

## EVALUATION OF IN-VITRO ANTI-BACTERIAL ACTIVITY OF *FICUS BENGALENSIS* SHOOT TIPS EXTRACT

K. Ravishankar\* and A. Udaya Sree

Sri Sai Aditya Institute of Pharmaceutical Sciences And Research, Department of Pharmacology,  
ADB Road, Surampalem, Andhra Pradesh, India.

### ABSTRACT

The aim of the present study was to explore the antibacterial potential of ethanolic extract of *Ficus bengalensis* (Family: *Moraceae*) by invitro assay method using agar diffusion method.. Ethanolic shoot tips extract of *F.bengalensis* at doses of 150mg/ml and 300mg/ml exhibited significant antimicrobial activity and gentamycin as reference standard at the concentration of 25µg/ml .The observed activity may be due to the presence of phytochemicals like glycosides, tannins, flavanoids, ketones,sterols,oentacyclic triterpenes and triterpenoids present in plant extract.

**Keywords:** Ficus bengalensis, Anti-bacterial.

### INTRODUCTION

*Ficus bengalensis* has long been used as antidiabetic, hypolipidemic, anthelmintic, antibacterial, immunomodulatory, antistress and antiallergic, antioxidant, antiinflammatory, antidiarrhoeal, analgesic and antipyretic, antiatherogenic, wound healing and growth promoting. <sup>1</sup> *Ficus bengalensis* shoot tips were chosen for study and its efficacy was evaluated with respect to inhibition over the growth of pathogenic bacteria under *in vitro* conditions <sup>2</sup>

### MATERIALS & METHODS

#### Collection

The shoot tips of *F.bengalensis* were collected from the surrounding villages of Kakinada and the plant was authenticated by Dr.Raghuram, taxonomist.

#### Preparation Of Ethanolic Extract of *Ficus bengalensis*

The freshly collected shoot tips of this plant were cleared from dirt then, dried under shade for about 15days and then coarsely powdered in a mechanical grinder. The powder was macerated with ethanol for 5 days, filtrate was collected & concentrated. The concentrated product was dried using desiccators with

anhydrous calcium chloride. The percentage yield of the extract was 4.8% w/w.

### IN-VITRO STUDY

#### Anti-bacterial study

**Bacterial strains** The strains of staphylococcus aureus ATCC BAA 1026, Bacillus subtilis ATCC 11774, Acitobacterium, Staphylococcus wernerii ATCC 27836, Eschereria coli ATCC 10536, Klebsiella pneumonia ATCC 33495, Salmonella typhi, Pseudomonas aeruginosa ATCC 10662, Proteus microbilis ATCC 14153 were used to study the anti-bacterial activity.

#### Chemicals used for Anti-Bacterial Assay

Gentamycin was used as reference standard and Di-methyl Sulphoxide (DMSO) as solvent (because of high polarity nature)<sup>3</sup>

#### Agar diffusion Method

In this method, the antibacterial substance diffuses from the cup through a solidified agar layer in a Petri dish or a plate to an extent so that the growth of added micro-organism is inhibited entirely in a circular area or zone around the cavity containing the solution of a known quantity of antibacterial substance<sup>4</sup>. The antibacterial activity is expressed as the zone

of inhibition in millimeters, which is measured with a zone reader.

### Evaluation of antibacterial activity

#### Determination of Zone of Inhibition by agar diffusion Method

The cylinder plate assay of drug potency is based on measurement of the diameter of zone of inhibition of bacterial growth surrounding cylinders (cups), containing various dilutions of test compounds. A sterile borer was used to prepare two cups of 6 mm diameter in the agar medium spread with the micro-organisms and 0.1 ml of inoculum was spread on the agar plate by spread plate technique<sup>5</sup>. Accurately measured (0.05 ml) solution of each extract and reference standards were added to the cups with a

micropipette. All the plates were kept in a refrigerator at 2 to 8°C for a period of 2 hours for effective diffusion of test compounds and standards. Later, they were incubated at 37°C for 24 hours. The presence of definite zone of inhibition of any size around the cup indicated antibacterial activity. The solvent control was run simultaneously to assess the activity of dimethyl sulphoxide which was used as a vehicle.

**Measuring the Zone of Inhibition** The presence of definite zone of inhibition of any size around the cup indicated anti bacterial activity. Zone of inhibition was measured using plastic scale<sup>6</sup>. Then the value were mentioned in the table given below

**Zone of inhibition in mm**

		F.bengalensis (150mg/ml)	F.bengalensis (300mg/ml)	Gentamycin (25µg/ml)	DMSO
Gram positive bacteria	Staphylococcus aureus	10.5	12.25	21.5	8.5
	Escherichia coli	10.5	12.7	21.5	8.5
	Acitobacterium	11.5	14.5	19.5	8.5
	Staphylococcus weneri	12.5	14.5	20.5	8.5
Gram negative bacteria	Bacillus subtilis	10	11.25	21.5	8.5
	Pseudomonas aeruginosa	10.75	13	21.5	8.5
	Klebsiella pneumonia	9.5	20	18.5	8.5
	Salmonella typhi	12.5	14	18.5	8.5
	Proteus microbilis	12	12.5	18.5	8.5

