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EVALUATION OF ANTIMICROBIAL ACTIVITY OF *JASMINUM GRANDIFLORUM* AGAINST HUMAN PATHOGENIC FUNGI

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ABSTRACT

Antifungal activity of *Jasminum grandiflorum* was tested against four human pathogeni fungi viz. *Aspergillus niger, Candida albicans, Trichophyton mentagrophytes T.rubrum.* Different plant parts stem, leaf and flower were taken for experimental studies. For testing antifungal activity agar well diffusion method given by Aida method was used. Leaf and stem extracts showed better results against *A.*niger, *C.albicans, T.mentagrophytes* and *T.rubrum.* Aqueous flower extracts showed no activity against any of the experimental organisms. Results were also compared with standard antibiotics.

KEYWORDS: Antifungal, Leaf and stem extracts and experimental organisms.

INTRODUCTION

The search of newer source of antibiotics of global challenge preoccupying research institution, pharmaceutical companies and academia, since many infectious agents are becoming resistant to synthetic drugs (Latha and Kannabiran, 2006). Infectious diseases are the world's major threat to human health and account for almost 50,000 deaths every day (Ahmad and Beg, 2001). The situation has further been complicated with the rapid development of multidrug resistance by the microorganism to the antimicrobial agents available. Plants have the major advantage of still being the most effective and cheaper alternative source of drugs (Pretorius and Watt, 2001). The local use of natural plants as primary health remedies, due to their pharmacological properties is quite common in Asia,

America and Africa (Bibitha *et al.,* 2002). The rich diversity of Indian plants it is expected that screening and scientific evaluation of plant extract for their antimicrobial activity may prove beneficial for the mankind. Several plants are indicated in folk and other traditional systems of medicines as antimicrobial agents. So in the present investigation an attempt has been made to test *in vitro* antifungal activity of *Jasminum grandiflorum* against four human pathogenic fungi.

MATERIAL AND METHODS

Plant Materials: The plant *Jasminum grandiflorum* (Oleaceae) were collected from farm lands in Tiruchirappalli, Tamil Nadu. The plants were identified in department of Botany, Bishop Heber College, Tiruchirappalli. A voucher specimen was deposited in our departmental laboratory. It is scrambling deciduous shrub growing up to 2-4 m tall. The leaves are opposite 5-12 cm long, pinnate with 5-11 leaflets. The flowers are produced in open cymes the individual flowers are white having corolla with a basal tube 13-25 mm long and five lobes 13-22 mm long. The flower's fragrance is unique and sweet.

Sample preparation: 10 g of fresh plant parts (leaf, stem and flower) was taken and washed in tap water and then thoroughly washed with sterilized water and crushed in mixer grinder separately. The extract were prepared in aqueous, ethanol and acetone to make a concentration 1: 1 W/V. All extracts were kept for 24 hours at room temperature, ethanol and acetone was allowed to evaporate. To the remaining plant material 10 ml distilled water added. These different extracts using filtered using muslin cloth and were centrifuged at 10,000 rpm for 20 minutes. The supernatants were filtered through What man's No.1 filter paper and were heated to 40^{o}C for 10 minutes to avoid contamination. These pure extracts were ready for use and kept in screw tight bottles.

Microorganism Culture: The fungal culture such as *Aspergillus niger, Candida albicans, Trichophyton mentagrophytes* and *T.rubrum* were obtained from Kaveri Medical Centre Hospital, Tiruchirappalli and maintained on Sabourauds dextrose agar medium. All strains were pure culture preserved as stab slant culture. The above pure culture of the microorganism were freshly using fungal for Sabouraud's dextrose agar medium before three days from the test conducted.

Determination of antimicrobial activity: Antifungal activity of the aqueous and organic extracts of the plant sample was evaluated by the agar well diffusion method (Aida *et al.,*

2001). The fungal cultures were adjusted to 0.5 McFarland turbidity standard and inoculated into Sabouraud's dextrose agar plates (diameter 20 cm). A sterile cork borer was used to make a well (6 mm in diameter) on the SDA plates. Aliquots of 0.2 ml of extract dilutions were applied in each wells in the culture plates previously seeded with the experimental organisms. The culture were incubated at 27^{o}C for 5 days. A well was made in each of the culture plates and filled with 20 µl of 10 mg/ ml of Griseofulvin as positive control and sterile distilled water served as a negative control. Antifungal activity was determined by measuring the zone of inhibition around each well (excluding the diameter of the well). For each extract, three replicate trials were conducted against each organism and average zone of inhibition was recorded.

RESULTS AND DISCUSSION

The antifungal activity of plant part extracts of *Jasminum grandiflorum* against various human pathogenic microorganisms is shown in Table -1. It was found that leaf and extracts were effective whereas aqueous flower extract showed no activity against experimental organisms. Aqueous stem extract inhibitory zone reduced whereas ethanol and acetonic extracts were effective against all the human pathogenic fungi. Aqueous leaf extract inhibited all the fungal organisms. In comparison, leaf extract showed better activity than the stem and flower extracts. Organic leaf extract showed best activity against *Salmonella typhi* followed by *E.col. In vitro* antimicrobial activity of ethanol and aqueous extracts of bark and leaves of *Cassia alata* was evaluated by Somchit *et al.,* 2003. The presence of bioactive substances have been reported to confer resistance to plants against bacteria, fungi and pests and therefore explains the demonstration of antifungal activity by the plant extracts used in this study (Srinivasan *et al.,* 2001). The results of this study showed that the organic extracts were more effective than aqueous extracts and the ethanol extracts demonstrated the highest activity. This may be due to the better solubility of the active components in organic solvents (De Boer *et al.,* 2005). The activity of the extracts was comparable to those of antibiotics. The demonstration of activity against the test fungi provides scientific bases for the local usage of these plants in the treatment of various ailments.

The demonstration of antifungal activity against human pathogenic fungi is in indication that the plant is a potential source for production of drugs with a broad spectrum of activity. The results of the study also support the traditional application of the plant and suggests that the plant extracts possess compound with antifungal properties that can be used as antifungal

agents in novel drugs. Further pharmacological evaluations, toxicological studies and possible isolation of the therapeutic antifungal from this plant are the future challenge.

Table-1. Antifungal activity of plant part extracts of *Jasminum grandiflorum.*

Plant part	Extract type	Diameter of inhibition zone (mm)				Distilled water Control	Standard Griseofulvin
		Aspergillus niger	*Candida albicans*	*Trichophyton mentagrophytes*	*Trichophyton rubrum*		
Leaf	Aqueous	13	14	13	14	-	24
	Ethanol	16	19	21	20		24
	Acetone	18	18	17	16	-	24
Stem	Aqueous	6	5	7	8	-	24
	Ethanol	18	17	18	17	-	24
	Acetone	13	14	15	12	-	24
Flower	Aqueous	-	-	-	-	-	24
	Ethanol	9	8	11	12	-	24
	Acetone	5	7	8	7	-	24

- : inhibition zone absent,

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