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# ANTIMICROBIAL ACTIVITY OF *Mimosa pudica* LINN. AGAINST SOME MICROBES

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## ABSTRACT

***Mimosa pudica* leaves extract were used for antimicrobial activity towards pathogens i.e. bacteria and fungi. The activity was tested against *Bacillus subtilis, Pseudomonas aeruginosa* and *Klebsiella pneumonia* at different concentrations of 25, 50, 75 and 100 µl/ disc and the results have been illustrated. Phytochemical analysis of the extract revealed that the antimicrobial activity of the plant materials is due to the presence of active constituents like alkaloids or tannins. *Mimosa pudica* is used in disease related to blood, piles, jaundice, leprosy and ulcer. In the present study ethanolic extracts of *Mimosa pudica* leaves sample were obtained using soxhlet apparatus. Phytochemical studies for the presence of revealed that tannin and proteins are sample.**

**KEYWORDS**: *Mimosa Pudica*, Antimicrobial Activity,Phytochemical

*Mimosa pudica* Family Mimosae known as sensitive plant in English and lajvanti or chuimui in Hindi language. The plant is distributed through out in India in moist locality. A diffuse prickly under shrub, is about 45-90 cm in height. Leaves bipinnately compound, pinnate 2-4 delicately arranged with 10-20 pairs of leaflets, rachis clothed with ascending bristles. Flowers pink, in globose heads, penduncles prickly, usually in auxiliary pairs all along the branches. Fruits bristly pods, flat, straw colored consisting of 3-5 one seeded segments. The roots and leaves are commonly used in treatment as bitter, astringent, acrid, cooling vulnerary, alexipharmic, diuretic antispasmodic, emetic, constipating and febrifuge (Vaidyaratanm, 2001).The present study intends to study about the phyto constituents of the plant extracts of *Mimosa pudica* against pathogenic microbes in Chhattisgarh.

**Figure 1: *Mimosa pudica* Plant**

**Figure 2: Powdered *Mimosa pudica* leaves**

Many plants species used traditionally have potential antimicrobial and antiviral properties (Shelef *et al.* 1983) and this has raised the optimistic thinking of scientists about the future of phyto-antimicrobial agents. (Das *et al.*, 1999). Mimosa 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 phytochemical components of *Mimosa pudica* (Ahmad *et al*. 2001; Arthur, 1954.) and also about the antimicrobial activity of the plant (Palacios *et al*., 1991). The major chemical substances of interest in these surveys were the alkaloids and steroidal saponins, however also been reported (Lozoya & Lozaya, 1989). The methanolic extract of leaves of *M. pudica* showed the presence of bioactive components like terpenoids, flavonoids, glycosides, alkaloids, quinines, phenols, tannins, saponins and coumarin (Gandhiraja *et al.*, 2009). In Chhattisgarh, the consumption of the decoction of leaves boiled in water causes diuresis and is used in

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urinary tract infection. This plant has hepatoprotective, hypolipidemic, antifertility, antihapatotoxic and wound healing properties. The seeds of the plant was also said to have diuretic property (Krishnaraju *et al.,* 2006). Roots of mimosa contain tannin, ash, calcium oxalate crystals and alkaloid mimosine (Oudhia *et al.,* 2006). The present study intends to study about the antimicrobial activity of the plant extracts of *Mimosa pudica* against pathogenic microbes.

**Collection of Plant Materials**

Fresh leaves and root of *Mimosa pudica* were collected from Durg Bhilai Region.

**Sample Preparation**

The sample leaf and root were washed with sterile water, shade dried, powdered and kept in an air tight container for further use. About 20g of the powdered leaves were soaked in 100ml of methanol. It was left for 24 hours so that alkaloids, terpenoids and other constituents if present get dissolved. The methanolic extract was filtered using Whatmann 41 filter paper. It was again filtered through Sodium sulphate in order to remove the traces of moisture.

