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Evaluation of Antimicrobial Activity of Some Garden Plant Leaves Against *Lactobacillus* Sp, *Streptococcus mitis*, *Candida albicans* and *Aspergillus niger*

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Abstract: The aim of the present study was to evaluate and compare the antimicrobial activity of *Bougainvillea glabra choicy, Lantana camara L and Delonix regia (Hook) Raf*, leaves against *Lactobacillus sp, Streptococcus mitis, Candida albicans and Aspergillus niger*. *Bougainvillea glabra choicy, Lantana camara and Delonix regia* leaves belong to three different families, viz. Nyctaginaceae, Caesalpinaceae and Verbenaceae. Antimicrobial activity of ethanol extract of these plant leaves were tested against Gram positive, Gram negative bacterial strains by observing the zone of inhibition. Antimicrobial activity was done by well diffusion method at a concentration of 1ml of the ethanol extract, using ethanol as the control. Among all the results obtained *Delonix regia (Hook) Raf* showed excellent antimicrobial activity against all the test organisms, *Bougainvillea glabra choicy* considered moderately active against all the test organisms and *Lantana camara L* having high antibacterial activity and no antifungal activity. As a results, the comparative of the three plant extracts *Lantana camara* showed high antibacterial activity and *Delonix regia* had high antifungal activity.

Key words: *Lactobacillus* sp · *Streptococcus mitis* · *Candida albicans* · *Aspergillus niger* and Antimicrobial activity

INTRODUCTION

An antimicrobial is a substance that kills or inhibits the growth of microorganisms such as bacteria, fungi, or protozoans,. Antimicrobial drugs either kill microbes (microbicidal) or prevent the growth of microbes (microbistatic).

The discovery of antimicrobials in the previous century was followed by spectacular gains in human health and life expectancy. The emergence of resistance to these "wonder drugs" is now so widespread that it threatens to undermine – or even reverse- these gains.

Fungi are significant destroyers of foodstuffs and grains during storage, rendering them unfit for human consumption by retarding their nutritive value and often by producing mycotoxins [1, 2]. A significant portion of the agricultural product in the country and the world over become unfit for human consumption due to mycotoxins contamination of grains, especially those produced by species of *Aspergillus* [3, 4]. More than 25% of the world acereals are contaminated with known mycotoxins and more than 300 fungal metabolites are reported to be toxic to man and animals [5]. The main toxic effects are carcinogenicity, genotoxicity, terratogenicity, nephrotoxicity, reproductive disorders and immunosuppression [6]. A sizeable portion of the world population living below poverty line in the developing and underdeveloped countries of Asia and Africa are suffering from health problems associated with consuming mycotoxin contaminated grains and cereals [7].

Infectious diseases are the leading cause of death world -wide. Antibiotic resistance has become global concern [8]. The clinical efficacy of many existing antibiotics is being threatened by the emergence of multi drug-resistant pathogens [9]. Many infectious diseases

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have been known to be treated with herbal remedies throughout the history of mankind. Natural products, either as pure compounds or as standardized plant extracts, provide unlimited opportunities for new drug leads because of the unmatched availability of chemical diversity. There is a continuous and urgent need to discover new antimicrobial compounds with diverse chemical structures and novel mechanisms of action for new and re-emerging infectious diseases [10]. Therefore, researchers are increasingly turning their attention to folk medicine, looking for new leads to develop betterdrugs failure of chemotherapeutics and antibiotic resistance exhibited by pathogenic microbialingts has led to the screening of several medicinal plants for their potential antimicrobial activity [11, 12].against microbial infections [13].

In the present study, we have evaluated the antibacterial effect of the extracts of gardening plant leaves such as *Bougainvillea glabra* choicy, *Lantana camara* L and *Delonix regia* (Hook) Raf against two bacterial organism such as *Lactobacillus* sp, *Streptococcus mitis* and two fungal organism such as *Aspergillus niger* and Antimicrobial activity and the results are discussed.

MATERIALS AND METHODS

Plant Material: Plants were collected from Thanjavur District of Tamilnadu. The botanical identity of the plant was confirmed by Dr. John Britto, Rapinet Herbarium, ST. Joseph's College, Tiruchirappalli.

