



## Original Research Article

### ***In vitro* efficacy of methanolic extract of *Mimosa pudica* against selected micro-organisms for its broad spectrum antimicrobial activity**

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#### A B S T R A C T

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properties

India have diversified fauna & flora, most of them are rich in natural products and naturally derived components. These components showed the antioxidant, anti microbial etc potential. The main aim of this study is to strengthen the multiple potential values of *Mimosa pudica* L. In this study, antimicrobial activities of 50% methanolic crude extracts of *Mimosa pudica* L were evaluated against different bacterial strains (*E.coli* MTCC-443, *Pseudomonas aeruginosa* MTCC-4673, *Staphylococcus aureus* MTCC- 3160, *Bacillus subtilis* MTCC-441, *Streptococcus pyogenes* MTCC-1926.) by agar well diffusion method & MIC determination. The crude extract showed a broad spectrum of antibacterial activities by inhibiting the respective bacteria in Agar well diffusion assay. Inhibitory zone of 17.25 mm to 20 mm diameter for *Mimosa pudica* extracts were observed against selected microorganism. The present study supports the immense medicinal properties of *Mimosa pudica*

## Introduction

Indian ayurvedic system is one of the noteworthy systems of traditional medicine practice that uses mainly certain plants for the treatments of ailments in both man and other animals. The increasing prevalence of multidrug resistant strains of bacteria and the recent emergence off strains with reduced susceptibility to antibiotics raises the specter of untreatable bacterial infections and adds urgency to the search for new infection- fighting strategies (Sieradzki et al 1999). Contrary to the synthetic drugs,

antimicrobial substances of plant origin are not associated with many side effects and have an enormous therapeutic potential to heal many infectious disease (Iwu et al 1999).

*Mimosa pudica* L. is a creeping annual or perennial herb often grown for its curiosity value, as the compound leaves fold inward and droop when touched and reopens within minutes. It belongs to the Fabaceae family. *Mimosa pudica* is native to Brazil, but is now a pan tropical

weed. The other names given to this plant are Humble plant, Shame plant, Touch me not, Sleeping grass (Tropical Biological Association), Prayer plant, The species epithet “pudica” is a latin equivalent for “Bashful” or “Shrinking”, because of its curious nature and easy procreation. The stem is erect in young plants, but becomes creeping or trailing with age. The plant grows to a height of 1.5m (5 ft). The leaves are bipinnately compound, with one or two pinnae pairs and 10-26 leaflets per pinna. The petioles are also prickly and on close examination, it is seen that the floret petals are red in their upper part and the filaments are pink to lavender. The fruit consists of clusters of 2-8 pods of 1-2cm long each, prickly on the margins. The pods break into 2-5 segments and contain pale brown seeds 2.5mm long (Vaidyaratnam et al 2011).

This plant has a history of use for the treatment of various ailments and the most commonly used plant part for this purpose is the root but flowers, bark and fruit can also be utilized. Several research works have been carried out to study about the antimicrobial activity of the plant (Palacios et al 1991, Ojalla et al 1999, Gandhiraja et al 2009). The antimicrobial activity was attributed to the presence of bioactive constituents like terpenoids, flavonoids, glycosides, alkaloids, quinines, phenols, tannins, saponins and coumarin (Gandhiraja et al 2009). The present study intended to study about the antibacterial activity of the plant extracts of *Mimosa pudica* against selected microbes.

## Materials and Methods

### Collection of plant material:

**Leaves:** The Fresh leaves of *Mimosa Pudica* Linn were first collected from the

plants. These leaves were washed thoroughly 10-15 minutes with running tap water and then with sterile water. They were dried in shade, powdered and used for extraction.

### Preparation of solvent extractions:

20gm of the *Mimosa Pudica* leaves powder was dissolved in 100 ml of 50% methanol to prepare the extract. Extraction was done by Soxhlet Apparatus

### Micro-organisms used

Bacterial strains were procured from Microbial Test Culture Collection (MTCC), Institute of Microbial Technology (IMTECH), Chandigarh, Punjab. The accession no. of bacterial strains was *E.coli* MTCC-443, *Pseudomonas aeruginosa* MTCC-4673, *Staphylococcus aureus* MTCC- 3160, *Bacillus subtilis* MTCC-441, *Streptococcus pyogenes* MTCC-1926. These were maintained on mueller hinton agar slants. All the isolates were sub cultured regularly in mueller hinton broth and slants.