**Plant Extraction Method Extraction:**

20 gms of each sample were taken and extracted separately with 250 ml ethanol using soxhlet apparatus. The extract were collected and dried. The condensed extract was then dissolved in ethanol to the concentration of 100mg/ml. After that allow for 5 cycles and switch of the apparatus and then take the sample solution and extracted solution in a beaker and cover it with a paper and make holes on the paper for the evaporation of the solvent .Allow it for drying and then collect the residue from the beaker.

**Phytochemical Screening (Dey and Raman, 1957)**

Phytochemical screening of the plant extract was carried out as per the methods and tests given by Dey and Raman (1957) to decipher the presence or absence of various phytocompounds. The stock concentration of plant extract 10 mg/ml was used.

**Test For Tannins**

**Preparation of 0.1% ferric chloride:**

To 99.9 ml of distilled water 0.1ml of ferric chloride reagent was added.

**Ferric chloride Test**

1 ml of the sample taken and a few drops of 0.1% ferric chloride was added and observed for brownish green or blue, black colouration.

**Test for Protein**

1 ml of sample was taken to that few drops of Bradford reagent was added. The blue colour was observed.

**Test for Steroids**

1 ml of the filtrate was taken to that 10% concentration $H_2SO_4$ was added and observed for green colour.

**Phytochemical analysis:**

The crude and pure extract samples were used for the antimicrobial and the result were tabulated. The phytochemical analysis of the crude extract indicated the presence of tannins, proteins and steroids.

These compounds are known to be biological active and therefore aid the antimicrobial activity. Tannins have been found to form irreversible complexes with highly rich protein resulting in the inhibition of cell protein synthesis.Tannins are known to react with protein to provide difficult tanning effect which is important for the treatment of influenced or ulcerated tissues. Herbs that that have tannins have the main component astringen are used for treating intestinal disorder such as diarrhea and dysentery. The presence of tannin in *Mimosa pudica* is the traditional treatment for ailments.

Steroidal compounds present in *Mimosa pudica* extracts are important due to their relationship with various anabolic hormones including sex hormones. *Mimosa pudica* extracts which exhibited antibacterial activity and antiviral activity. It is concluded that both extract could be potential source of active antimicrobial agent.

The activity was tested against *Bacillus subtilis, Staphylococcus aureus, Pseudomonas aeruginosa* and *Klebsiella pneumonia* at different concentrations of 25, 50, 75 and 100 µl/ disc and the results have been illustrated.

**Table 1: Antimicrobial activity of *Mimosa pudica* leaf extract**

| Test Organism | Zone of Inhibition (cm) | Zone of Inhibition (cm) |
|---|---|---|
| | Crude sample | Purified sample |
| *B. subtilis* | 1.6 | 1.6 |
| *S. aureus* | 1.4 | 2.0 |
| *P. aeruginosa* | 1.2 | 1.6 |
| *K. pneumonia* | 1.5 | 1.8 |

**Antimicrobial activity of pure and crude *Mimosa pudica* leaf extract**

**Figure 1 and 2: Against *B. subtilis***

**Figure 3 and 4: Against *S. aureus***

**Figure 5 and 6: Against *Pseudomonas aeruginosa***

**Figure 7 and 8: Against *Klebsiella pneumonia***

## CONCLUSION

From above studies, it is concluded that the susceptibility of various microbial agents to different concentrations of *Mimosa pudica* indicates that plant is the potential source for antimicrobial compound. So further work on the profile in order to determine the nature of bioactive principles present in the plant and their mode of action.

In the present era, plant and herb resources are abundant, but these resources are dwindling fast due to the onward march of civilization (Vogel, 1991). Although a significant number of studies have been used to obtain purified plant chemical, screening programmes have been initiated on crude plant materials. It has also been widely observed and accepted that the medicinal value of plants lies in the bioactive phytocomponents present in the plants (Veeramuthu *et al*., 2008).

From the above studies, it is concluded that the traditional plants may presented new sources of anti-microbials with stable, biologically active components that can establish a scientific base the use of plants in modern medicine. These local ethnomedical preparations and prescriptions of plant sources should be scientifically evaluated and then disseminated properly and the knowledge about the botanical preparation of traditional sources of medicinal plants can be extended for future investigation into the field of pharmacology, phytochemistry, ethnobotany and other biological actions for drug discovery.

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