



***In-vitro* bioactivity of Indian medicinal plants *Lantana camara* and *Mimosa pudica* against important pathogens**

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Abstract

Methanolic extracts from different parts of *Lantana camara* and *Mimosa pudica* were evaluated for potential antimicrobial activity against medically important pathogenic strains. The present study aimed at evaluating the *in vitro* antimicrobial activity of methanolic extracts of medicinal plant against *Alternaria alternata*, *Aspergillus niger*, *Macrophomina phaseolina* and *Rhizoctonia solani* using agar well diffusion technique. The extract showed the highest activity against *Aspergillus flavus*. Hence, these plants can be used to discover bioactive natural products that may serve as leads in the development of new pharmaceuticals that address not fulfilled therapeutic needs.

Key words: *Alternaria alternata*, Methanolic extract, Agar well diffusion technique.

Introduction

Since ages, man has been dependent on nature for curing various body diseases. From ancient civilization various parts of different plants were used to eliminate pain, control suffering and counteract disease. Most of the drugs used in primitive medicine were obtained from plants and are the earliest and principal natural source of medicines. The plants used, as drugs are fairly innocuous and relatively free from toxic effects or were so toxic that lethal effects were well known. The nature has provided the storehouse of remedies to cure all ailments of mankind. There is no doubt that plants are a reservoir of potentially useful chemical compounds which serve as drugs, are provided newer leads and clues for modern drug design by synthesis. There are several reports of antibiotic resistance of human pathogens to available antibiotics [1, 2, 3,4]. Biomolecules of plant origin appear to be one of the alternatives for the control of these antibiotic resistant human and plant pathogens besides small molecules from medicinal chemistry, natural products are still major sources. Nature has bestowed upon us a very rich botanical wealth and a large number of diverse types of plants grow wild in different parts of our country Indian medicinal plants are regularly used in various system of medicine because of

minimal side effect and cost effectiveness. In this study, we evaluated the antimicrobial activity of methanolic extracts of *Lantana camara* and *Mimosa pudica* against several pathogenic microorganisms. *Lantana camara* L belongs to Verbenaceae and uses are Skin itches, leprosy, scabies cancers, chicken pox, measles, asthma, ulcers, swellings, eczema, tumors, high blood pressure, bilious fevers, catarrhal infections, tetanus, rheumatism and malaria where as *Mimosa pudica* Linn belongs to Fabaceae and uses are Menorrhagia, piles, Skin wounds Diarrhoea, Hydrocele, Whooping cough, Filiriasis.

Materials and Methods

Solvents and chemicals used:

All chemicals were purchased from Merck, Qualigens fine Chemicals and SD fine chemicals, Mumbai.

Plant material and extraction procedure for antimicrobial:

Healthy, disease free, medicinal plant materials *Lantana camara* and *Mimosa pudica* collected from Visakhapatnam, Andhra Pradesh they were taxonomically identified and the Voucher specimen is stored. The plant material were dried under shade with occasional shifting and then powdered with a mechanical grinder and stored in an airtight container. The powder obtained was subjected to successive soxhlet extraction with organic solvents with increasing order of polarity i.e. Hexane, Chloroform and Methanol respectively.

Test microorganisms:

Alternaria alternata (MTCC 1362), *Asperigellus niger* (MTCC 2723), *Macrophomina phaseolina* (MTCC 2165), *Rhizoctonia solani* (MTCC 4633), procured from Microbial Type Culture Collection (MTCC), Chandigarh. Active cultures were generated by inoculating a loopful of culture in separate 100mL nutrient/potato dextrose broths and incubating on a shaker at 37°C overnight. The cells were harvested by centrifuging at 4000 rpm for 5 min, washed with normal saline, spun at 4000 rpm for 5 min again and diluted in normal saline to obtain 5×10^5 cfu/mL.

Determination of antimicrobial activity: The crude extracts of the different plant parts of different species were subjected to antimicrobial assay using the agar well diffusion method of Murray *et al.*, 1995 [6] modified by Olurinola 1996 [7].

Minimum inhibitory concentration (MIC) assays:

Based on the preliminary screening chloroform and methanolic extracts were found to have potent antimicrobial activity and Minimum Inhibitory Concentrations (MIC) of the extracts was determined according to Elizabeth., 2001 [8]. The MICs were determined as the lowest concentration of extracts inhibiting visible growth of each organism on the agar plate. Similarly the MICs of methanolic extracts were determined against all other microorganisms.

Results and Discussion**Table 1 *Lantana camara***

Name of pathogen	100 mg/ml	300 mg/ml	500 mg/ml	MIC
<i>A.alternate</i>	10	12	16	85
<i>A. niger</i>	0	0	0	0
<i>M. phaseolina</i>	10	11	16	80
<i>R. solani</i>	9	12	16	90

Table 2 *Mimosa pudica*

Name of pathogen	100 mg/ml	300 mg/ml	500 mg/ml	MIC
<i>A.alternate</i>	0	0	0	0
<i>A.niger</i>	7	9	12	100
<i>M. phaseolina</i>	10	12	14	85
<i>R. solani</i>	0	0	0	0

* Methanolic extract concentrations (100,300 and 500 mg/ml of DMSO)

* All values indicate Zone of inhibition (ZI) in mm, (0) Value indicates No activity.

Lantana camara and *Mimosa pudica* are rich in metabolites and exhibited antimicrobial activity on phytopathogens showing different sensitivity with three concentrations (100, 300 and 500 mg/ml) .The hexane and chloroform extracts showed negligible activity than the methanolic extract hence not presented here.

The results summarized in Table 1 and 2 *L.camara* extract shown highest activity (10 mm) against *A. alternate* where as lowest activity against *R. solani* where as no activity was found *A.niger* .Both *L.camara* and *M. pudica* extract shown same activity (10 mm) with *M. phaseolina*.

It is not surprising that there are differences in the antimicrobial activities of plant groups, due to the phytochemical differences between species. Negative results do not indicate the absence of bioactive constituents, nor is that the plant inactive. Active compound(s) may be present in insufficient quantities in the crude extracts to show activity with the dose levels employed. Lack of activity can thus only be proven by using large doses. On the other hand, if the active principle is present in high quantities, there could be other constituents exerting antagonistic effects of the bioactive compounds. However, the strength of the existing data is not enough to suggest a reasonable mode of action for antimicrobial effects. The data of this study may just enrich the existing comprehensive data of biological activity.

Conclusion

It can be concluded that plant extracts have greater potential as antimicrobial compounds against microflora and that they can be used in the treatment of infectious diseases caused by resistant pathogenic microorganisms. Our study undoubtedly confirms that the varies parts contain higher relative percentage of the above mentioned crude organic extracts has potential antibacterial and antifungal principle for chemotherapeutic application. Thus, it is anticipated that phytochemicals

with adequate antimicrobial efficacy will be used for the treatment of bacterial and fungal infections since time immemorial.

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