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# Anitmicrobial activity of ethanolic extract of the whole plant of *Sida Spinosa* Linn. (Malvaceae)

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## ABSTRACT

*The antimicrobial activity of Ethanolic extract of the whole plant of Sida spinosa Linn. (Malvaceae) was investigated to verify its claimed ethano medical use in the treatment of microbial infections. Phytochemical analysis revealed the presence of saponins, alkaloids, steroids, flavanoids and glycosides. The test organisms were Staphylococcus aureus, Bacillus subtilis, Pseudomonas aeroginosa, Escherichia coli, Candida albicans, Aspergillus niger. Amongst the test extracts the results suggested that Ethanolic extract to whole plant of Sida spinosa showed antimicrobial activity.*

**Key words:** *Sida spinosa*, Antimicrobial activity, Ciprofloxacin, Ethanolic extract.

## INTRODUCTION

Traditional medicine is the oldest method of curing diseases and infections and various plants have been used in different parts of the world to treat human diseases and infections. Medicinal plants are known to owe their curative potentials to certain biological active substances, which exist in parts of the plants.[1] In recent years, Pharmaceutical companies have spent a lot of time and money in developing natural products extracted from plants, to produce more cost effective remedies that are affordable to the population. The rising incidence in multi drug resistance amongst pathogenic microbes has further necessiated the need to search for newer antibiotic source.[2]

*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.[3][4][5][6]

This present study examined the microbial activity of the ethanolic extract of the whole plant of *Sida spinosa* Linn.

## MATERIALS AND METHODS

### Plant material

The whole plants of *Sida spinosa* were collected in Jan.2011 at Komaneri village, Thothukudi dist. Tamil Nadu, India. The plant was authenticated by Dr. P. Jayaraman, National Institute of Herbal Science, Chennai.

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 - 80°C) 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.[7]

### 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) and *Aspergillus niger* (NCM 105). The antimicrobial agents used were ciprofloxacin (Himedia Laboratory, Mumbai). These microorganisms were obtained from the laboratory stock of the Department of microbiology, Periyar College of Pharmaceutical Sciences, Trichy - 21. The microorganisms were grown overnight at 37°C in Muller Hinton broth at PH 7.4.[8][9] They were maintained on agar slants at 4°C in the refrigerator.

## RESULTS AND DISCUSSION

The Antimicrobial activity of Ethanolic extract of whole plant 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 extract of *Sida spinosa* Linn. and showed a potential activity against growth of both Gram positive and Gram negative bacteria and Fungus *Candida albicans*. The activity was concentration dependent order of activity against the various micro organisms used was as follows.

*Staphylococcus aureus* > *Bacillus subtilis* > *E.Coli* > *Pseudomonos aeruginosa* > *Candida albicans* > *Aspergillus niger*.

It effectively inhibited the growth of *Bacillus subtilis* and gave a sensitive activity against *Staphylococcus aureus*. *Candida albicans* showed significant activity than *Aspergillus niger*. Thus the present study supports the traditional use of *Sida spinosa* Linn. as antiseptic.

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

S.No	Micro Organism	Zone of Inhibition (mm)							
		A	B	C	D	E	F	G	H
1	<i>Staphylococcus aureus</i> (NCM 2079)	12	15	15	15	17	19	-	38
2	<i>Bacillus subtilis</i> (NCM 2439)	13	18	20	20	21	23	-	35
3	<i>E.coli</i> (NCM 2965)	12	14	16	18	19	21	-	38
4	<i>Pseudomonas aeruginosa</i> (NCM 2036)	14	14	15	16	20	22	-	40
5	<i>Candida albicans</i> (NCM 3102)	14	15	16	16	18	21	-	32
6	<i>Aspergillus niger</i> (NCM 105)	-	-	-	-	-	-	-	34

