

ANTIBACTERIAL ACTIVITY OF *SOLANUM SURATTENSE* BURM. F.

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ABSTRACT

Ethanol extracts of *Solanum surattense* used in traditional medicine for treatment of various infections. The antibacterial activity detected was against *Staphylococcus aureus*, *Streptococcus sp.*; *Bacillus subtilis*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Salmonella typhi*, *Shigella dysenteriae* and *Vibrio cholerae*. The highest antibacterial activity was observed in 500µg concentration of leaf extracts of all bacteria screened except *Shigella dysenteriae*. The minimum zone of inhibition observed in 25µg concentration of leaf extract except *Pseudomonas aeruginosa* and *Shigella dysenteriae*. These results indicate that the extracts were bacteriostatic at higher concentrations.

Keywords: Antibacterial activity, *Solanum surattense*, pathogenic micro organisms.

INTRODUCTION

Plants have been an important source of medicine for thousands of years. The rich resource is decreasing at an alarming rate as a result of over-exploitation. The medicinal value of drug plants is due to the presence of some chemical substances in the plant tissues which produce a definite physiological action on the human body. These chemicals include alkaloids, flavanoids, glucosides, tannins, gums, resins, essential oils, fatty oils, carbon compounds, hydrogen, oxygen, nitrogen salts of some chemicals, etc. Very few of these chemicals are toxic also. Hence, preparation and administration of drugs should be done by experts only. Drugs may be obtained from various parts of the plant. So, an extensive study is required to detect the medical properties of the plant. Several medicinal plants have been tried against pathogenic microorganisms (Haraguchi *et al.*, 1999; Sashikumar *et al.*, 2003). Solanaceae is a large plant family containing two thousand and three hundred species, nearly half of which belong to a single genus, *Solanum*. There are herbs, shrubs or small trees under this genus. This family comprises a number of plants widely known for the presence of variety of natural products of medicinal significance. Crude plant extract is beneficial in bronchial asthma and non-specific cough, influenza, difficult urination, bladder stones, rheumatism, etc.

MATERIALS AND METHODS

Plant Material

The plant material was collected from in and around Pudukkottai. Leaves collected from field grown plants were used for antibacterial study.

Extraction of plant material

The field grown plants were washed with distilled water to remove the adhering dust particles. They were dried in the shaded place. The dried leaves were powdered and stored in clean containers. 20-30g of leaf powder was placed in the soxhlet extractor by using the solvent ethanol at 60°C for the extraction of bioactive compound.

Susceptibility testing

Strains of microorganisms used susceptibility tests were performed using eight strains of microorganisms including Gram positive and Gram negative bacteria. These microorganisms were collected from Department of Microbiology, J.J College of Arts and Science, Pudukkottai, Tamilnadu.

Determination of antimicrobial activity

Sensitivity tests were performed by agar-well diffusion method (Cole, 1994; Espinel-Ingroff *et al.*, 1995; Okeke *et al.*, 2001). The test bacterial strains were inoculated in to Mueller Hinton Agar Medium. Different concentrations of leaf extract were poured in the wells. After holding the plates at room temperature for one hour to allow diffusion of the extract in to the agar, they are incubated for 24 hours at 37°C. For *Streptococcus sp.* the incubation was performed in micro aerophilic conditions. After 24 hours, zone of inhibition were observed and recorded. The tests were performed in duplicates for each microorganism evaluated and the final results were presented as arithmetic average.

Minimum inhibitory Concentration

The MICs were estimated by broth dilution technique. The test tubes were incubated at 37°C for each type of bacterial cultures. Minimum inhibitory concentration (MIC), which was determined as the lowest concentration of plant extracts inhibiting the growth of the organism, was determined.

RESULTS

The antibacterial activity results are shown in table 1. The extracts showed varying degree of inhibitory effect. The inhibitory effect of extracts was directly proportional to increasing concentration of field grown leaf extracts.

The leaf extract inhibit the growth of pathogenic microorganisms. Maximum zone of inhibition was obtained in 500µg concentration of leaf extract of all bacteria screened except *Shigella dysenteriae*. The minimum zone of inhibition observed in 25µg concentration of leaf extract except *Pseudomonas aeruginosa* and *Shigella dysenteriae*. The MIC of 50-100µg/ ml was found against all the tested bacteria but its all concentrations did not show any inhibitory effect on *Shigella dysenteriae*.

Table: 1 Antibacterial activity of leaf extracts of *Solanum surattense*.

S.N.	Name of the Microorganism	Concentration of leaf extract (μg)	Zone of inhibition (mm)
1.	<i>Staphylococcus aureus</i>	25	11
		50	13
		100	16
		250	19
		500	23
2.	<i>Streptococcus sp.</i>	25	9
		50	13
		100	13
		250	19
		500	22
3.	<i>Bacillus subtilis</i>	25	16
		50	18
		100	19
		250	22
		500	25
4.	<i>Escherichia coli</i>	25	14
		50	15
		100	17
		250	17
		500	19
5.	<i>Pseudomonas aeruginosa</i>	25	0
		50	4
		100	9
		250	11
		500	16
6.	<i>Salmonella typhi</i>	25	13
		50	15
		100	16
		250	16
		500	16
7.	<i>Shigella dysenteriae</i>	25	0
		50	0
		100	0
		250	0
		500	0
8.	<i>Vibrio cholerae</i>	25	10
		50	13
		100	14
		250	16
		500	17

DISCUSSION

Solanum surattense is the most potent plant against pathogenic microorganisms. Based on the concentrations of the extracts, the zone of inhibition was changed (John Britto, *et al.*, 2001). Agar well diffusion method was effective against eight strains of microorganisms (Marcos Salvador *et al.*, 2004). Ethanol was suitable solvent for the extraction (Kumar *et al.*, 2005). However, further studies are needed, including toxicity evaluation and purification of active antibacterial constituents from *Solanum surattense* extracts looking toward a pharmaceutical use.

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