### Screening for antibacterial activity

Antimicrobial activity was tested using a modified well diffusion assay method (Perez *et al* 1990). Crude extract powder were dissolved in the 50% methanolic solvents. Pure solvent were used as control in the study. The inoculums for each microorganism were prepared in luria broth medium, incubated overnight and spreaded with a sterile swab into petri-plates. Then extract and control were added in well of plate and incubated at 37°C for 24 hours. The results were recorded by measuring the zones of growth inhibition. Clear inhibition zones

Fig.1 Antibacterial activity of Methanolic extract of *Mimosa pudica* Leaves

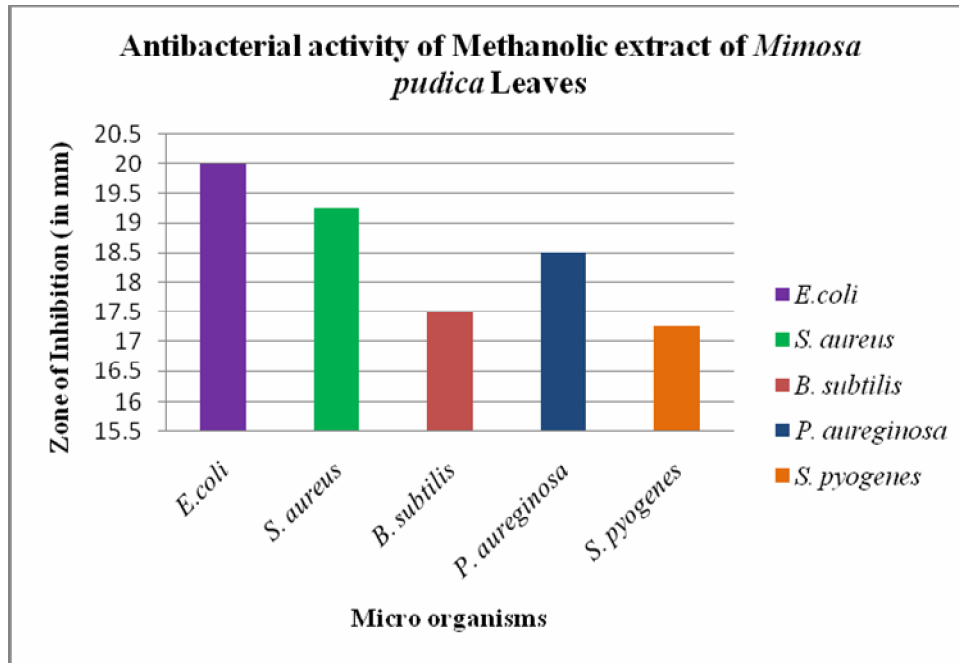
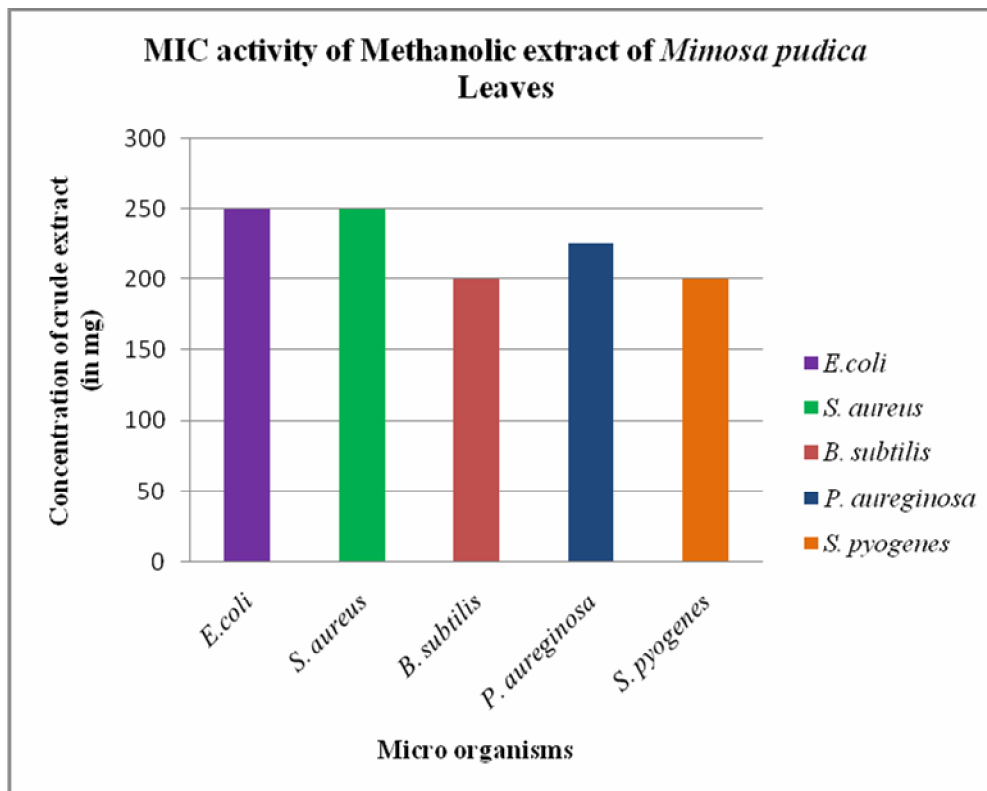


