



## Detection Of Antimicrobial Activity of Leaves Extracts (Alcoholic) of *Mangifera Indica* & *Cymbopogan Citrata* Sps. Against Bacterial and Fungal Strains

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### ABSTRACT

Now a days, it has been observed that there is a drastic increase in the number of antibiotic resistant microorganisms, because of which alternative antimicrobial agents other than synthetic antibiotics are required. Plants can serve as an alternative resource for that. In the current study detection of antimicrobial activity of leaves extracts (Alcoholic) of *Mangifera indica* & *Cymbopogan citrata* sps. against bacterial and fungal strains has been carried out. Different concentrations (25%, 50%, 75% and 100%) of methanol and ethanol leaf extracts has been applied to Bacterial strain (*E.coli*, *Bacillus subtilis*) and fungal strain (*Aspergillus niger*, *Aspergillus nidulans*) through disc diffusion method and zone of inhibition was observed. Methanol extract was found ineffective against fungal strains but ethanol extract showed effectiveness but up to lower extent. Ethanol and methanol extracts showed maximum effect in case of bacterial strains.

Keyword: Antimicrobial, *Mangifera* Sps. *Cymbopogan* Sps. Methanol extract, ethanol extract.

### INTRODUCTION

Plants are the preferred source of a variety of natural drugs). Plants are easily available, safe and low cost sources of alternative medicines (Pretorius and Watt, 2001; Sharif and Banik, 2006; Doughari *et al.*, 2007)). Not only developing, individuals from developed countries are also using traditional medicines whose active compounds are acquired from plants (Selvamohan *et al.*, 2012)..The experimental research is necessarily required for better understanding of medicinal al properties of various plant parts so that we can use them safely and effectively. Secondary metabolites and essential oils present in the plant may be of therapeutic importance (Dipankar *et al.*, 2011). These products are known by the name of their active ingredients. It has been found that microorganisms like bacteria have genetic capability to transmit and acquire resistance to various factors viz. metals, drugs (antibiotics) etc. which are generally used as therapeutic agents (Singh *et al.*, 2015). The multiple and repeated difficulties with antibiotics has prompted research to explore phototherapeutic agents against microbial infection.

*Mangifera indica* L, commonly known as mango, is a plant belonging to the family *Anacardiaceae* which consists of about sixty genera and six hundred species (Akinpelu and Onakoya, 2006). It is a popular tropical fruit bearing trees in the world (Kabuki *et al.*, 2000) having medicinal properties. The leaves of *M. indica* have been chemically analyzed and found to contain glucoside and mangiferin which is potent antimicrobial agent. Mangiferin also possess antiviral activity, hypoglycemic, anti-hyperlipidemic and antiatherogenic activities (Zakaria *et al.*, 2006).



*Cymbopogon citratus* (Poaceae family), commonly known as lemon grass, is a perennial tropical grass with thin, long leaves and having medicinal properties. In Asia and Africa, its oil is used as antiseptic, antitussive, anti-rheumatic and to treat backache, sprains, and hemoptysis. It is also used as alternative medicine as sedative, antimicrobial, anti-inflammatory and antidiabetic also. The present study aimed to evaluate the antimicrobial activity of the leaves extract of above mentioned plants.

#### MATERIALS AND METHODS

**Preparation of plant extracts :** Fresh leaves of *Mangifera indica* and *Cymbopogon citratus* was collected from the IMSEC premises. These were washed thoroughly, first with tap water (two to three times) and then with distilled water to remove the dust particles and mid-ribs of the leaves were removed. These were wiped by means of a tissue paper, kept in dark till they were completely dry and crushed into very fine powder using a pestle mortar. . Five grams leaf powder of each plant was added with the solvent, ethanol and methanol. These extracts were kept on orbital shaker for 48-72 hours The samples were then filtered with the help of whattman filter paper no.1. These samples were poured in separate crucibles. The crucibles were then kept in hot air oven at 60 °C till the excess acetone, methanol and ethanol was evaporated. Some amount of organic solvents still remained and to remove the moisture extracts were placed in a desiccator. The weight of the extracts in the crucibles were monitored regularly till it became constant. The extracts in the crucibles were then scrapped out and dissolved in dimethyl sulfoxide (10% DMSO; 4 times the amount of extract). These tubes were kept in the freezer for future use

