

ANTIMICROBIAL ACTIVITY OF THE FRUIT-SEEDS *MADHUCA LONGIFOLIA* (KOENIG)

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## ABSTRACT

The investigation was carried out to study the antibacterial activity of the *Madhuca longifolia* (Koenig) in gram positive and gram negative organism. Antimicrobial activity of the acetone and aqueous extracts of *M. longifolia* were determined against various pathogenic bacteria. The extracts were tested against various bacteria like *Bacillus subtilis*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *E. coli* by disk diffusion method. Minimum Inhibitory Concentration (MIC) values of both extracts were determined. It is concluded that acetone extract exhibited significant antimicrobial activity. The study lends scientific support for its use in folk medicine.

**KEYWORDS:** *Madhuca longifolia*, Antimicrobial.

## INTRODUCTION

*Madhuca longifolia*, commonly known as mahwa or mahua belonging to family Sapotaceae, is an Indian tropical tree found largely in the central and north Indian plains and forests. It is a fast growing tree that grows to approximately 20 meters in height, possesses evergreen or semi-evergreen. It is adapted to arid environments, being a prominent tree in tropical mixed deciduous forests in India in the states of Jharkhand, Uttar Pradesh, Bihar, Madhya Pradesh, Kerala, Gujarat. Previous phytochemical studies reported that presence of terpenoids, saponins, flavonoids and glycosides in *M. longifolia* seeds.

## MATERIALS AND METHODS

## Chemical used

The following chemicals were used in study-Dimethyl formadine, Ampicillin.

## Plant material and extraction

The seeds samples were collected from Tambaram Tamilnadu, India, during December and January 2009 and authenticated by Dr. P. Jayraman, Director of PARC. The specimen sample No. 21 is kept at Department, B. Pharmacy College, Rampura, Kakanpur, Godhra, Gujarat.

## Preparation of Extracts

The air-dried seeds of powder material (200 gm) of *M. longifolia* were prepared with water and acetone was placed in reflux condenser and was subjected to extraction by hot percolation method and were defatted with petroleum ether. The extract was evaporated to dryness in vacuo.

## Antibacterial Screening

Test organism used

Gram positive organisms: *Staphylococcus aureus*, *Bacillus subtilis*

Gram negative organisms: *Escheria coli*, *Pseudomonas aeruginosa*

## Antibacterial Screening

Antibacterial screening of acetone and aqueous extracts of *Madhuca longifolia* was performed against 4 pathogenic bacteria (2 gram positive and 2 gram negative) by the standard disc diffusion method. Each Petri dish was inoculated with one of the bacterial cultures suitably diluted to contain above  $10^6$  cells/ml by spreading 0.1 ml suspension of the organism with a sterile cotton swab. In each plate cups of 6 mm diameter were made at equal distances using sterile cork borer. One cup was filled with 0.1 ml of standard drug, another with 0.1 ml of DMF, and others were filled with 0.1 ml of samples in sterile DMF. Ampicillin was used as an antibacterial standard. The Petri dishes were incubated at 37°C for 48 hours. The diameter of zone of inhibition in mm was recorded after incubation. The

experiment was performed in triplicates and average diameter of zone of inhibition was obtained.

## Determination of MIC

The extracts that showed antibacterial activity were subjected to minimum inhibitory concentration (MIC) assayed by serial two fold dilution method. A positive control and negative control were also prepared to confirm the nutritive and sterility properties of the prepared medium respectively. All the tubes were incubated at 37°C for 24 hours. MIC was interpreted as the lowest concentration of the sample, which showed clear fluid without development of turbidity.

## RESULTS AND DISCUSSION

The antibacterial activity of the different extracts of *Madhuca longifolia* showed significant variation as shown in Table 1. Among the two extracts tested acetone extract had greater antibacterial potential, followed by aqueous extract.

Antibacterial potency of the different extracts of *Madhuca longifolia* against the tested bacterial stains were expressed in MIC as presented in Table 1. The MIC values against these bacteria, and fungal strains ranged from 14.47 to 67.5 µg/ml.

## CONCLUSION

The present study indicate that *Madhuca longifolia* extracts have broad inhibitory activities to pathogenic microorganism and promising to act as potential antibacterial agent from natural sources. The development of oedema in the paw of the rat after the injection of carrageenan is due to release of histamine secretion and prostaglandins like substances. Significantly high anti-inflammatory activity of acetone extract *Madhuca longifolia* may be due to inhibition of the mediators of inflammation such as histamine, serotonin and prostaglandins. Further laboratory and clinical studies of this plant is required in order to understand better antibacterial and anti-inflammatory principles which will allow scientific community to recommend their use as an accessible alternative to synthetic drugs.

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**Table 1: Antimicrobial activity and MIC values of extracts of *Madhuca longifolia***

Microorganisms	Zone of Inhibition(mm)			MIC ( $\mu\text{g/ml}$ )	
	Acetone Extract	Aqueous Extract	Ampicillin	Acetone Extract	Aqueous Extract
S. aureus	23	13	26	15.62	33.45
B. subtilis	19	14.47	28	15.62	62.5
P.aeruginosa	17	14	23	15.62	29.25
E. coli	25	16	25	15.62	15.62

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