

Antimicrobial activity of ethanolic leaf extract of *Sida spinosa* linn. (Malvaceae)

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ABSTRACT

The present study was carried out to evaluate the antimicrobial property of sida spinosa Linn (malvaceae) leaves against certain bacterial stains causing microbial infection using cup plate method .The test organism were Staphylococcus aureus, Bacillus subtilis, Pseudomonas aeruginosa, Escherichia coli, Candida albicans Aspergillus niger. All the different concentration of ethanolic leaf extracts of sida spinosa exhibited the concentration dependant significant anti microbial activity comparable with ciprofloxacin 5µg/disc and amphotericin B 30µg/disc were used respectively as standard for bacteria and fungi stains .

Key words: *Sida spinosa*, Antimicrobial activity, Amphotericin B, Ciprofloxacin.

INTRODUCTION

The history of antimicrobials begins with the observations of Pasteur and Joubert, who discovered that one type of bacteria could prevent the growth of another [1]. Now microorganisms have become resistance to many antibiotics due to increased use of drugs, which is decreasing efficiency of conventional medicines. So, it has become necessary to find out new antimicrobial agents [2]. Though the traditional Indian system of medicine has a long history of use, they lacked adequate scientific documentation particularly in light modern scientific knowledge [3]. Traditional healers claim that their medicine is cheaper and more effective than modern medicine [4]. *Sida spinosa* Linn. (Malvaceae) is an erect, branched small perennial herb (or) small shrub which grows abundantly on cultivated fields, waste areas, road sides and open clearing in India. The plant has a variety of traditional uses. Leaves are reported to possess demulcent, refrigerant properties, and are useful in cases of gonorrhoea, gleet and scalding urine. They are bruised in water and the filtrate is administered. Root is used as a tonic and diaphoretic and is given in mild cases of debility and fever. A decoction of it is said to be given as a demulcent in irritability of bladder and in gonorrhoea. [5][6][7][8]. The development of new antimicrobial drugs has been used to overcome resistance. However, plant-derived medicines have been part of traditional health care in most part of the world and the antimicrobial

properties of plant derived compounds are well documented and there is increasing interest in plants as sources of antimicrobial agents[9] Medicinal plants have been used for centuries as remedies for human diseases because they contain components of therapeutic value. Recently, some higher plant products have attracted the attention of microbiologists to search for some phytochemicals for their exploitation as antimicrobials, such plant products would be biodegradable and safe to human health [10] This present study examined the microbial activity of the ethanolic extract of the whole plant of *Sida spinosa* Linn.

MATERIALS AND METHODS

Plant material

A large number of plant leaves of *sida spinosa* Linn were collected in the surrounding of Coimbatore and authenticated by botanical survey of India (BSI), Coimbatore, India. The plant material was air dried and then ground to powder using an electric mill. The coarse powder was extracted with 2 - 3 liters of Ethanol (60 - 80oc) by continuous hot percolation using soxhlet apparatus. After completion of extraction the solvent was removed by distillation under the reduced pressure. The extract was stored in desiccators. [11]

Antimicrobial Study

Four bacterial and two fungal were used in this study. Standard strain of *Staphylococcus aureus* (NCM 2010) *Bacillus subtilis* (NCM 2439), *Escherichia coli* (NCM 2965), *Pseudomonas aeruginosa* (NCM 2036), *Candida albicans* (NCM 3102). *Aspergillus niger* (NCM 105). The antimicrobial agents used were ciprofloxacin and Amphotericin B (Himedia Laboratory, Mumbai). These microorganisms were obtained from the laboratory stock of the Department of microbiology, Browns College of Pharmaceutical Sciences, Khammam, Andra pradesh. The microorganisms were grown overnight at 37°C in Muller Hinton broth at PH 7.4. [12][13] They were maintained on agar slants at 4°C in the refrigerator.

Table 1: Zone of inhibition shown by the Ethanolic leaf extract of *Sida spinosa* Linn.

S.No	Microorganism	Zone of inhibition(mm)								
		A	B	C	D	E	F	G	H	L
1	<i>Bacillus subtilis</i>	12	14	17	18	18	20	-	35	-
2	<i>Staphylococcus aureus</i>	10	12	12	13	15	17	-	37	-
3	<i>E.coli</i>	10	11	12	13	13	15	-	37	-
4	<i>Pseudomonos aeruginosa</i>	11	13	14	15	17	20	-	41	-
5	<i>Candida albicans</i>	19	20	21	22	22	23	-	-	43
6	<i>Aspergillus niger</i>	18	19	20	21	21	22	-	-	40

A- Ethanolic leaf extract of *Sida spinosa* 50 µg/disc

B- Ethanolic leaf extract of *Sida spinosa* 100 µg / disc

C- Ethanolic leaf extract of *Sida spinosa* 200 µg/ disc

D- Ethanolic leaf extract of *Sida spinosa* 300 µg/ disc

E- Ethanolic leaf extract of *Sida spinosa* 400 µg/ disc

F- Ethanolic leaf extract of *Sida spinosa* 500 µg/ disc

G- Solvent control (DMSO)

H- Ciprofloxacin – 5 µg / disc

L- Amphotericin B – 30 µg / disc

RESULTS AND DISCUSSION

The Antimicrobial activity of Ethanolic leaf extract of *Sida spinosa* Linn. against *Staphylococcus aureus*, *Bacillus subtilis*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Candida albicans*, *Aspergillus niger* is shown in Table -1. Almost all the microbes used in the present Study were sensitive to the Ethanolic leaf extract of *Sida spinosa* Linn. and showed a potential activity against growth of both Gram positive and Gram negative bacteria and Fungus. It effectively inhibited the growth of *Bacillus subtilis* and gave a sensitive activity against *Staphylococcus aureus*. *E.coli*, *Pseudomonas aeruginosa* when compared with ciprofloxacin and *Candida albicans*, and *Aspergillus niger* showed significant inhibition activity, When compared with amphotericinB. Thus the present study supports the traditional use of *Sida spinosa* Linn. as antiseptic.

CONCLUSION

It may be concluded from this study that *sida spinosa* Linn. leaf extract has antimicrobial activity against certain bacteria and fungi. It is expected that using natural products as therapeutic agents will probably not elicit resistance in microorganisms. This can explain the rationale for the use of the plant in treating infections in traditional medicine. The plant could be a veritable and cheaper substitute for conventional drugs since the plant is easily obtainable and the extract can easily be made via a simple process of maceration or infusion. It is essential that research should continue to isolate and purify the active components of this natural herb and use in experimental animals.

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