

Antifungal Activity of *Indigofera aspalathoides* (Shivanar Vembu) Vahl ex Dc.

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The present study deals with the antifungal activity of the hexane, ethyl acetate and methanol extracts of the plant *Indigofera aspalathoides* using agar diffusion method against human pathogens, such as *Candida albicans*; *Candida parapsilosis*; *Candida tropicalis*. In the present investigation, all the extracts were found to be effective against three human fungal species sensitive to all the plant extracts. The study suggests that the extract of the plant parts possesses potential broad spectrum antimicrobial activity. The antimicrobial activity of methanol extracts was found to be higher than that of other extracts.

Keywords: *Indigofera aspalathoides*; Agar diffusion method; Human pathogens;

INTRODUCTION

Plants have provided a source of inspiration for novel drug compounds, as plant derived medicines have made large contributions to human health and well being. Their role is twofold in the development of new drugs: (1) they may become the base for the development of a medicine of new drugs or; (2) a phytomedicine to be used for the treatment of diseases (Iwu M, 1999). Traditional medicine using plant extracts continues to provide health coverage for over 80% of the world's population, especially in the developing world (WHO, 2002). Among plants of economic importance medicinal and aromatic plants which played a vital role where it utilized as therapeutic agents since old days (Cordell GA, 1995). Herbal medicine represents one of the most important fields of traditional medicine all over the world (Awadh et al., 2002).

Medicinal plants represent a rich source of antimicrobial agents (Mahesh & Satish, 2008). Many of the plant materials used in traditional medicine are readily available in rural areas at relatively cheaper than modern medicine (Mann et al., 2008). Fungal infections remain a significant cause of morbidity and mortality despite advances in medicine and the emergence of new antifungal agents (McNeil et al., 2001). *Candida albicans*, the agent of candidiasis, is an increasingly important disease that has a worldwide distribution due to the fact that it is a frequent opportunistic pathogen in AIDS patients (De Pavia et al., 2003). It is a common commensally of the gastrointestinal and urogenital tracts of human (Black, 1996) and is also the cause of Candidiasis in women (Demarch et al., 1995). *C. albicans* is a major concern worldwide (Nolte et al., 1997). *Candida tropicalis* is one of the non- *Candida albicans* strains currently emerging in fungal infections (Powderly et al., 1999).

The plant *Indigofera aspalathoides* is a low under shrub with wide distribution, mostly found in South India and Sri Lanka. The plant is popularly known as Sivanar vembu in Tamil. The stem is traditionally used for various skin disorders and cancer (Anonymous, 2001). In the traditional medicinal system, the leaves, flowers and tender shoot are said to be cooling and demulcent; they are used in the form of decoction for leprosy and cancer affections (Kirtikar and Basu, 1975).

The leaves are also applied to abscesses. The whole plant is used in edematous tumors and the ashes are used in preparations for dandruff's (The Wealth of India, 1959). The methanol extract of *Indigofera aspalathoides* also possess hepato-protective activity (Gupta et al., 2004). The main objective of this study was to search for medicinal plants with antifungal activity of *Indigofera aspalathoides* plant.

MATERIALS AND METHODS

Plant collection:

Fresh leaves of *Indigofera aspalathoides* were collected from the fields located in Salem, Tamil nadu, India.

Preparation of plant extract:

The Plants of *Indigofera aspalathoides* were carefully washed with tap water, rinsed with distilled water, and air-dried for 1hour. Then plants were separated & dried in room temperature for one week. Then they were ground into powder and stored in room temperature.

Direct extraction with different solvent:

Direct extraction with hexane, ethyl acetate and methanol following the method of (Eloff, 1998) was used as an extraction method for the purpose of preliminary screening of the *Indigofera aspalathoides*.

In this method, finely ground leaf material (1gm) was extracted with 10 ml of hexane, ethyl acetate and methanol in conical flask in shaking condition. The extract was decanted in to pre-weighed glass vials. The process was repeated 3 times and the same plant material but using fresh solvent. The solvent was removed by placing the extracts in front of a steam of air in a fume hood at room temperature. The extracted residues were weighed and re-dissolved in different solvents to yield 10mg/ml solutions ready for further analysis.

