

Antimicrobial Activity of Ethanol Extract of *Mukia maderaspatana* (L.) M. Roemer

T.S. Dhanaraj¹, K. Murugaiah² and M. Jegadeesan³

¹⁻²Department of Biochemistry, Enathi Rajappa College, Pattukkottai - 614 615, India.

³Department of Environmental & Herbal Science, Tamil University, Thanjavur, Tamilnadu, India.

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Mukia maderaspatana (L.) M. Romer., is an annual monoecious tendril climber, belonging to the family Cucurbitaceae, mostly prevalent in South India. It is commonly called *Musumusukkai* in Tamil. It is a traditional medicinal plant used for a considerable time in Siddha for treatment of various diseases. The ethanol extract of leaf and root part of the plant were tested for their antimicrobial activity using well diffusion assay method against common human pathogens, *Escherichia coli*, *Streptococcus pyogenes*, *Helicobacter pylori*, *Pseudomonas aeruginosa*, *Aspergillus niger*, *Candida albicans*, *Trichoderma viride* and *Fussarium spp*. Both the leaf and root extracts shows antimicrobial activity in concentration dependent manner. Leaf extract shows broad spectrum of antimicrobial activity in tested organism than root.

Key words: *Mukia maderaspatana*, Ethanol extract, Anti-microbial activity.

Mukia maderaspatana (L.) M. Romer. Belongs to the family Cucurbitaceae. The plant is a tendril climber / prostrate herb, used in the treatment of asthma and respiratory infections¹. It is distributed through out the India. The earlier reports showed that it possesses anti-inflammatory, hepatoprotective² and antirheumatic activities³. The tender shoots and bitter leaves were used as a gentle aperient and prescribed in vertigo and biliousness⁴. The roots of the plant when masticated relieve toothaches⁵. It is distributed through out the India. Since the antimicrobial activity against human pathogens has not been reported, an attempt has been made to screen the antimicrobial

activity of both the leaf and root part. Four bacteria (*Escherichia coli*, *Streptococcus pyogenes*, *Helicobacter pylori*, *Pseudomonas aeruginosa*) and four fungi (*Aspergillus niger*, *Candida albicans*, *Trichoderma viride* and *Fussarium spp*) were used for the study. The preliminary phytochemical screening^[6] shows the presence of alkaloids, flavonoids, triterpenes and glycosides in the leaf and root parts of *Mukia maderaspatana*.

MATERIALS AND METHODS

Collection of Plant Material

The leaf and root part of *Mukia maderaspatana* (L.) was collected from different places of Thanjavur district, Tamil nadu, India.

Collected specimen was carefully examined and identified with the help of regional Floras^[7,8]. A voucher specimen has been deposited in the Dept. of Environmental and Herbal Sciences, Tamil University, Thanjavur. Department herbarium for future reference (THU-273).

* To whom all correspondence should be addressed.
Tel: 04373-222730, 223730, 224730.
E-mail address: ramanisethu@yahoo.com

Preparation of Plant Extracts

The fresh plants were collected in the month of July, thoroughly dried in shade after separating aerial parts from roots for a period of 2 weeks. The dried plant material was made into coarse powder (yield 750 g). The powdered plant materials were subjected to extract with different solvents viz., petroleum ether, benzene, chloroform, methanol and ethanol using Soxhlet apparatus. Preliminary phytochemical screening carried out in both leaf and root extracts^[9].

Anti-Microbial Activity

Well Diffusion Assay Method^[10]

The various concentration (5, 10 and 20%) ethanol extract of leaf and root parts of *Mukia maderaspatana* were tested for their antibacterial and antifungal studies.

The microbial strains tested against *Mukia maderaspatana* extracts were *Escherichia coli*, *Streptococcus pyogenes*, *Helicobacter pylori*, *Pseudomonas aeruginosa*, *Aspergillus niger*, *Candida albicans*, *Trichoderma viride* and *Fussarium spp.*

Test against standard controls

The commercially available antibiotics disc was used as standard controls for all the test micro-organism. The sensitivity patterns were recorded and the readings were interpreted according to the critical diameter given by National Committee for Clinical Standards.

