September 2009 Volume 5 Issue 3

Trade Science Inc.

Natural Products

An Indian Journal

Short Communication

NPAIJ, 5(3), 2009 [146-148]

Antifungal potency of *Gnidia glauca* (Fresen) Gilg. and *Pothos scandens* L.

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Received: 19th June, 2009 ; Accepted: 29th June, 2009

ABSTRACT

In this study, we explored the efficacy of methanol, chloroform and petroleum ether extracts of two traditionally used medicinal plants *Gnidia glauca* (Fresen) Gilg. and *Pothos scandens* L against human pathogenic dermatophytic fungi. The powdered plant materials were subjected to soxhlet extraction and the concentrated extracts were tested for antifungal activity by Agar well diffusion method. The zone of growth inhibition was recorded. The presence of various phytoconstituents was observed in the methanol extract. Among the plants, *G. glauca* exhibited potent antifungal activity than *P. scandens*. Methanol extract was found to inhibit test fungi to more extent than chloroform and petroleum ether extracts. From the results, it is suggestive that the plants selected for the study contain constituents possessing antifungal activity. The results of the study justified the folkloric importance of the plants tested. Further experiments in animal models have to be carried out to justify in vivo potential of the plant extracts.

KEYWORDS

Gnidia glauca (Fresen) Gilg;
Pothos scandens L;
Soxhlet extraction;
Antifungal activity;
Agar well diffusion.

INTRODUCTION

Gnidia glauca belongs to the family Thymeliaceae and locally known as Mukkadakana gida. It is a large shrub, leaves alternate, linear oblong, head inflorescence with involucre of bracts, bisexual regular flower with tubular calyx, flower and fruit in January and February. Fruit is indehiscent, one seeded with superior ovary. It is traditionally used as pesticide in the paddy fields to control insects and to treat skin diseases. *Pothos scandens* belongs to the family Araceae, It is locally known as Akkigida and is a climbing shrub with aerial roots, leaves distichous, obliquely linear to ovate, the blade absolete petiole, flower hermaphrodite, spathe cymbiform, green, spadix yellow, tricarpellary ovary, stigma lobulate, fruits are berries. The leaves are traditionally used as fodder, increases milk in cows, leaf powder is used for small pox, and root is bruised and fried in oil for application on abscesses[1]. Traditional healers claim that some medicinal plants are more efficient to treat infectious diseases than synthetic antibiotics. It is necessary to evaluate, in a scientific base, the

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potential use of folk medicine for the treatment of infectious diseases produced by common pathogens. Medicinal plants might represent an alternative treatment in non-severe cases of infectious diseases. They can also be a possible source for new potent antibiotics to which pathogen strains are not resistant[2]. The literature survey on these two plants did not reveal much information about the biological activity. Knowing its traditional importance and lack of sufficient data, we have investigated the antifungal potential of various solvent extracts of the plants against human pathogenic fungi.

MATERIALS AND METHODS

Collection and identification of plant materials

Gridia glauca (Fresen) Gilg was collected in the Sharavathi river basin of Central Western Ghats of Karnataka. *Pothos scandens* L was collected in the evergreen forests of Western Ghats of Karnataka. The plants were authenticated in Dept. of Studies and Research in Applied Botany, Jnanasahyadri, Shankaraghatta and voucher specimens (KU/AB/KSV/237 and KU/AB/KSV/315) were deposited in the department for future reference.

Extraction of plant materials using solvents

The plant materials were washed thoroughly 2-3 times with running tap water and once with sterile water, shade dried, powdered and used for extraction. The powdered plant material was extracted with solvents namely petroleum ether, chloroform and methanol. A known amount of powdered material (500gm) was subjected to soxhlet extraction and exhaustively extracted with respective solvents for about 48 hours. The extracts were filtered and concentrated in vacuum under reduced pressure using rotary flash evaporator and dried in the desiccator[3,4]. The solvent was removed under pressure to obtain a total extracts. Yield of extract was recorded by weighing extract in pre-weighed container and taking the difference. All the extracts were subjected to preliminary phytochemical screening to screen the presence of various secondary metabolites in the solvent extracts[5-7].