**Test organisms :** Bacterial strain (*E.coli*, *Bacillus subtilis*) and fungal strain (*Aspergillus Niger*, *Aspergillus nidulans*) were included in the study. The organisms were made as stock by mixing 100 µl of suspension in 10 ml of sterile nutrient broth and grown overnight. The organisms were maintained by sub culturing them on nutrient agar at regular intervals and used throughout the study. Antimicrobial activity assay .The microbial susceptibility test was done by using disc diffusion method

**Disc Diffusion Method:** Discs soaked with four different concentrations (25%, 50%, 75%, and 100%) of these plant extracts were transferred to the culture plates of various strains of microbes and pressed slightly. The plates are then incubated for 2-3 days at ambient temperature (37°C for bacterial strains and 30 °C for fungal strains) for the purpose of measurement of minimum inhibitory concentration

#### RESULT AND DISCUSSION

The agar disc diffusion method is a standard technique extensively used for the screening of antimicrobial activities of extracts. We evaluated the antimicrobial activities against Bacterial strain(*E.coli*, *Bacillus subtilis*) and fungal strain(*Aspergillus niger*, *Aspergillus nidulans*) The resultants are given in the Table 1 . Compared to methanol extract, ethanol extract of both mangifera and cymbopogan exhibited a potent inhibitory effect against *fungal strains*. *Methanol extract of cymbopogan was found ineffective against fungal strains*. Methanol extract of mangifera showed mild activity against *Aspergillus nidulans*. (Figure 1& 2). Both methanol and ethanol extracts of mangifera and cymbopogan showed potent antibacterial activities but extent was lower in case of methanol if we compare between methanol and ethanol extract (Figure 1&2).. The zone of growth inhibition expanded with the increasing concentration of extracts. In other words zone of inhibition was directly proportional to the increasing concentration of extracts.

It has been observed that the benefits of antibiotics have been reduced significantly because of development of disease-resistant microbial strains. Another reason of downfall of antibiotics is their adverse effects to human health. The excessive use of antibiotics causes deteriorating effects on some body organs (Towers et al., 2001).



Prominent zones of inhibition by leaves extract of mangifera and cymbopogan showed that these plants have a lot of potential to serve as effective antimicrobial drug alternatives against many antibiotics. They not only possess antimicrobial properties but are also friendly to human health. However, further studies are required for efficient evaluation of the potential effects of the plant-extracts as antimicrobial agents. The current and the past studies will form the base for the conclusion

Table 1: Showing the effect of methanol and ethanol extract of Mangifera and Cymbopogan leaf against bacterial & fungal strains

PLAN	Bacillus subtilis	E.coli	Aspergillus nidulans	Aspergillus niger
MANGIFERA INDICA	METHANOL	METHANOL	METHANOL	METHANOL
	++	++	+	-
	ETHANOL	ETHANOL	ETHANOL	ETHANOL
	+++	+++	+++	++
CYMBOPOGONN	METHANOL	METHANOL	METHANOL	METHANOL
	++	+	-	-
	ETHANOL	ETHANOL	ETHANOL	ETHANOL
	+++	+++	++	+