Fig.2 MIC activity of Methanolic extract of *Mimosa pudica* Leaves



around well indicated the presence of antimicrobial activity. All data on antimicrobial activity were average of triplicate. Tetracycline was used as positive control and solvents were used as negative control.

### Minimum Inhibition Concentration:

The minimum inhibitory concentration (MIC), is the lowest concentration of material, which inhibits the growth of an organism. It was determined by broth tube dilution method, which is based on cultures containing different concentration of Methanolic crude extract of *Mimosa pudica* Leaves (NCCLS, 2000)

### Results and Discussion

Antibacterial activity & MIC of 50% Methanolic extract of *Mimosa pudica* Leaves were checked against *E.coli* MTCC-443, *Pseudomonas aeruginosa* MTCC-4673, *Staphylococcus aureus* MTCC- 3160, *Bacillus subtilis* MTCC-441, *Streptococcus pyogenes* MTCC-1926.

Figure 1 shows the result of antibacterial activity of 50% Methanolic extract of *Mimosa pudica* Leaves, in which *E.coli*, *Staphylococcus aureus* showed the highest activity with zone of inhibition (20 mm, 19.25 mm respectively) whereas *Bacillus subtilis*, *S. pyogenes* showed the lowest activity with the zone of inhibition (17.5 mm, 17.25 mm respectively), moreover *Pseudomonas aeruginosa* showed moderate activity (18.5 mm).

Figure 2 shows the result of Minimum Inhibitory Concentration of 50% Methanolic extract of *Mimosa pudica* Leaves, against all the selected bacteria, in which *E.coli*, *Staphylococcus aureus* showed significant results at concentration of 250 mg/ml whereas *Bacillus subtilis*, *S.*

*pyogenes* showed significant activity the lowest concentration of 200mg/ml, In addition to these *Pseudomonas aeruginosa* showed the activity on 225 mg/ml.

Methanol extract of *M. pudica* showed antibacterial activities against all five bacterial strains (3 gram positive and gram negative bacteria). Our results are in support of previous studied. (Muthukumaran et al 2011, Arokiyaraj et 2012, Mohan et al 2011). The methanol extract of the *M. pudica* was most effective in inhibition of the bacterial growth. It is suggested that polar solvent methanol was most successful in extracting secondary metabolites responsible for the antibacterial property than aqueous extracts (Banso et al 2007). The antimicrobial activity of *M. pudica* may attributed to the presence of bioactive constituents like terpenoids, flavonoids, glycosides, alkaloids, quinines, phenols, tannins, saponins and coumarin (Gandhiraja et al 2009)

It may be concluded from study that bioactive compounds from *M. pudica* can be employed in the formulation of antimicrobial agents for the treatment of various bacterial and fungal infections. Moreover isolation, identification and purification of these phytoconstituents and determination of their respective antimicrobial potencies and toxicological evaluation with the view to formulating novel chemotherapeutic agents should be the future direction for investigation.

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