Well diffusion assay:

Agar diffusion assay is used widely to determine the anti-bacterial activity of Leaf extract (Vlientink et al., 1995, Fazeli et al., 2007, Magaldi et al., 2004, Tadeg, et al., 2005). The

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technique works well with defined inhibitors (Hewitt & Vincent, 1989). Nutrient agar prepared was poured in the Petri dish. 24 hours growing culture (*Candida albicans*; *Candida parapsilosis*; *Candida tropicalis*) were swabbed on it. The wells (10mm diameter) were made by using cork borer. The different concentrations of the crude extract were loaded in the wells. The plates were then incubated at 37° C for 24hours. The inhibition diameter was measured.

RESULT AND DISCUSSION

In the present study, biological activities of *Indigofera aspalathoides* have been investigated, by using hexane, ethyl acetate and methanol extracts were assayed for their antifungal properties using disc diffusion method.

The result of antifungal activity was showed in Table 1. Among three different extracts, methanol extract showed maximum inhibitory activity against (*Candida albicans*; *Candida parapsilosis*; *Candida tropicalis*) With zone of inhibition of 13 mm, 14 mm and 16 mm, respectively followed by ethyl acetate (zone of inhibition of 13 mm, 15 mm and 16 mm, respectively) and hexane (zone of inhibition of 15 mm, 16mm and 18mm respectively). The methanol extract effectively inhibits all the test pathogen. The methanol extract was chosen for further studies because of its high inhibitory activity compared to ethyl acetate extract and hexane (Figure 1).

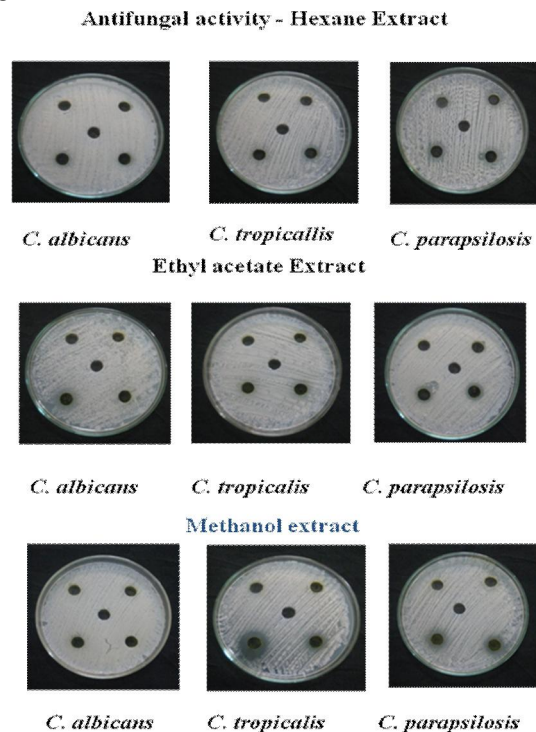
Table 1: *In vitro* antifungal activity of *Indigofera aspalathoides*

Hexane extract:				
Organisms	Concentrations (µg)			
	250	500	750	1000
<i>C. albicans</i> MTCC 183	11	11	13	15
<i>C. parapsilosis</i> MTCC 2509	12	15	16	18
<i>C. tropicalis</i> MTCC 184	11	12	13	15

Ethyl acetate extract:				
Organisms	Concentrations (µg)			
	250	500	750	1000
<i>C. albicans</i> MTCC 183	11	12	13	16
<i>C. parapsilosis</i> MTCC 2509	11	12	14	16
<i>C. tropicalis</i> MTCC 184	12	13	15	16

Methanol extract:				
Organisms	Concentrations (µg)			
	250	500	750	1000
<i>C. albicans</i> MTCC 183	12	13	15	21
<i>C. parapsilosis</i> MTCC 2509	11	13	16	17
<i>C. tropicalis</i> MTCC 184	12	13	14	15

Figure 1: Chart of IC50 values of zone of inhibition.



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