



Antibacterial activity of flowers of *Tecoma Stan* (L.) Juss ex Kunth

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Abstract

Tecoma Stan L. is an important ornamental plant belongs to Bignoniaceae family. The study was focused on the antibacterial activity of the plant. Flowers were selected as part for screening. Chloroformic extracts was prepared for the analysis. The flowers have alkaloids, flavonoids, saponins, terpenoids are present. These phytochemicals can be helpful to cure different types of diseases in plants as well as in humans. Agar well diffusion method was used for the antibacterial activity against *Bacillus subtilis* and *Staphylococcus aureus*. The concentrations used for the activity were 5% w/v, 10% w/v, 15%w/v and 20% w/v. So, *Tecoma Stan L.* is one of the important ornamentals and it can be medicinal plant because of antibacterial activity.

Keywords: *Tecoma Stan L.*, medicinal importance, flowers, antibacterial activity

Introduction

The current issue of Antibiotic resistance needs the continuous search for novel antimicrobial agent, particularly from natural sources like medicinal plants. The medicinal plants are useful for healing as well as for curing of human diseases because of the presence of phytochemical constituents. Phytochemicals are naturally occurring in the medicinal plants leaves, stem bark, fruits and roots that have defence mechanism and protect from various diseases. Natural products from plants called secondary metabolites are the end products of primary metabolites such as carbohydrates, amino acid, and chlorophyll lipid so on. They are synthesis large variety of chemical substances known as secondary metabolites which include alkaloids, steroids, flavonoids, terpenoids, glycoside, saponins, tannins, phenolic compounds etc. *Tecoma Stan L.* is famous ornamental plant found in India. It has so many phytochemicals. The study was focused on the antibacterial activity of Aqueous and chloroformic extracts of the flowers against *Bacillus subtilis* and *Staphylococcus aureus*. The study targets two key bacterial groups: *Staphylococcus aureus*, a major Gram-positive opportunistic pathogen causing a minor skin condition to life-threatening sepsis and MRSA (methicillin-resist *S. aureus*) whereas *Bacillus subtilis*, a model Gram-positive, spore forming bacteria used to assess sensitivity to novel antimicrobial agents.

This study systematically evaluates the antibacterial potential of *Tecoma Stan* flower extracts against both bacterial strains to validate its traditional medicinal use and enhance scientific understanding of its antimicrobial properties.

Material and Methodology

The fresh flowers were collected from R. R. Mehta College of Science and C. L. Parikh College of Commerce, Palanpur, Banaskantha, Gujarat. The plant material was identified by Dr. Dhruv Pandya, Assistant Professor

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Extract Preparation Method

The Flowers were air dried for 4 days and crushed to form powder of dried plant material. The powdered samples were obtained after pulverisation then they were subjected to successive extraction with organic solvent Chloroform by dry crude extraction. 10gm weighed powdered material of each sample were treated with solvent chloroform incubated for 24 hrs on shaker. After one day all the samples were filtered with the help of Whatman filter paper no.1. The filtered extract was kept at room temperature for evaporation of solvent. After 2 days we got the crude extract of each sample.

Preparation of Pure Culture

The bacterial culture of *Bacillus subtilis* and *Staphylococcus aureus* were collected from department of Microbiology, R. R. Mehta College of Science and C. L. Parikh College of Commerce, Palanpur, Banaskantha, Gujarat. In the sterile condition the broth was prepared and inoculated the test bacteria. Incubating them at 37°C for 18-24 hrs.

Methodology for Antibacterial Activity

The agar well diffusion method was employed to determine the antibacterial activity. Muller-Hinton Agar medium was prepared and sterilized them in autoclave. Under Aseptic condition medium was poured into sterile petri-dishes and allowed to solidify. The selected bacterial suspension was uniformly spread over the surface of medium. Muller-Hinton agar plates were prepared for chloroformic extract of young flowers of *Tecoma Stan* (L.). Wells of about to 2.5mm diameter were punched into it with a sterile corkborer. A total of 100µl of chloroformic plant extract prepared at different concentrations, prior to the addition of

the test samples wells were marked as 5, 10, 15, 20 and C (control) namely, 5% w/v, 10% w/v, 15% w/v and 20% w/v were added to respective wells. Then the plates were incubated at 37°C for 24 hours. Antibacterial activity was determined by measuring the diameter of the Zone of Inhibition with zone scale.

