

Antibacterial activity of Various Extracts of *Abutilon Pannosum* (Forst.f.) Schlecht Leaves

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ABSTRACT

In present study carried out the antibacterial activity of the plant *Abutilon pannosum* (Forst.f.) Schlecht., which is a cosmopolitan in distribution belonging to the family Malvaceae. Different parts of this plant are in use to treat various ailments in ethno medicine especially its leaves have been used for treating infections. In this study antibacterial activity of the extracts prepared from the dried leaves of *A. pannosum* (Forst.f.) Schlecht., using agar-well diffusion method against both Gram positive and negative microorganisms. Among all the extracts the ethanolic extract of the leaves showed significant ($P < 0.001$) antibacterial activity comparable to the standard penicillin potassium and streptomycin sulphate against selected gram positive and gram negative bacteria.

Keywords :- *A. pannosum*, antibacterial activity, agar-well diffusion method

I. INTRODUCTION

Malvaceae is a cosmopolitan family with 88 genera and more than 2300 species distributed in tropical, sub tropical and temperate regions. *Abutilon* is one of the important genus of this family (Nasir and Ali, 1979). Various species of the genus *Abutilon* is used in indigenous medicines for the treatment of various ailments (Bagi *et al.*, 1985; Rahuman *et al.*, 2008, Land and Norton, 1973). Among this, *Abutilon pannosum*, is an under shrub and is distributed in India, Pakistan, Tropical Africa, China and Arabia. The only reference available in the literature on this

species describes the presence of quercetin, kaempferol and flavonoids derivative (Sharma and Ahmad, 1989; Abedin, 1980; Akiyama *et al.*, 2001; Sammia, 2008; Gai and Chopra, 1976). *A. pannosum* roots are medicinally used in jaundice (Hatil, 2009; Badami *et al.*, 1976). No information in the literature was found concerning its possible antibacterial activity. However, some experiments have shown antibacterial activity on some other species of genus *Abutilon* (Robert, 1986; Muhammad *et al.*, 2009; Arulsamy *et al.*, 2009; Survase *et al.*, 2012). The present study was carried out to determine the antibacterial activity of different

extracts of the leaves on Gram positive and negative micro-organisms against penicillin potassium (20units/ml) and streptomycin sulphate(25µg/ml).

successively extracted with different solvents and the extractive values were calculated.

Materials and methods:-

Collection of plant materials-

The leaves of *A. pannosum* used in this study were collected from Beed Parli Road, Beed District (M.S.) India, Accession no. 7781, voucher specimen deposited in the Department of Botany of Dr. Babasaheb Ambedkar Marathwada University, Aurangabad. The leaves were shade dried and powdered. Two hundred grams of the powder were

Table1. Extractive values of different solvents of *A. pannosum*.

S/N	Extract	Extractive value(%)W/W
1	Petroleum ether	1.75
2	Acetone	1.86
3	Hexene	2.88
4	Methanol	5.36
5	Water	2.55

Table2. Antibacterial activity of leaf extracts of *A. pannosum* Gram positive organisms.

S/N	Name of organism	Agar-well diffusion (zone of Inhibition in mm)					
		Pet. ether	Acetone	Hexene	Methanol	Water	Penicillin
1	<i>B.subtilis</i>	-	10.0 ±0.5*	11.0 ±0.3*	23.3 ±1.2**	12.5 ±0.7*	24.1 ±1.1**
2	<i>S.aureus</i>	-	13.5 ±0.4*	10.2 ±0.5*	19.4 ±1.0**	19.5±0.4	23.0 ±1.0**
3	<i>S.leuka</i>	10.2±0.5	9.0±0.2*	7.2±0.2	17.1 ±0.6**	11.3 ±0.4*	23.6 ±0.9**
4	<i>B.megaterium</i>	10.8±0.6	8.0±0.1	11.0 ±0.6*	20.5 ±1.1**	13.0 ±0.5*	22.5 ±0.9**

Values are expressed as mean ±SEM, N=6, *P<0.01and **P<0.001when compared to control.