A- Ethanolic Extract of *Sida spinosa* 50 µg/disc

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

C- Ethanolic Extract of *Sida spinosa* 200 µg/ disc

D- Ethanolic Extract of *Sida spinosa* 300 µg/ disc

E- Ethanolic Extract of *Sida spinosa* 400 µg/ disc

F- Ethanolic Extract of *Sida spinosa* 500 µg/ disc

G- Solvent Control (DMSO)

H- STS Drug Ciprofloxacin – 5 µg / disc

Zone of inhibition shown by the Ethanol extract of whole plant of *Sida spinosa* Linn. given below:

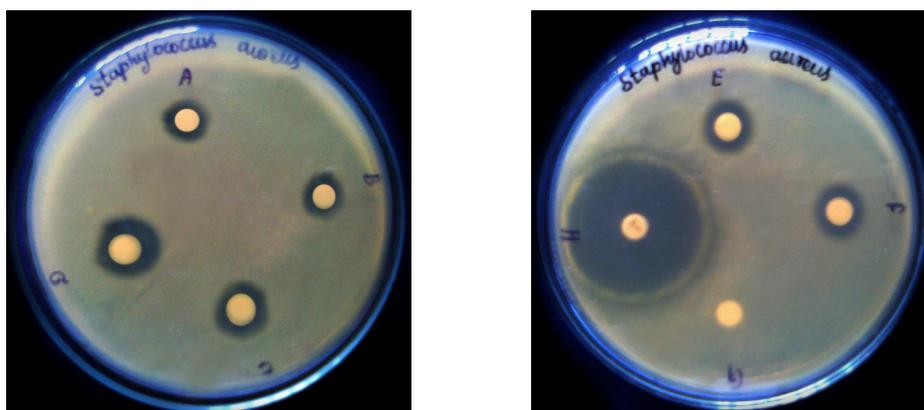
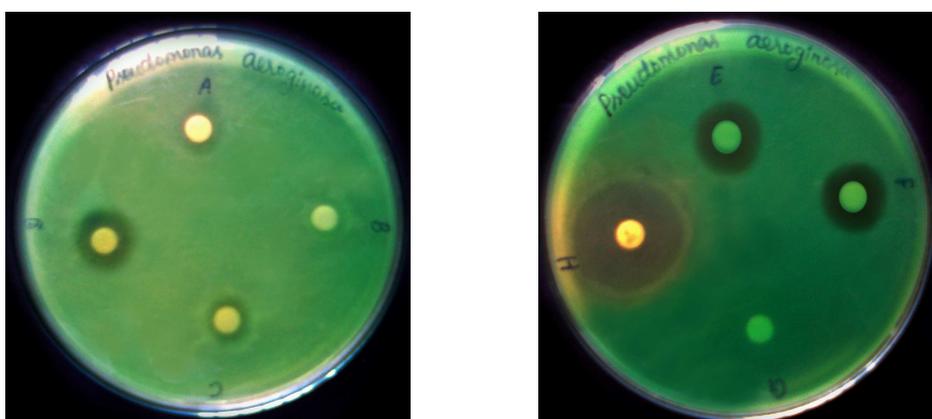
**Fig 1: Zone of Inhibition shown by the Ethanolic extract of whole plant of *Sida spinosa* Linn. on *Staphylococcus aureus*.****Fig 2: Zone of Inhibition shown by the Ethanolic extract of whole plant of *Sida spinosa* Linn. on *Bacillus subtilis*.**

Fig. 3: Zone of Inhibition shown by the Ethanolic extract of whole plant of *Sida spinosa* Linn. on *E.coli*

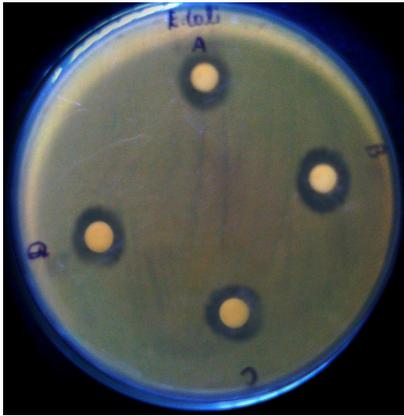


Fig 4: Zone of Inhibition shown by the Ethanolic extract of whole plant of *Sida spinosa* Linn. on *Pseudomonas aeruginosa*

