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Review Article

Review on antifungal activities of Ayurvedic Medicinal Plants

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ABSTRACT

Infectious diseases represent a critical problem to health and they are one of the main causes of morbidity and mortality worldwide. The resistance to antibiotics and with the toxicity during prolonged treatment with several drugs due to this medicinal plants are widely used by the traditional medical practitioners for curing various diseases in their day to day practice. Since ancient times, plants have been an exemplary source of medicine. During the past several years, there has been an increasing incidence of fungal infections due to a growth in immunocompromised population such as organ transplant recipients, cancer and HIV/AIDS patients. The presented review summarizes the information concerning the new profile of antifungal drugs obtaining from medicinal plants.

Keywords: Infectious, medicinal plants, antifungal, Drug, antibiotic

INTRODUCTION

In developing countries, microorganisms are frequently a cause of prevailing diseases, presenting a serious public health issue in a significant segment of the population as uncovered by either private or official health care systems. The economic crisis, high cost of industrialized medicines, inefficient public access to medical and pharmaceutical care. There is currently an increase in the numbers of immune compromised individuals due to advances in medical technology and a pandemic of HIV infections. With the rise in-at risk patients, the number of invasive fungal infections has dramatically increased in both developed and developing countries. An antifungal drug is a medication used to treat fungal infections such as athlete's foot, ringworm, candidiasis (thrush), serious systemic infections such as cryptococcal meningitis, and others. Such drugs are usually obtained by a doctor's prescription or purchased over-the-counter. But use of this type of drugs used in large way makes the unusable due to resistance to antibiotics and with the toxicity during prolonged treatment. There are large number drawback in synthetic drugs so people move towards herbal drugs which is more safe. Yeasts of the genus *Candida* (in particular *C. albicans*) and of the species *Cryptococcus neoformans* are the fungal agents most frequently involved in the etiology of infectious processes in subjects affected by AIDS. Many studies investigating the antifungal susceptibility of clinical strains of *Candida* spp. have been performed with a variety of results and these studies point to the emergence of new resistant strains [1]. Disseminated cryptococcosis, on the other hand, affects a more limited percentage of patients (6-8%), yet is still a serious life-threatening condition[2-4]. In the present scenario, an emergence of multiple drug resistance in human pathogenic fungi and the small number of antifungal classes available stimulated research

directed towards the discovery of novel antifungal agents from other sources, such as medicinal plants.[5] There is very little information available on the activity of medicinal plants.

Some medicinal plants which having antifungal properties

Allium sativum :

The antifungal activity of six fractions derived from garlic was investigated in an in vitro system. Ajoene had the strongest activity in these fractions. The growth of both *Aspergillus niger* and *Candida albicans* was inhibited by ajoene at less than 20 micrograms/ml. Scientific studies have shown garlic to be a very effective treatment for athlete's foot and other fungal infections. Soaking the infected foot in a tub of warm water containing several cloves of garlic generally relieves itching and burning. Garlic can also be steeped in olive oil and applied directly to the area of infection once or twice daily. [6, 7]

Zingiber officinalis :

Ginger contains the compound caprylic acid, which has potent antifungal properties. Simmer about an ounce of ginger root in a cup of boiling water and then apply it directly to the affected area of the foot at least twice a day.[8,9]

Glycyrrhiza Glabra :

Chinese practitioners have been using licorice to treat fungal infections, most notably ringworm, for a very long time. This is because licorice contains the greatest number of antifungal compounds of any of the herbs. You can either add some licorice to your garlic footbath, or boil six to seven teaspoons of dried licorice and apply it directly to the affected area.[10]

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Curcuma longa :

Turmeric oil and curcumin, isolated from *Curcuma longa* L., were studied against fifteen isolates of dermatophytes .[11]

Mentha piperita :

The composition and antifungal effects of *Mentha piperita* oil on *Fusarium oxysporum* f. sp. *ciceri*., *Macrophomina phaseolina*, and *Drechslera oryzae* on the basis of agar dilution method. The test was carried out with factorial experiments based on the random complete block design with triplicates. Essential oil analysis with GS/MS revealed that main compounds of oil include menthol (19.76%), menthan-3-one (19.31%), menthofuran+isomenthone (9.12%), 1, 8-cineole+beta phellandren (8.8%) and menthol acetate (5.63%).[12].

Azadirachta Indica :

Evaluation of the activity of the cold expeller neem oil (*Azadirachta indica* A. Juss.) and the fractions derived through solvent partitioning, against *Drechslera oryzae*, *Fusarium oxysporum* and *Alternaria tenuis* showed that the active antifungal fraction is a mixture of tetra nor tri terpenoids. Further, testing the triterpenoidal mixture derived from the 90% methanol (MeOH) extract of neem oil against 13 phytopathogenic fungi revealed that various species were inhibited to different degrees. Direct preparative High Performance Liquid Chromatography (HPLC) of the active fractions and subsequent bioassay of the semi-pure fractions indicated that the active fractions contained major compounds such as 6-deacetyl nimbicin, azadiradione, nimbicin, salannin and epoxyazadiradione. Pure azadiradione, nimbicin, salannin and epoxy-azadiradione did not have appreciable activity. However, when these terpenoids were mixed and bioassayed, they showed antifungal activity, indicating possible additive/synergistic effects. [13,14]

Withania somnifera :

The antifungal activity of *W.somnifera* root extract (at 0.5,1.0,2.0 and 2.5g) was investigated against *Fusarium solani* using clotrimazole (1%) as reference and filter disc without the extract as the control. The extract had higher inhibitory effect on the growth of *F. solani* than clotrimazole.[15]

Acorus calamus :

The rhizome extract of *A. calamus* exhibited highest antifungal activity inhibiting the mycelial growth completely (100%) against all the 6 test pathogens.[16]

Piper betel :

P. betel exhibited more than 50% inhibition against all the test pathogens except *M. phaseolina*. The ethanolic extract of several higher plants could be used as alternative source of antifungal agents for protection of plants or crops against fungal infection.[17]

Adhatoda vasica (Basuti or Vasa)

Leaves are reported to be used for the treatment of various diseases and disorders, particularly for the respiratory tract ailments. It is a potent antifungal agent for various infections such as ring worm, athlete's foot.[18]

Solanum xanthocarpum:

The Indian night shade, which grows abundantly in arid areas of the country is known to have pest repellent properties. The research showed that the methanolic extract has potent antifungal properties. The antifungal activity is carried by microbroth dilution, percent spore germination inhibition and disc diffusion methods.[19,20]

Aloe Vera :

Aloe Vera showed an inhibitory effect of the pulp of *A. Vera* on *F. oxysporum* at 104 μ l-1 and over a long period. For the two types of *Aloe* fractions the activities were similar. Besides the liquid fraction reduced the rate of colony growth at a concentration of 105 μ l-1 in *R. solani*, *F. oxysporum*, and *C. coccodes*. [21]

Ocimum sanctum :

Ocimum sanctum is a medicinal plant having pharmacological properties like anabolic, hypotensive, cardiac depressant, smooth muscle relaxant, antifertility and antistress activity. Its extract shows antifungal activity. [22,23]

CONCLUSION

Methanolic extracts of medicinal plants selected based on their reputation in Ayurvedic and Indian traditional system of medicine were analyzed for their antifungal properties. The literature survey revealed that drugs used in large way makes the unusable due to resistance to antibiotics and with the toxicity during prolonged treatment due to this the herbal drugs which are safe against synthetic drugs are major drugs for future perspective.

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