ANTIMICROBIAL ACTIVITY OF LEAF EXTRACTS OF *Sida acuta* Burm.

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Abstract

Phytochemical investigations, Antibacerial and antifungal activity studies for leaf extracts of *Sida acuta* were carried out. Two common solvents i.e Chloroform and Ethanol (95%) were used successively for extraction of active principles from the dried powdered leaves. The Phytochemical tests of extracts revealed the Presence of Carbohydrates, Alkaloids, Phytosterols, Saponins and fixed Oils.The antimicrobial screening was done with two Gram +ve (S*taphylococcus aureus* NCIM 2079, *Bacillus subtilis* NCIM 2063) and two Gram –ve (*E.coli* NCIM 2065 *Pseudomonas aeruginosa* NCIM 2036) bacteria and fungi (*Candida albicans* NCIM 3102, *Aspergillus niger* NCIM 1054) as test microorganisms. All the three microorganisms were markedly effected by both the extracts under study.

Keywords: Phytoconstituents, Leaf extracts, Antibacterial and Antifungal activity, *Sida acuta*

Introduction

Sida acuta (Malvaceae), is an erect perennial shrub found throughout the hotter parts of India and Nepal. It is used for various medicinal purposes such as liver disorders, diuretic & abortifacient, in Ayurvedic preparations, asthma, fever, headache (migraine), cough, cold, ulcer, anthelmintic, snake bite, urinary diseases, female disorders, antifertility agents and sedative[1,2]. The present study is undertaken to evaluate the antimicrobial potential of the extract of *Sida acut*L

Experimental

Preparation of extract

The leaves of *Sida acuta* were collected at Tiruchirappalli, Tamilnadu, India. The leaves were shade dried, pulverized and sieved through 40 mesh. The powdered leaves were successively extracted with Chloroform, Ethanol in soxhlet apparatus.. The extracts obtained were evaporated under vacuum to remove the solvent completely. Then these were taken for further study.

Organisms used

Bacterial strains used for testing included *Bacillus subtilis Staphylococcus aureus*, *Escherichia coli*, and *Pseudomonas aeruginosa*. The fungi used was *Candida albicans and Aspergillus niger*. These were obtained from National collection of Industrial Microorganisms, Pune, India. The stock culture was maintained on Mueller Hinton agar medium (Himedia chemicals) at 37^{o} C.

Antimicrobial activity

Antibacterial activity of the extract of *Sida acuta* was studied using the disc diffusion method[3,4]. Petri plates containing 10 ml of Muller Hinton agar medium were seeded with 24h old culture of a selected bacterial strain. Sterile filter paper discs (6 mm) containing 100mg/disc of a plant extract residue dissolved in acetone were placed on the surface of the medium. Acetone and water alone served as negative controls. A standard disc containing reference antibiotics (Gentamycin 10 mcg//Nystatin 100 units) were used as a positive control. Incubation was done for 24h at 37 ^{0}C. The assessment of anitbacteial activity was based on the measurement of diameter of zone of inhibition formed around the disc. Six determinations were conducted for the extract. The same was done for *C. albicans* except the medium used was potato agar.

Results and discussion

The results of preliminary Phytochemical screening and antimicrobial activity of *Sida acuta* leaves extract are given in Tables 1 & 2 respectively

The Phytochemical tests of crude extracts revealed the presence of Carbohydrates, Alkaloids , Saponins , Fixed oil and Phytosterols [5,6]. (Table.1) While assessing the anti bacterial activity for both the chloroform and ethanolic extract, appreciable antibacterial activity was found against all the selected bacteria with the maximum activity recorded against gram positive *Staphylococcus aureus* and gram negative *Escherichia coli* respectively.

These effects were compared with the commercially available antibiotics under the same laboratory conditions and activity index was calculated (Table 2).The results further showed that the extracts were having more potent antibacterial activity and antifungal activity.

These results suggest the presence of potent antibacterial and antifungal activity of the extracts against the bacteria and fungi might be due to naturally occurring bioactive Phytochemicals present in the plant drug. It could be concluded that detailed characterization of various compounds from leaves of *Sida acuta* is needed, so that structure activity relationship in term of antibacterial activity and antifungal activity could be investigated. The high degree of antibacterial activity and antifungal activity seems to confirm the folk therapy of infections and traditional therapeutic claims of this herb. Table: 1

Preliminary Phytochemical Screening of Leaf Extracts of *Sida acuta.* L

S.No	Phytoconstituents	Chemical tests	Chloroform extract	Ethanolic extract
1	Carbohydrates	Molisch test	+	+
2	Alkaloids	Dragnodraffs, Mayers and Hagers test	+	+
3	Phytosterols	Liberman& Burchard test	_	+
4	Saponins	Foarm test	+	+
5	Fixed oils	Stain test	+	+

Table:2
Antimicrobial activity of Leaf Extracts of *Sida acuta.* L

Test Microorganisms	I Z* mm/ A I	Chloroform extract	Ethanolic extract	Standard drug
Gram positive ***Bacillus subtilis*** NCIM 2063	I Z A I	17 0.50	18 0.53	34
Stephylococcus aureus NCIM 2079	I Z A I	38 0.90	40 0.95	42
Gram negative ***Eschorichia coli*** NCIM 2065	I Z A I	42 0. 98	37 0.86	43
Pseudomonas aeruginosa NCIM 2036	I Z A I	21 0.58	20 0.54	37
Fungi ***Candida albicans*** NCIM 3102	I Z A I	24 0.92	23 0.88	26
Aspergillus niger NCIM 1054	I Z A I	11 0.50	15 0.68	22

I Z = Inhibition Zone (in mm)
A I = Activity index

* Average of three observations adjusted to the nearest whole number.

$$\text{Activity Idex} = \frac{\text{Inhibition Zone of the test sample}}{\text{Inhibition Zone of the standard}}$$

Standard Drugs Gentamycin – 10 mcg
Nystatin – 100 units

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