



## Studies on antibacterial activity of extracts from *Tinospora cordifolia* (Giloy) against *Staphylococcus aureus*

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### Abstract

The active components of stem bark of *Tinospora cordifolia* were extracted using cold water and organic solvents (methanol, diethyl ether and acetone) and were tested against *Staphylococcus aureus* using the agar disc diffusion method. All the four extracts inhibited the growth of *S. aureus*, with methanol extract exerting the highest activity whereas water extract was least active. The results were compared with the reference antibiotic ciprofloxacin.

**Keywords:-** Antibacterial, *Tinospora cordifolia*, *S. aureus*, Stem extract, Methanol, Diethyl ether, Acetone.

### Introduction

Plants have been a valuable source of natural products for maintaining human health, especially in the last decade, with more intensive studies for natural therapies (Nascimento *et al.*, 2000). According to WHO medicinal plants would be the best source to obtain a variety of drugs (Santos *et al.*, 1995). Therefore such plants should be investigated to better understand their properties, safety and efficacy (Ellof, 1998). Antimicrobial activity of 120 plant species from 28 different families was carried out (Santos *et al.*, 1990). Antifungal activity of leaf extracts of medicinal plants used by Himalayan people was investigated against *Alternaria alternata* and *Curvuleria lunata* (Guleria and Kumar, 2006). 18 plants belonging to zingiberaceae family was evaluated for their antioxidant and antimicrobial activity (Chen *et al.*, 2008). *T. cordifolia* (Giloy) is a large glabrous and climbing succulent shrub with rocky bark. It is found throughout the tropical India ascending up to an altitude of 300m

and has been used from ancient times to cure different types of ailments like general debility, dyspepsia, fever and urinary diseases (Negi and Pant, 1994).

### Materials and Method

The matured leaves of *T. cordifolia* were collected from Hardwar and the bacterial strain of *S. aureus* (MTCC-737) was obtained from Institute of Microbial Technology (IMTECH), Chandigarh. For the preparation of plant extract the powdered stem bark of *T. cordifolia* were extracted with methanol, diethyl ether and acetone for 24 hrs using Soxhlet apparatus and aqueous extract. Three different dilutions of plant extracts i.e. 800, 400 and 200 mg/ml DMSO were used for primary screening which was carried out through agar disc diffusion method (Bauer *et al.*, 1966). DMSO served as negative control and standard antibiotic ciprofloxacin (500 ppm) as positive control. The antibacterial activity was evaluated by measuring the diameter of the inhibition zones in mm.

### Results and Discussion

Preliminary evaluation of antibacterial activity clearly indicates that all the stem bark extracts prepared in four solvents exhibited activity against

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*S. aureus* but the 800 mg/ml concentration of methanol extract was found to possess higher level of antibacterial activity (14.3 mm) in comparison to diethyl ether, acetone and aqueous extract which was comparable to that of antibiotic ciprofloxacin (15 mm). Hence, it can be concluded that keeping in mind the side effects of allopathic medicines and the drug resistance in microbes it will be of great

interest to use plant based medicines to combat against diseases. The discovery of a potent remedy from plant origin will be of great advancement in bacterial infection therapies.

**Table 1: Antibacterial activity of stem bark extract of *T.cordifolia* and that of reference antibiotic on *S.aureus***

Solvents	*Effective zones of inhibition				
	Concentration of sample(mg/ml)			Antibiotic control(500ppm)	DMSO control
	800	400	200	Ciprofloxacin	
Methanol	14.3	12.3	10.3	15	0
D.E.E	14.0	10.3	7.6	15	0
Acetone	11.6	9.6	7.3	15	0
Aqueous	11.3	9.3	6.6	15	0

\*Effective zone of inhibition = Total zone of inhibition – Diameter of the disc (5mm)

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