genus.

Fungal resistance can be:

- 1)Microbiological resistance or in vitro resistance
- 2) Clinical resistance or in vivo resistance.[27]

II. CONCLUSION: -

Several medicinal plants have shown antifungal properties, making them valuable in traditional and alternative medicine for the treatment of various fungal infections. These plants produce bioactive compounds with antimicrobial activity, including against fungi. Although the evidence supporting the antifungal properties of these herbs is often promising, it is important to note that research is still developing, and more research is needed to better understand their efficacy, safety, and mechanisms of action. The use of herbs with antifungal properties offers several potential benefits, including natural alternatives to synthetic antifungal medications, reduced risk of side effects, and potential additional support for skin health. In addition, these herbs can provide anti-inflammatory, moisturizing, and soothing effects that promote overall skin comfort. Herbs with recognized antifungal properties include tea tree oil, garlic, coconut oil, oregano oil, neem, calendula, aloe vera, grapefruit seed extract, turmeric and Pau d'arco. These herbs can be incorporated in various forms such as creams, oils,

lotions, teas, and supplements, making them adaptable to different preferences and needs. Although antifungal herbs are widely used and well regarded in traditional medicine, it is important to approach their use with caution. Individual reactions may vary, and allergic reactions or skin sensitivity may occur. It is recommended to consult a doctor before using herbal remedies, especially for persistent or severe fungal infections. In addition, herbal preparations should not replace prescribed medications or professional medical care when necessary. In general, the study of medicinal plants with antifungal properties contributes to the growing interest in natural and holistic approaches to skin health. As research progresses, the potential benefits and limitations of these plants will likely become better understood, increasing knowledge of their role in skin care and health.

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