The microbes were obtained from the Microbiology Laboratory, Sea Horse Hospital Pvt., Tiruchirapalli. The test bacterial strains were seeded over the Muller Hinton agar plates except *H. pylori*,

it was cultured in modified brain heart infusion (BHI) agar plates and Sabouraud's dextrose agar plates were used for fungi. Wells were made on the agar surface with 5mm cork borer. The test drugs (0.5ml) were injected into the well using a micropipette for all concentration (5, 10 and 20%) separately and it was compared with the standard drugs Amoxicillin and Clotrimazole for bacterial and fungal strains respectively. The plates were incubated at $37 \pm 2^\circ\text{C}$ for 48 to 72 hrs under microaerophilic condition. The plates were observed for the elevating zone around the well. The zone of inhibition was calculated by measuring the diameter of their inhibition zone around the well (in mm) including the well diameter. Readings were taken in three different fixed directions in all three replicates and the average values were calculated.

RESULTS AND DISCUSSION

Successive solvent extracts of leaf and root of *Mukia maderaspatana* was subjected to qualitative phytochemical screening, based on that ethanol extract was used for the screening of antimicrobial activity.

Ethanol extracts of leaf and root of *Mukia maderaspatana* at different concentration (10, 20, 30 mg %) against *Escherichia coli*, *Streptococcus pyogenes*, *Helicobacter pylori*, *Pseudomonas aeruginosa*, *Aspergillus niger*, *Candida albicans*, *Trichoderma viride* and *Fussarium spp.* were given in Table 1 (Plate -1).

Ethanol extract of leaf and root of

Table 1. Antimicrobial activity of leaf and root extracts of *Mukia maderaspatana*

Name of the Organism	Zone of inhibition (mm)						Amoxicillin/ Clotrimazole
	Leaf			Root			
	10mg %	20mg %	30mg %	10mg %	20mg %	30mg %	
<i>Escherichia coli</i>	-	-	06	-	-	-	09
<i>Streptococcus pyogenes</i>	12	15	18	15	18	21	12
<i>Helicobacter pylori</i>	07	09	15	13	15	17	06
<i>Pseudomonas aeruginosa</i>	19	20	22	14	17	19	25
<i>Aspergillus niger</i>	07	10	12	09	12	14	23
<i>Candida albicans</i>	07	09	11	07	09	12	20
<i>Trichoderma viride</i>	03	07	09	05	07	10	24
<i>Fussarium spp.</i>	-	-	-	-	-	-	12

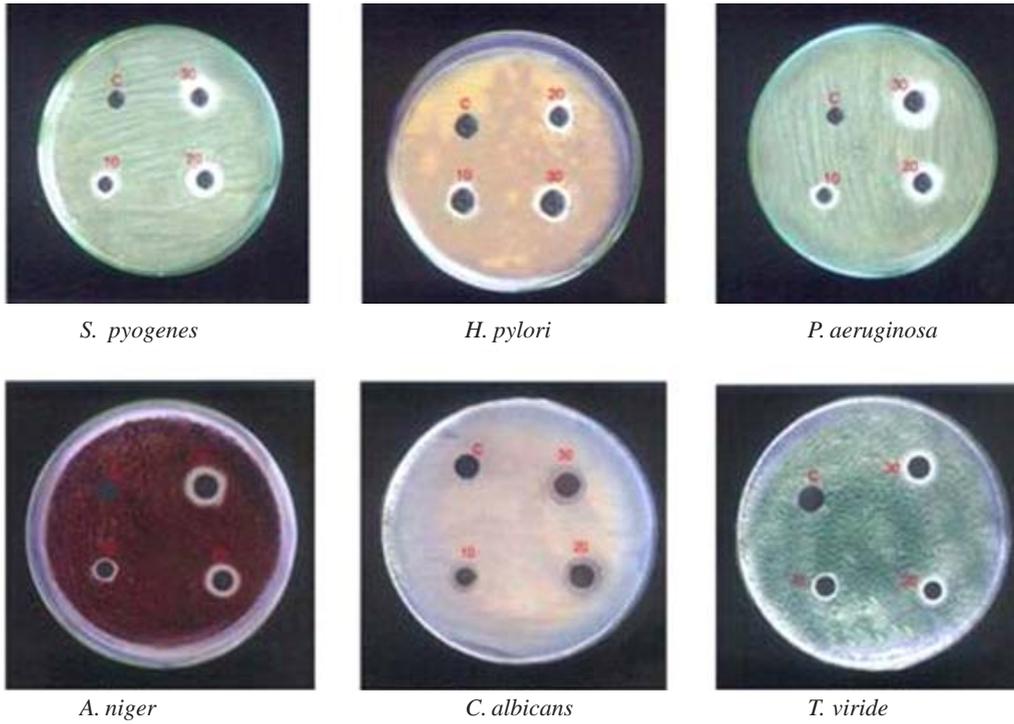


Plate 1 a. Antimicrobial activity of ethanol extract of root of *M. maderaspatana*

