

ANTIBACTERIAL ACTIVITY OF MUKIA MADERASPATANA (MUSUMUSUKKAI) AGAINST BACTERIAL STRAINS ISOLATED FROM SEWAGE SAMPLE

SUDHA N¹, AMEERA BANU S², ANITHA N², PREETHA T², SATHIYA PRAPHA S², SUDHA K²

¹ Assistant Professor, Department of Microbiology & CLT, Dr. Umayal Ramanathan College for Women, Karaikudi

² Under Graduate Student, Department of Microbiology & CLT, Dr. Umayal Ramanathan College for Women, Karaikudi

¹Sudha3057@gmail.com

Abstract – In this study antibacterial activity of Musumusukkai (*Mukia maderaspatana*) against different bacteria, *Klebsiella* spp., *Escherichia coli*, *Bacillus* spp., the leaf extract was obtained by aqueous and solvent extraction and was tested against bacterial organisms. Antibacterial activity of plant extracts was measured by agar well diffusion method. In *E. coli* the best antibacterial activity was observed with the leaf aqueous extract. Boiled water extract showed the zone of Inhibition of 10mm while ethanol extract showed 4mm against *E. coli*. *Klebsiella* spp., *Bacillus* spp., showed resistance to the aqueous and solvent extract.

Keywords: Bacteria, antimicrobial activity, plant extracts, aqueous, solvent.

I INTRODUCTION

Natural resources are the god's biggest gift to mankind. Since olden days, our ancestors have made use of their natural resources mainly the green resources which have the components to cure various kinds of diseases. Traditional medicines are more effective with fewer side effects compared to modern medicines up to date. Every part of the plant is utilized for the medicinal purpose. Numerous studies have been identified that various compounds within herbal plants that acts as effective antibiotics. There is large number of new antibiotics produced by pharmacological industries but the resistance produced against their drugs by microorganisms is high. The microorganisms are becoming resistant to the present day using drugs due to different reasons [1]. This increase in resistance to the drugs automatically increases the use of antibiotics in adequate manner and leads to development of multi-drug resistant microorganisms including bacteria and also finally leads to increase the untreatable diseases [2]. So, there is a need to identify and develop the new antimicrobial agents with broad activity. Plants are the main sources to the humans since olden days for treating different diseases [3]. Considering this the present study was undertaken to screen the local flora for antibacterial activity of *Mukia maderaspatana*. The plant belongs to the family Cucurbitaceae and commonly called as Madras pea pumpkin in English and Musumusukkai in Tamil. This species is globally distributed in the Paleotropics. Within India, it is said to be found throughout the country. (Musumusukkai) is a climbing herbal plant inhabiting predominantly southern part of India and is well known for its curative effect on cough, cold and as expectorant and astringent in respiratory tract ailments in traditional medicine [4]. Musumusukkai which is rich in phenolic, that contributes to its medicinal properties.

II MATERIALS AND METHODS

Fresh plant leaves were collected from local areas of Sivaganga district. The leaves were washed thoroughly with running tap water and finally with sterile water and then air dried on sterile blotting paper under shade and then homogenized to fine powder and stored in airtight bottles [5].

A. Preparation of Extracts

1) *For aqueous extraction:* 3 g of air-dried powder was added to 25ml distilled water and boiled on slow heat for 2 hours and was filtered through muslin cloth. The filtrate was centrifuged at 5000 rpm for 10 minutes. The supernatant was collected and concentrated to make the final volume to one-fourth of the original volume. It was then autoclaved at 121 °C temperature at 15 lbs pressure and stored at 4°C.

2) *For solvent extraction:* 3 g of air-dried powder was taken in 100 ml of organic solvent ethanol in a conical flask, cotton plugged and then kept on a rotary shaker at 150 rpm. After 24 hours the supernatant was collected and the solvent was evaporated to make the final volume to one-fourth of the original volume and stored in airtight bottles [6].

B. Isolation of microorganisms

Conservative methods were successful in isolating *E.coli*, *Bacillus*, and *Klebsiella* from Sewage sample and identified them based on cultural and biochemical tests as shown in table 1.

TABLE 1
MORPHOLOGICAL AND BIOCHEMICAL TESTS FOR IDENTIFICATION OF THE ISOLATES

Biochemical Tests	<i>E.coli</i>	<i>Bacillus</i>	<i>Klebsiella</i>
Colony Morphology on Nutrient agar	Cream pinpoint colonies	Large opaque, raised, irregular surfaced colonies	Mucoid colonies
Colony Morphology on selective medium	EMB agar, greenish metallic sheen	Blood agar, Mucoid or smooth or raised wrinkly colonies.	Mac Conkey agar, Pink colour Mucoid colonies
Grams Nature	Gram negative	Gram positive	Gram negative
Cellular Morphology	Rods	Rods	Rods
Motility	Motile	Positive	Motile
Indole	Positive	Negative	Negative
Methyl red	Positive	Negative	Negative
Voges Proskauer	Negative	Positive	Negative
Citrate	Negative	Positive	Positive
Oxidase	Negative	Positive	Positive
Urease	Negative	Negative	Negative
Nitrate reduction	Positive	Positive	Negative
Catalase	Positive	Positive	Positive

C. Antimicrobial assay

The antimicrobial assay was performed by an agar well diffusion method for both aqueous and solvent extracts. For agar well diffusion method, a well was prepared in the Nutrient agar plates using a cork-borer and 50ul of the test extract was introduced into the well. The plates were incubated overnight at 37°C. Microbial growth was dogged by measuring the diameter of the zone of inhibition. For each bacterial strain controls were maintained where pure solutions (aqueous and solvent) were used instead of the extracts. The result was obtained by measuring the zone diameter.

III RESULTS AND DISCUSSION

The result obtained in the study revealed that the tested medicinal plant possess potential antibacterial activity against *E. coli*. When tested by disc diffusion method, the aqueous extract showed significant activity against *E. coli* (10mm) when compared to solvent extract (4mm). *Klebsiella* spp., *Bacillus* spp., showed resistance to the aqueous and solvent extract.

Bacterial infectious diseases are a serious threat to public health. Antibiotic treatment is the preferred treatment for bacterial infection. Emerging multidrug resistance microbial strains increased the search for new antibiotics from various sources such as medicinal plants. Each plant is distinct itself by its own herbal characteristics. Nowadays, Ayurvedic treatment are playing major role in curing disease. These herbal plants are used for various purposes from ancient times to till date.

IV CONCLUSION

In this study, preliminary screening for antimicrobial activity of *Mukia maderaspatana* showed, that the aqueous extract showed maximum inhibitory zone *E. coli*. While the ethanol extract showed least inhibitory activity. Plant extracts have shown inhibitory effect on the growth of the bacteria studied, even if they are different forms. From this investigation it is recommended to isolate new antimicrobial metabolites from medicinal plants for therapeutic applications.

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