



## ANTIBACTERIAL ACITIVITY OF METHANOLIC EXTRACT OF ROOTS OF *CAESALPINIA PULCHERRIMA*

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### ABSTRACT

Methanolic extract of roots of *Caesalpinia pulcherrima* (family Fabaceae) was analyzed for antibacterial activity against four clinical isolates. Results against the selected microorganism *Klebsilla pneumonia*, has shown that the zone of inhibition was moderately higher than the other three selected microorganisms.

**Key words :** Plant extract, Antibacterial activity, *Caesalpinia pulcherrima*

### INTRODUCTION

*Caesalpinia pulcherrima* belongs to kingdom plantae, division magnoliophyta, class magnoliopsida order fabales family Fabaceae, subfamily Caesalpinodeae genus *Caesalpinia*. It is a shrub growing to 3m tall. The leaves are bipinnate, 20-40 cm long, bearing 3-10 pairs of pinnae each with 6- 10 pairs of leaf lets 15-25 mm long and 10-15 mm broad. The flowers are borne in racemes upto 20 cm each flower with five yellow orange red petals. The fruit is a pod 6- 12 cm long. *Caesalpinia pulcherrima* ethanolic extract of the dry fruits is reported to exhibit a broad spectrum of antimicrobial activity against *P. vulgaris*, *P. aeuriginosa* and *S. aureus*. In *Caesalpinia pulcherrima* five isolated flavanoids viz., 5, 7 – dimthoxy-3, 4-methylenedioxyflavanone, isobunducellin, 2-hydroxy-2, 3, 4, 6-tetramethoxychalcone and bonducellin are reported to possess anti-inflammatory activities. In *Caesalpinia pulcherrima* new flavonoids reported are 5, 7-dimethoxy 3, 4-methylenedioxyflavanone and bonducellin along with 2 hydroxy-2, 3, 4, 6 tetramethoxychalcone, 5, 7-dimethoxyflavone and bonducellin.

### EXPERIMENTAL

#### Plant material and preparation of extract

*Caesalpinia pulcherrima* species of family Fabaceae was collected from Bapatla

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College of Pharmacy campus, Bapatla, A. P. (Medicinal plants garden) and it was authenticated. The air dried plant material was ground into powder in a mill. The crude dried powder was separately extracted with methanol; concentrated to small bulk under reduced pressure at 50°C. It was suspended in water and the pH of the water was adjusted to neutral.

### Test for microorganisms

Four clinical strains were used in the study methicillin- resistant *Staphylococcus aureus* multi drug resistant *Psuedomonas aeruginosa* (i. e. resistant to ampicillin, cefuroxime, cefotaxime, gentamicin, amikacin, erythromycin, clindamycin, ofloxacin, nalidixic acid, norfloxacin, ciprofloxacin and amoxicillin clavulanic acid *Staphylococcus epidermidis* and *Klebsilla pneumonia*. A standard ciprofloxacin solution 2 µg/mL was also tested.

### Antibacterial activity

Antibacterial activity was determined by the Agar cup plate method. Petriplates containing 20 mL of nutrient agar medium (pH 7.2-7.4) were seeded with a 24h culture of the bacterial strains. Wells 8 mm diameter was cut into the agar and 50 µL of the plant extracts were tested in a concentration of 100 mg/mL, which were dissolved in DMSO. The inoculum size was adjusted so as to deliver a final inoculum of approximately 10<sup>8</sup> colony forming units (CFU/mL). Incubation was performed at 37°C for 24h. Assessment of antibacterial activity was based on measurement of diameter of inhibition zone formed around the well.

## RESULTS AND DISCUSSION

The results of antibacterial activity of the methanolic extract of root of *Caesalpinia pulcherrima* is given in Table 1.

**Table 1. Antibacterial activity of methanolic extract of roots *Caesalpinia pulcherrima* on different bacteria**

Treatment	Concentration µg/mL	Zone of inhibition (mm)			
		<i>S. Aureus</i>	<i>S. Epidermidis</i>	<i>P. Aeruginosa</i>	<i>K. Pneumoniae</i>
Standard Ciprofloxacin	2	29	30	30	30

Treatment	Concentration µg/mL	Zone of inhibition (mm)			
		<i>S. Aureus</i>	<i>S. Epidermidis</i>	<i>P. Aeruginosa</i>	<i>K. Pneumoniae</i>
<i>Caesalpinia pulcherrima</i> root methanolic extract	75	19	18	20	19
	150	22	21	21	20
	225	23	22	25	27

The maximum zone of inhibition (27 mm) was observed in 225 µg/mL concentration against *Klebsilla pneumonia*, while the minimum zone of inhibition (18 mm) was observed in 75 µg/mL concentration against *Staphylococcus epidermidis*.

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