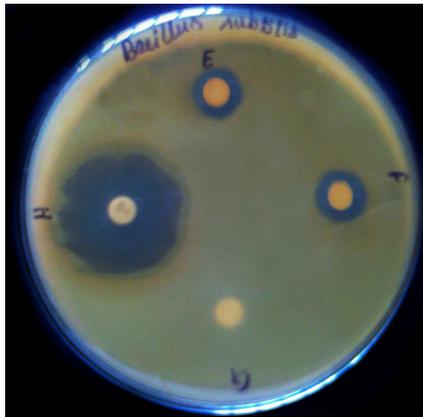
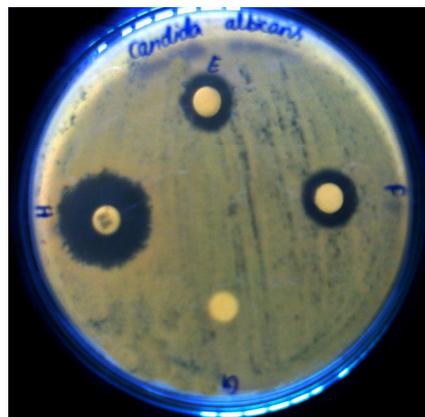
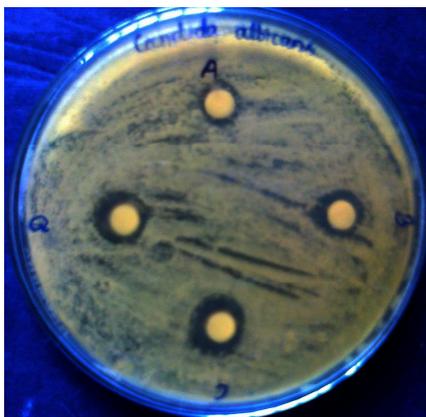
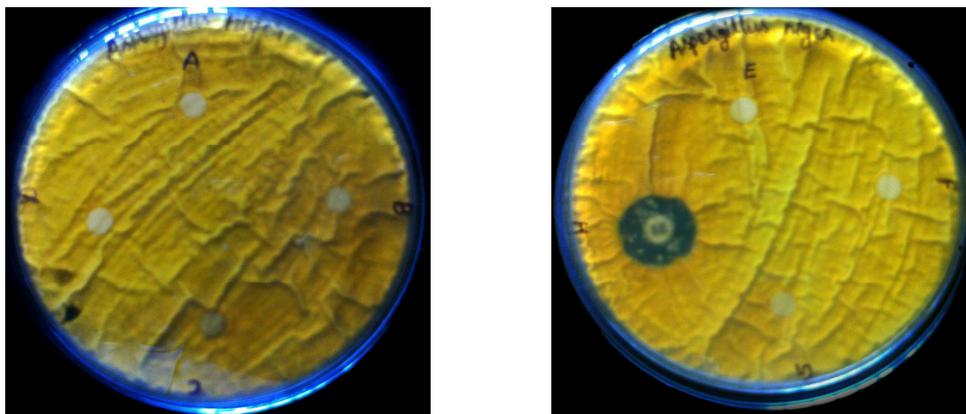


Fig 5 : Zone of Inhibition shown by the Ethanolic extract of whole plant of *Sida spinosa* Linn. on *Candida albicans*



**Fig 6 : Zone of Inhibition shown by the Ethanolic extract of whole plant of *Sida spinosa* Linn. on *Aspergillus niger***



### CONCLUSION

From the above study it is concluded that the dried whole plant of *Sida spinosa* Linn. may represent a new source of antimicrobial with stable, biologically active components that can establish a scientific base for the use of this in modern medicine. The local ethno medical preparation of plant sources should be scientifically evaluated and then disseminated properly. This knowledge about the medicinal plants usage can also be extended to other fields like of pharmacology.

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