Plant Sample Extraction: 20gm powdered plant material is soaked in 50ml of ethanol overnight and then filtered through whatmann filter paper No.41 along with 2gm sodium sulfate to remove the sediments and traces of water in the filtrate. Before filtering, the filter paper along with sodium sulphate is wetted with ethanol. The filtrate is then concentrated by bubbling nitrogen gas into the solution and reduces the volume to 1ml. The extract contains both polar and non-polar phytocomponents.

Microorganisms: *Lactobacillus* sp, *Streptococcus mitis*, *Candida albicans*, *Aspergillus niger* were the pathogenic microorganisms included in the study. All the cultures were obtained in pure form from the culture collection of Institute of Microbial Technology (IMTECH), Chandigarh, India.

Media Preparation

Bacterial Media: 36gm of Muller Hindon Media (Hi-Media) was mixed with distilled water and then sterilized in autoclave at 151b pressure for 15 minutes. The sterilized media were poured into petridishes. The solidified plats were bored with 5mm dia cork bored. The plate with wells were used for the antibacterial studies.

Fungal Media: 200gm of potato slices were boiled with distilled water. The potato infusion was used as water source of media preparation. 20gm of dextrose was mixed with potato indusion. 20gm of agar was added as a solidifying agent. These constituents were mixed and autoclaved. The solidified plates were bored with 6mm dia cork borer.

Well Diffusion Method: Antibacterial and anti-fungal activity of the plant extract was tested using well diffusion method. The prepared culture plates were inoculated with different selected strains of bacteria and fungi using streak plate method. Wells were made on the agar surface with 6mm cork borer. The extracts were poured into the well using sterile syringe. The plates were incubated at 37°C ± 2 °C for 24 hours for bacterial and 25 °C ± 2 °C for 48 hours for fungal activity. The plates were observed for the zone formation around the wells was measured in mm (millimeter). For each treatment three replicates were maintained.

The diameter of inhibition zones was measured in mm and the results were recorded. Inhibition zones with diameter less than 12mm were considered as having no antimicrobial activity. Diameters between 12 and 16mm were considered moderately active and these with >16mm were considered highly active.

The data was subjected to statistical analysis of SPSS for windows.

RESULTS

The result of the antibacterial activity against the tested pathogens are given in the Table 1.

Among all the results obtained all three plant extracts showed antimicrobial activity. *Delonix regia (Hook) Raf* showed excellent antimicrobial activity against all the test organisms, *Bougainvillea glabra choicy* considered moderately active against all the test organisms and *Lantana camara L* having high antibacterial activity and no antifungal activity.

Table 1: Antimicrobial activity of plant extracts:

S.No.	Name of organism	*Bougain villea glabra* (mm)	*Delonix regia (mm)*	*Lantana camara* (mm)
1.	*Streptococcus mitis*	17.50±0.38	22.62±0.18	28.00±0.00
2.	*Lactobacillus sp*	15.00±0.60	18.25±0.16	34.75±0.84
3.	*Candida albicans*	16.17±0.34	16.58±0.61	0.00±0.00
4.	*Aspergillus niger*	14.33±0.11	23.25±0.14	0.00±0.00

Values are expressed as mean ± S.D of three replicates.

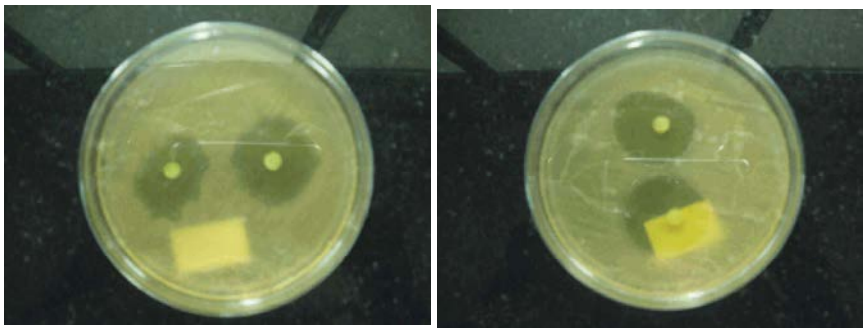

Fig. 1: Ethanol extract in *Lantana camara* on *Streptococcus mitis* and *Lactobacillus sp.*