Result

Extract Yield

Antibacterial Activity

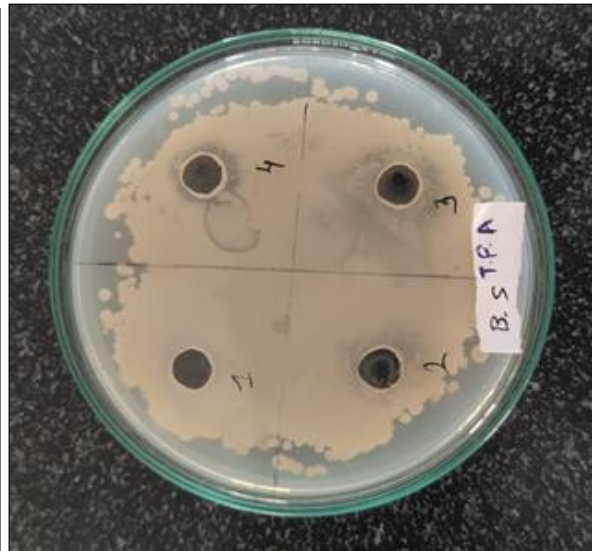
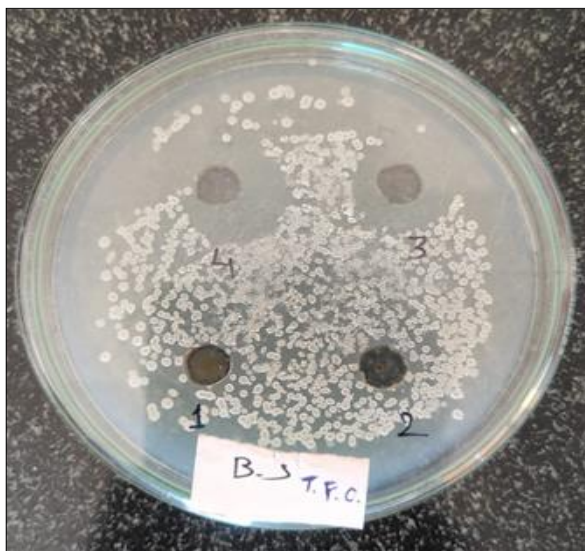
The antibacterial activity of *T. Stan* flower extract against the two Gram-positive bacterial strains was summarized in Table 1. The antibacterial activity expressed as the diameter of zone of Inhibition in millimeters (mm).

Table 1: Zone of Inhibition (mm) of *T. Stan* flower extract against test bacteria

Test Organism	Extract Concentration	Zone of Inhibition (mm)
<i>Bacillus subtilis</i>	5%W/V	12
	10%W/V	15
	15%W/V	19
	20%W/V	27
<i>Staphylococcus aureus</i>	5%W/V	5
	10%W/V	7
	15%W/V	11
	20%W/V	12

The results clearly indicate that the *T. Stan* flower extract possesses inhibitory activity against both target bacteria. At the higher concentration (100 mg/mL), the extract demonstrated a ZOI of 27 mm

against *S. aureus* and 12 mm against *B. subtilis*. Generally, Gram-positive bacteria are often more susceptible to plant extracts due to their simpler cell wall structure compared to Gram-negative bacteria.



Discussion

The findings of this study confirm that the flowers of *T. Stan* are a source of compounds with significant antibacterial activity against key Gram-positive pathogens, *S. aureus* and *B. subtilis*. The observed zone of inhibition is comparable to or greater than those reported for other medicinal plant extracts, suggesting a potent antimicrobial profile.

The biological activity of *T. Stan* is often attributed to its rich secondary metabolite profile. Previous phytochemical studies on *Tecoma* spp. have identified compounds such as iridoid glycosides, phenylethanoid glycosides, and a high concentration of flavonoids (like luteolin and apigenin derivatives). Flavonoids and phenolic acids are well established antimicrobial agents, primarily acting by disrupting the bacterial cell membrane integrity, inhibiting nucleic acid synthesis and interfering with energy metabolism. Gram-positive bacteria lack the outer membrane that acts as a permeability barrier in Gram-negative bacteria, making their peptidoglycan layer more accessible to hydrophobic compounds like those found in plant extracts.

Conclusion

The present investigation successfully demonstrated the significant *in vitro* antibacterial activity of the *T. Stan* flower extract against *B. subtilis* and *S. aureus*. The observation of zone of inhibition validate the use of this plant in traditional medicine and highlight its potential as a source for natural antimicrobial agents.

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