



Research Article

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## Antifungal activity of *Parthenium hysterophorus* L.

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### ABSTRACT

Ethanol, chloroform, methanol, acetone, ethyl acetate, hexane, petroleum ether and aqueous extracts of *Parthenium hysterophorus* from vellore were tested in vitro for their antifungal activities against, *Aspergillus niger*, *Candidia albicans* and *Candida kefyr* with the disc diffusion method. Methanol was the best solution for extracting the effective antifungal materials from the *Parthenium hysterophorus* used in this experimental and compared with standard drug, Ketoconazole. In the present study show the importance of in producing new bioactivity compounds having antifungal activity.

**Key words:** Antifungal activity, *Parthenium hysterophorus* and leaf extract

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### INTRODUCTION

In India thousands of species are known to have medicinal values and the use of different parts of several medicinal plants to cure specific ailments has been in vogue since ancient times [1]. Plant based antimicrobials represent a vast untapped source of medicines even after their enormous therapeutic potential and effectiveness in the treatment of infectious disease hence, further exploration of plant antimicrobials need to occur [2]. Mainstream medicine is increasingly receptive of the use of antimicrobial and other drugs derived from plants, as traditional antibiotics become ineffective and because of the rapid rate of plant species extinction Medicinal plants are valuable natural resources and regarded as potentially safe drugs and have been tested for biological, antimicrobial and hypoglycemic activity also play an important role in the modern medicine [3]. Recently scientific interest in medicinal plants has burgeoned due to the increased efficiency of plant derived drugs and raising concern about the side effects of modern medicine. The efficacy of current antimicrobial agents has been reduced due to the continuing emergence of drug resistant organisms and the adaptations by microbial pathogens to commonly used antimicrobials. Therefore the search for new drugs from plants continues to be a major source of commercial drugs. Even though hundreds of plant species have been tested for antimicrobial properties, the vast majority of them have not yet been evaluated [4]. The screening of plant extracts and their products for antimicrobial activity has shown that higher plants represent a potential source of novel antibiotic prototypes [5]. In the present study was undertaken to evaluate antifungal activity of the *Parthenium hysterophorus* However against selected strains of fungi *Parthenium hysterophorus* belongs to the family Asteraceae.

### EXPERIMENTAL SECTION

*Parthenium hysterophorus* leaf was collected from Vellore, Tamil Nadu, India in the form of dry sample

**Crude extract preparation**

For preliminary investigation, 20.0 g dry powdered material was extracted with 200 ml of desired solvent [Ethanol, chloroform, methanol, acetone, ethyl acetate, hexane, petroleum ether and aqueous extracts] in cold maceration method using aspirated bottle and the extract thus obtained was dried *in vacu*.

**Test Microorganisms**

Clinical isolates of *Aspergillus niger*, *Candidia albicans* and *Candida kefyr* were gifted by Dr Agarwal's eye Hospital, Chennai, used as the test organisms. Disc diffusion method Bauer [6] was adopted for the determination of antifungal activity of the extract residues. From the stock cultures of various test organisms, inoculum was prepared by subculturing each of the organisms on Potato dextrose agar at 37°C. Seeding of Potato dextrose agar plates was done using the 24 hr culture with a cotton swab under aseptic conditions. The discs loaded with extract residues were aseptically placed on top of the seeded medium and gently pressed to ensure contact. The plates were then incubated at 37°C. After overnight incubation, the plates were observed for zones of inhibition. Ketoconazole was used as standard drug.

**RESULTS AND DISCUSSION**

The antifungal activity of the crude solvent extracts of the *Parthenium hysterophorus* eight solvent systems namely Ethanol, chloroform, methanol, acetone, ethyl acetate, hexane, petroleum ether and aqueous extracts. The fungi *Candidia albicans* was used as test organism (Table.1). In this preliminary investigation, the leaf extract prepared with a mixture of methanol proved to be more effective than the other solvent system used in inhibiting the growth of *Candidia albicans* on Potato dextrose agar plates. Ethanol exhibit only 80% maximum activities against the test organism (Table.1). While ethyl acetate, acetone, petroleum ether, hexane and chloroform of the leaf were able to exhibit only 20% to 75% maximum activity against the test organism (Table.1). The aquas extract appeared to be poor growth of *Candidia albicans*. Based on these observations, further experiments on the antifungal activities of the *Parthenium hysterophorus* were carried out methanol extracts.

The methanol extract of the *Parthenium hysterophorus* were prepared as described earlier and testes at a concentration of 700 µg/disc by disc diffusion method against three pathogenic fungal namely, *Aspergillus niger*, *Candidia albicans* and *Candida kefyr* The results are presented in Table.2. The extract residues of leaf recorded maximum activity against *Candidia albicans* with an inhibition zone of 17 mm for *Parthenium hysterophorus* which are quite high (Table.2). The extract residue of *Parthenium hysterophorus* recorded activity against *Candida kefyr* and *Aspergillus niger* 70.5 to 58.8% (Table .2). The antifungal activities of the methanol extract residues of the *Parthenium hysterophorus* against the three pathogenic fungal was compared with the standard antibiotics (Tables.2).

There was no activity observed in aqueous extract against the tested fungus. Our findings are in accordance with the observations of Ravindra *et al.*, [7]. The different components difusing at different rates may have been responsible for the varying zone of inhibition obtained in our assays against microorganisms. If the components could be separated and tested further we might find use as individual antibacterial agent against antimicrobial infection [8].

**Table 1: Antifungal activity of the crude solvent extracts of the *Parthenium hysterophorus***

S.No	Solvent used for extraction	Antifungal activity (% maximum activity) <i>Parthenium hysterophorus</i>
1.	Methanol	100%
2.	Ethanol	80%
3.	Ethyl acetate	75%
4.	Acetone	68%
5.	Chloroform	55%
6	Petroleum Ether	32%
7	Hexane	20%
8	Aquas Extract	12%

The present study differs from the previous study since the antifungal activity was evaluated using methanol extract residues of the *Parthenium hysterophorus*. On evaluating the antifungal property of, *Parthenium hysterophorus* the alga proved to be a potent antifungal agent. The finding of this study also paves the way for further research to identify the specific bioactive compounds that is responsible for its claimed antifungal activity.

Maximum activities (zone of inhibition) for *Candidia albicans* were 17 mm (for *Parthenium hysterophorus* extract)

Table 2: Antifungal activity of the crude petroleum extracts residue of the *Parthenium hysterophorus*

S.No	Test fungal	Zone of inhibition (mm) $\pm$ S.E.	
		<i>Parthenium hysterophorus</i>	Ketoconazole
1.	<i>Candidia albicans</i>	17 $\pm$ 0.022 (100)	15 $\pm$ 0.110
2.	<i>Candida kefyr</i>	12 $\pm$ 0.125 (70.5)	10 $\pm$ 0.043
3.	<i>Aspergillus niger</i>	10 $\pm$ 0.005 (58.8)	8 $\pm$ 0.150

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