Antifungal assay

Fungi namely *Aspergillus niger* (MTCC478), *Candida albicans* (MTCC1637), *Microsporium gypsium* (MTCC2819), *Chrysosporium keratinophilum* (MTCC1367), *Trichophytum rubrum* (MTCC3272), *Chrysosporium indicum* (MTCC4965) were tested for their susceptibility to the solvent extracts. All these cultures were obtained from MTCC collection IMTECH (Institute of Microbial Technology), Chandigarh., India. The cultures were maintained at 4ºC and subculture frequently in respective media. The antifungal activity of plant extracts by Agar well diffusion method[8]. In this method, spore suspension of test fungi, in 0.01% Tween 80 in saline, were swabbed uniformly on solidified sterile Sabouraud's dextrose agar plates using sterile cotton swab. Then, aseptically wells of 6mm diameter were bored in the inoculated plates with the help of sterile cork borer and the extract (10mg/ml of DMSO), Standard (fluconazole, 1mg/ml) and Control (DMSO) were added into the respectively labeled wells. The plates were incubated at 28ºC for 72 hours in upright position and the zone of inhibition was recorded. The experiment was carried in triplicates to get average reading.

RESULTS AND DISCUSSION

The presence of various secondary metabolites in the methanol extract of plants selected for study is determined. The phytoconstituents namely Tannins, Terpenoids, steroids, saponins, and Flavonoids were found in the *G. glauca* while terpenoids, alkaloids, steroids and saponins were found to be present in *P. scandens*. The presence of alkaloids in *G.glauca* and tannins and flavonoids in *P.scandens* were not detected. Among the plants tested, marked antifungal activity was observed in extracts of *G. glauca* (TABLE 1). Methanol extracts were found to possess more antimycotic activity followed by chloroform and petroleum ether extracts. Among fungi tested, more inhibition of *C. keratinophilum* was observed in case of both the plant extracts followed by *C. tropica, T. rubrum* and others. Methanol extract of *G. glauca* was not found effective against *C. albicans* while that of *P. scandens* has shown good inhibition. Chloroform extract of *G. glauca* did not reveal any inhibition of *M. gypsium*. Petroleum ether extract of P. *scandens* failed to show inhibition of *A. niger*. The antimycotic activity of ex-

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tracts could be due to the presence of various phytoconstituents. Interest in plants with antimicrobial properties has revived as a result of current problems associated with the use of antibiotics. One way to prevent antibiotic resistance of pathogenic species is by using new compounds that are not based on existing synthetic antimicrobial agents[9].

TABLE 1 : Antifungal activity (in terms of zone of inhibition in mm) of various extracts of selected plants.

Test fungi	*G. glauca*			*P. scandens*			Standard	Control
	MeOH	Chl.	Pet. ether	MeOH	Chl.	Pet. ether		
A. niger	9	8	8	8	8	-	13	-
C. tropica	11	10	9	10	9	8	18	-
C. albicans	-	8	8	9	8	8	22	-
M. gypsium	8	-	8	9	8	8	15	-
T. rubrum	9	8	8	8	8	8	18	-
C. keratinophilum	14	11	12	11	8	8	17	-

CONCLUSION

From the results, it is suggestive that the plants used in the study possess marked antifungal activity in terms of inhibition of fungal growth in vitro. Thus, the extracts could be used against mycotic infections caused by the human pathogenic dermatophytes. Further studies employing animals have to be conducted to justify the *in vivo* potential of the extracts. The results of the study justified the traditional use of plants.

ACKNOWLEDGEMENT

Authors express their sincere thanks to Dr. Y.L Krishnamurthy, Reader, Dept. of Studies and Research in Applied Botany, Jnanasahyadri, Kuvempu University and Principal, S.R.N.M.N College of Applied Sciences, Shivamogga for the facilities provided.

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