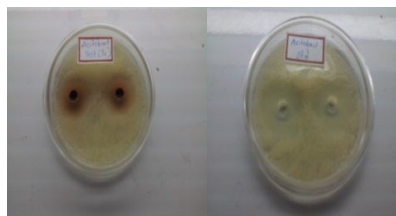
### RESULTS AND DISCUSSION

The shoot tips extract of *Ficus bengalensis* was studied for antibacterial activity using agar diffusion method. The zone of inhibition recorded for various organisms was found *Staphylococcus aureus*(12.25mm), *Escherichia coli*(12.7mm), *Acitobacterium*(14.5mm),

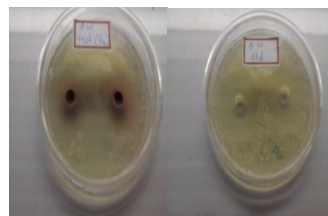
*Staphylococcus weneri* (14.5mm), *Bacillus subtilis* (11.25mm), *Pseudomonas aeruginosa* (13mm), *Klebsiella pneumonia* (20mm), *Salmonella typhi* (14mm), *Proteus microbilis* (12.5mm)

### Antibacterial assay

#### Zone Of Inhibition shown by *Ficus bengalensis* shoot tips extract



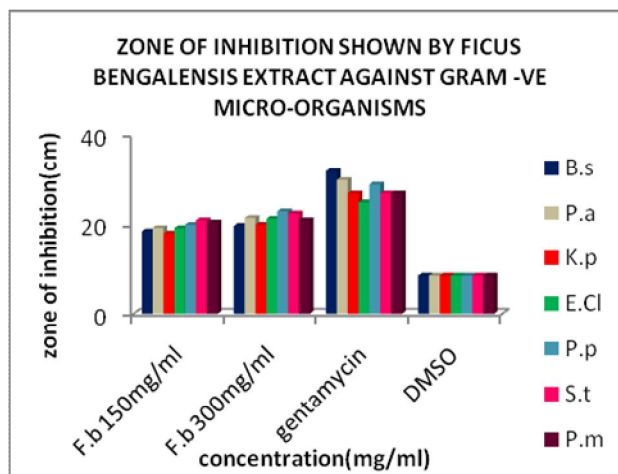
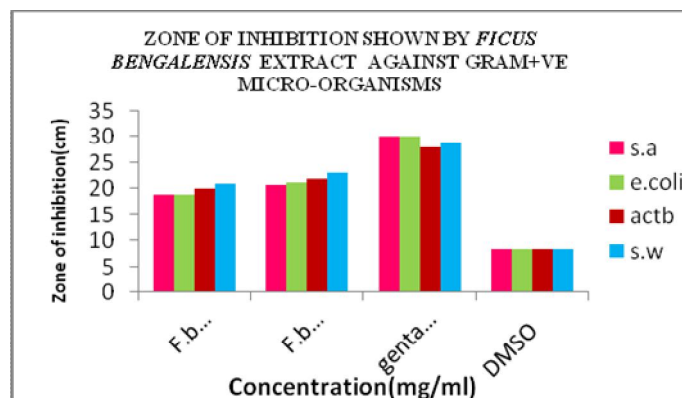
F.bengalensis(300mg/ml)    Gentamycin  
Acitobacterium



F.bengalensis(150mg/ml)    Gentamycin  
Staphylococcus weneri

The ethanolic extract of shoot tips of plant of *Ficus bengalensis* (150mg/ml and 300mg/ml)<sup>7</sup> were screened for antibacterial activity against gram positive & gram negative bacteria by agar diffusion method. The ethanol extract exhibited antibacterial activity in compared with the standard drug gentamycin (25µg/ml)<sup>8</sup>. The ethanolic extract of *Ficus bengalensis* shoot tips extract shown highest antibacterial activity against *Staphylococcus weneri*, *Acitobacterium*. In the present study *Ficus bengalensis* were found to be the most sensitive against

bacterial strains. Two or more of the common phytoconstituents like proteins, alkaloids, tannins, phenols, glycosides and flavonoids were detected in these active extract<sup>9</sup>. These major phytoconstituents are known to have antimicrobial activity. On the basis of the present investigations it can be highlighted that several of the plant extracts show promising antibacterial properties and could be exploited in herbal preparations against bacterial infections at least for external uses.



## CONCLUSION

From the present study, it can be concluded that ethanol extract of *Ficus bengalensis* shoot tips are good anti-bacterial agents and are so effective against Gram positive and Gram

negative microorganisms. The anti-bacterial activity of shoot tips extract with 150mg/ml and 300mg/ml concentrations was very well when compared with standard drug gentamycin 25µg/ml. The maximum zone of inhibition with

shoot tips extract of *Ficus bengalensis* at various concentrations like 150,300mg/ml are 21.5,20,19.75mm. Further investigations can be carried out in order to isolate new compounds from the plant shoot tips extract and to evaluate the bioactivities as it is necessary to introduce to suppress the growth of micro-organisms.

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