Reagents and chemicals-

Standard drugs Penicillin potassium and streptomycin sulphate were collected from Government of Science Institute and Y. B. Chavan Pharmacy College, Aurangabad. Peptone, beef extract and all other chemical grade were obtained in the Department of Botany, Dr. Babasaheb Ambedkar Marathwada University, Research Laboratories, Aurangabad.

Preparation of the extracts-

Different extracts of the dry powdered leaves were prepared by successive continuous hot percolation using Soxhlet extractor with different solvents like petroleum ether, acetone, Hexene, methanol and water. All the extracts were filtered and evaporated to dryness under reduced pressure and stored in the refrigerator for future use.

Evaluation of antibacterial activity-

The antibacterial activity was carried out by the agar well diffusion method using Muller Hinton agar plates (Nair and Chanda, 2004, Singh et al. 1988). Petroleum ether, acetone, hexane, methanol extract and water extract were dissolved in dimethyl sulphoxide (250 mg/10ml). Streptomycin sulphate (25µg/ml) and

penicillin potassium (20 units/ml) were used as standards for Gram positive bacteria and Gram negative bacteria, respectively. 0.1 ml of the samples was added to each cup. The zones of inhibition produced by the extracts were compared with the standards.

Statistical analysis-

The results obtained were analyzed statistically using student test and any $p < 0.001$ considered significant (Mungikar, 2003).

Results-

The extractive values of different solvents were tabulated in Table 01. The methanolic extract of *A. pannosum* was found to produce significant ($P < 0.001$) antibacterial activity, than the other extracts, against the Gram positive organisms like *Bacillus subtilis*, *Staphylococcus aureus*, *Sarcina leuka*, *Bacillus megaterium* and Gram negative organisms like *Escherichia coli*, *Pseudomonas aeruginosa*, *Proteus vulgaris*, *Shigella sonnie*, when compared with the standard antibiotics, Penicillin potassium and Streptomycin sulphate are tabulated in Tables 02 and 03. The petroleum ether extract did not produce any significant antibacterial activity ($P > 0.05$) when compared with standards.

Discussion:-

The results of the agar-well diffusion method showed that the crude methanolic extracts of *A. pannosum* exhibits antimicrobial activity against the Gram positive organisms such as *B. subtilis*, *S. aureus*, *S. leuka*, *B. megaterium* and gram negative organisms *E. coli*, *P. aeruginosa*, *P. vulgaris*, *S. sonnie* with a maximum diameter of zone of inhibition ranging from 23.3 mm accompanied by ≥ 19.4 and 17.1, 20.5, 21.4, 20.0, 23.5 and 21.1 mm, respectively. It produced a comparable activity similar to the standard antibiotics taken for the study. Further, this study suggests that the isolation of the active principle responsible for the activity will reveal one or more novel antibacterial agents.

Table 3. Antibacterial activity of leaf extracts of *A. pannosum* Gram negative organisms.

S/N	Name of organism	Agar-well diffusion (zone of Inhibition in mm)					
		Pet. ether	Acetone	Hexene	Methanol	Water	Streptomycin
1	<i>E. coli</i>	-	12.2 \pm 0.5*	13.5 \pm 0.9*	21.4 \pm 1.2**	11.0 \pm 0.5*	23.0 \pm 1.2**
2	<i>P. aeruginosa</i>	-	11.4 \pm 0.5*	10.2 \pm 0.6*	20.0 \pm 1.0**	12.2 \pm 0.6*	23.4 \pm 1.0**
3	<i>P. vulgaris</i>	-	13.5 \pm 0.5*	10.2 \pm 0.4	23.5 \pm 1.2**	10.3 \pm 0.5*	22.5 \pm 1.0**
4	<i>S. sonnie</i>	10.0 \pm 0.6	11.0 \pm 0.4*	11.0 \pm 0.4*	21.1 \pm 1.0**	10.2 \pm 0.3	24.3 \pm 1.2**

Values are expressed as mean \pm SEM, * $P < 0.01$ and ** $P < 0.001$ when compared to control.

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