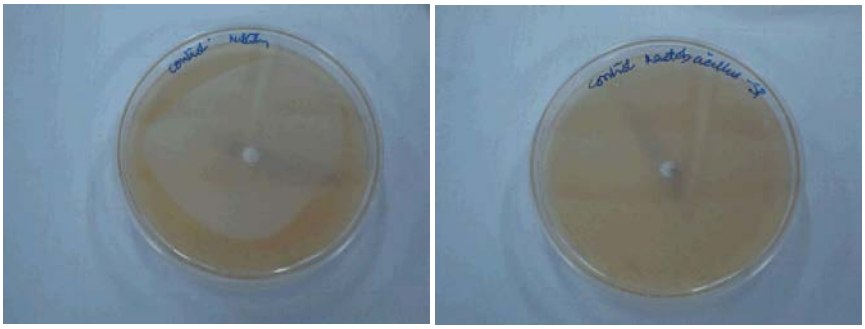

Fig. 2: Inhibitor effect of ethanol extract in *Lantana camara* on *Streptococcus mitis* and *Lactobacillus sp*.

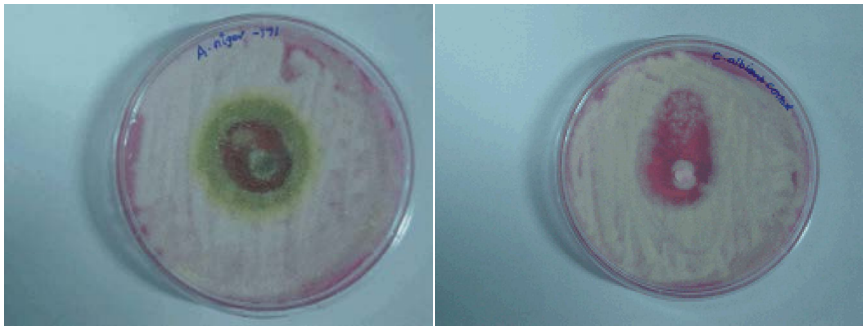

Fig. 3: Ethanol extract in *Delonix regia* on *Aspergillus niger* and *Candida albicans*.

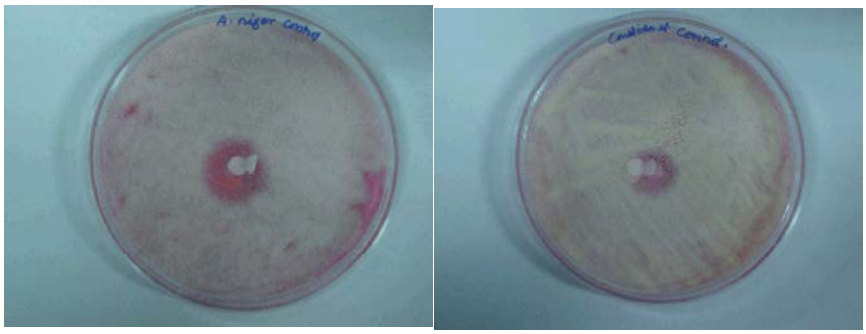

Fig. 4: Inhibitor effect of ethanol extract in *Delonix regia* on *Aspergillus niger* and *Candida albicans.*

As a result, the comparing the three plant extracts *Lantana camara* (Fig1,2) showed high antibacterial activity and *Delonix regia* (Fig3,4) have high antifungal activity.

DISCUSSION

Ethnobotanical approach is one of the common methods that are employed in choosing the plants for pharmacological study. India is one of the twelve mega biodiversity centers having more than 45,000 plant species. Its diversity is unmatched due to the presence of sixteen different agroclimatic zones, 10 vegetative zone and 15 biotic provinces [14].

Use of plants as a source of medicine has been inherited and is an important component of the health care system. Approximately 20% of the plants found in the world have been submitted to pharmacological or biological tests [15].

The systemic screening of plant extracts for antibacterial activity is a continuous effort to find new antibacterial compounds. Considering the rich diversity of plants in Karnataka, it is necessary to screen plants for their antibacterial activity.

The present investigation shows the above three garden plant leaves had high antimicrobial activity of comparing other ornamental plants. so, it was considered the three plants had medicinal values and some biological activities of ethanol extract.

The comparative study of three plants has been demonstrated for the first time and further investigation is in progress to isolate and characterize the active principles.

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