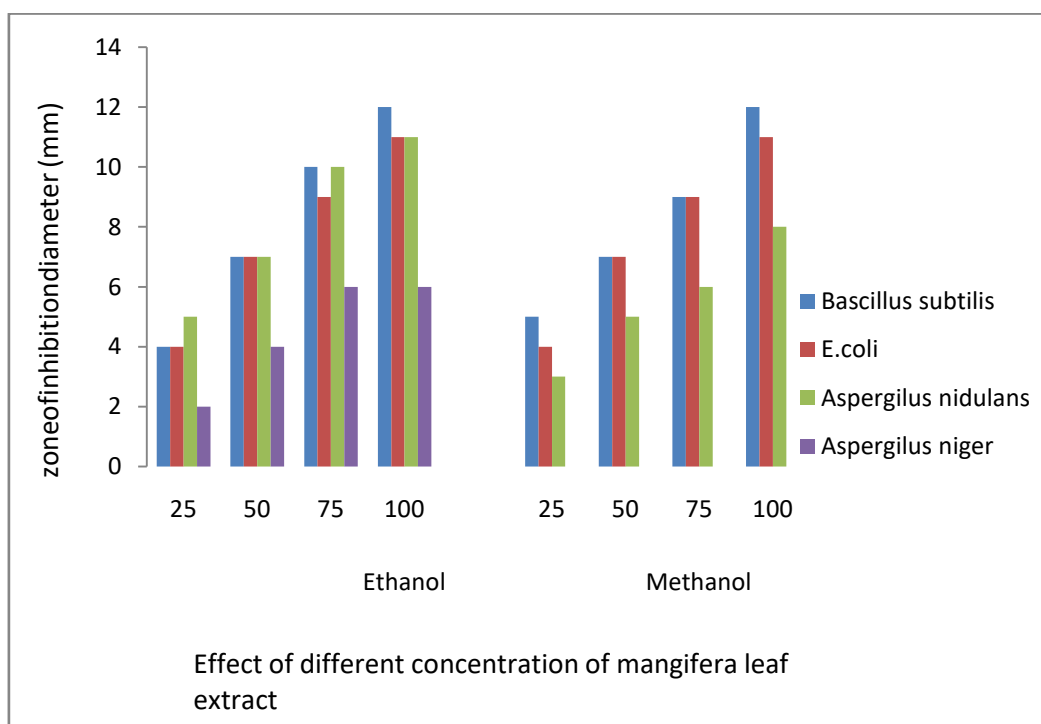


Figure1: Effect of different concentration of mangifera leaf extract on bacterial and fungal strains

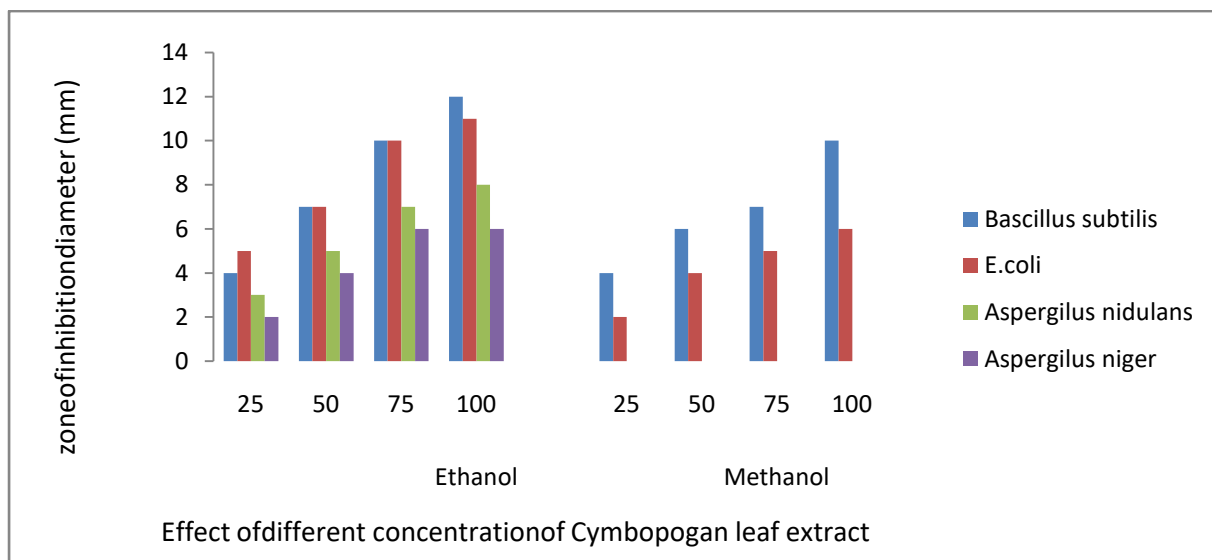


Figure2: Effect of different concentration of cymbopogon leaf extract on bacterial and fungal strains

#### CONCLUSION

Because of increasing the number of antibiotic resistant microorganisms, there is a need for alternative antimicrobial agents other than synthetic antibiotics (Parmar and Rawat, 2012). Plants can serve as an alternative resource for that. Studies are continuing all over the world to establish the effectiveness of plant extracts against many pathogenic bacteria (Chowdhury et al., 2013). Demonstration of antimicrobial activity of mangifera and cymbopogon indicates that there is possibility of sourcing alternative antibiotic substances in these plants for the development of newer antimicrobial agents. . The research must go on beyond what is done so far, so that we may utilize our natural sources to treat any ailment associated with microbial infections.

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