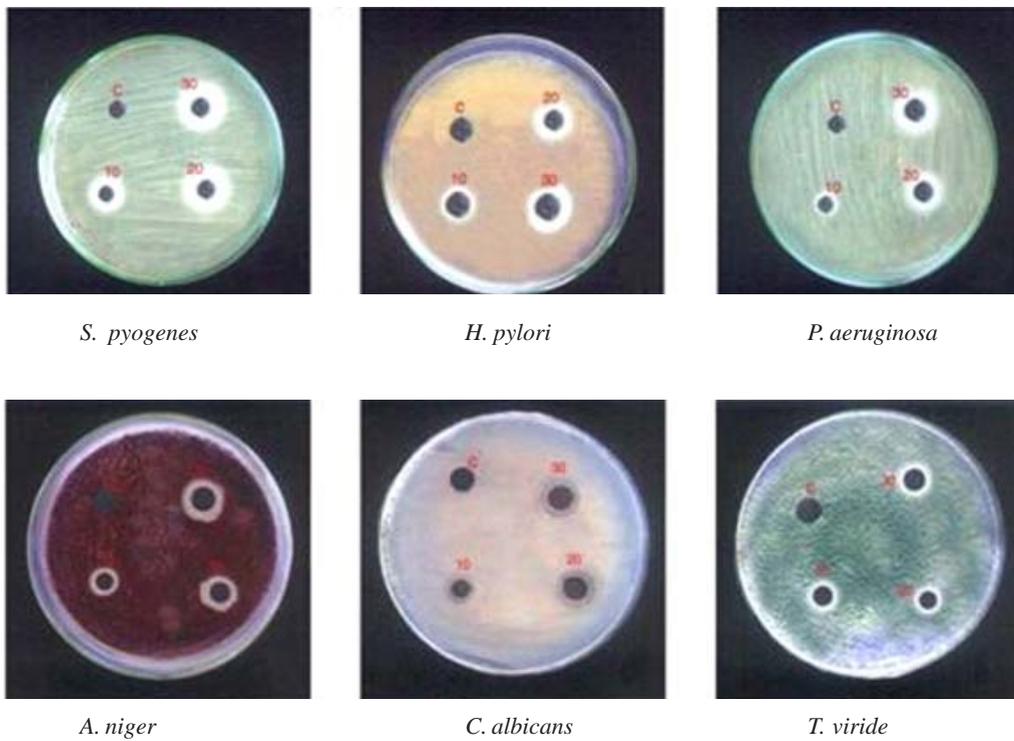


Plate 1 b. Antimicrobial activity of ethanol extract of leaf of *M. maderaspatana*

M.maderaspatana showed antimicrobial activity in a concentration dependent manner. The leaf extract shows positive result against *Streptococcus pyogenes*, *Helicobacter pylori*, *Pseudomonas aeruginosa*, *Aspergillus niger*, *Candida albicans*, and *Trichoderma viride* and also exhibited antimicrobial activity against *Escherichia coli* at 30 mg % concentration only. No zone of inhibition was found in *Fusarium spp.*

The root extract shows positive result against *Streptococcus pyogenes*, *Helicobacter pylori*, *Pseudomonas aeruginosa*, *Aspergillus niger*, *Candida albicans*, and *Trichoderma viride*. No zone of inhibition was found in *Fusarium spp.* and *Escherichia coli*.

The phyto-constituents like triterpens, flavonoids, and alkaloids may be responsible for antimicrobial activity^[11].

CONCLUSION

It is concluded that among ethanol extract of leaf and root of *M.maderaspatana*, leaf showed the broad spectrum of antimicrobial activity in tested organism in well diffusion assay method.

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