

Anti Microbial Effect of a Coastal Sand Dune Plant of *Spinifex littoreus* (Burm. f.) Merr

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Abstract: Methanolic and aqueous grass extracts of *Spinifex littoreus* (Burm. f.) Merr were screened for their antibacterial and antifungal activities. The extracts were tested against 6 different species of human pathogenic bacteria and 4 fungal strains. Most of the extracts were devoid of antifungal and antibacterial activities, the aqueous grass extract of *Spinifex littoreus* obtained by very good activity when compare to methanol extract, which showed strong inhibitory activity against the Gram-positive and Gram-negative bacteria. This study suggests that aqueous grass extracts of *S. littoreus* obtained by infusion can be used in the treatment of skin diseases caused by dermatophytes.

Key words: Aqueous, bacterial, fungal, methanol, pichavaram, *Spinifex littoreus*

INTRODUCTION

Marine plants and animals are reported to possess a wide spectrum of bioactive substances, which are structurally novel and biologically active substances. Research in the areas of marine natural products has grown geometrically in the recent past (Aswal *et al.*, 1984; Rawiwon *et al.*, 1990). However, reports on the bioactive substances possessed by coastal plants are very meager. Few reports on the coastal plant *Ipomoea pes-caprae* containing pharmacologically active substances were indicated by de Souza *et al.* (2000), Krogh *et al.* (1999) and Rogers *et al.* (2000). The drug-resistant bacteria and fungal pathogens have further complicated the treatment of infectious diseases in immune compromised, AIDS and cancer patients (Diamond, 1993). It is likely that plant extract showing target sites other than those used by antibiotics will be active against drug-resistant microbial pathogen. However, very little information is available on such activity of medicinal plants (Lee, 1998). In the present study, we have selected *Spinifex littoreus*, a sand dune, is screened against multi drug resistant bacteria like *Bacillus subtilis*, *Bacillus pumilus*, *Micrococcus luteus*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae* and *Esherichia coli* and some fungal strains like *Candida albicans*, *Aspergillus niger* *Penicillium chrysogenum* and *Trichosporon begelli*

MATERIALS AND METHODS

The grass of *Spinifex littoreus* were collected from the sand marsh region of Pichavaram on the South East

coast of India, during November to December in 2009. The work was carried out of Centre of Advanced study in Marine Biology, Annamalai University, Parngipettai, Tamil nadu,

Preparation of aqueous extracts: The aqueous extract of *Spinifex littoreus* was prepared by squeezing the sand - free specimens in triple distilled water. The resultant solution was filtered and dialyzed by using Sigma dialysis membrane-500 (Av Flat width-24.26 mm, Av. Diameter -14.3 mm and capacity approx-1.61 mL/cm) against D-glucose to remove the excess water. The supernatant so obtained was lyophilized (Labcono Freeze Dry System) and stored at 4°C in a refrigerator for the further use as crude aqueous extract.

Chloroform extraction: Crude toxin was extracted following the method of Bakus *et al.* (1981) with certain modifications, for chloroform extraction, the *S. littoreus* was dried in air for 2 days and after complete drying, 10g *S. littoreus* was put into 200 mL of chloroform, covered and kept standing for 5 h. The solvent was then removed after squeezing *S. littoreus* and the filtered through whatman filter paper No 1. The solvent was evaporated at low pressure by using a Buchi Rotavapor R-200 at 45°C in refrigerator for further use as crude chloroform extracts.

Antibacterial activity: Petri dishes with nutrient agar were inoculated with six different species of bacteria *S. littoreus* extracts were sterilized by passing each through a 0.22 µm Millipore GV filter (Millipore, USA) Round paper discs with a radius of 0.8 cm were dipped

into each *S. littoreus* extract and placed in the center on inoculated Petri dishes. Bacterial colonies were allowed to grow overnight at 37°C, then the inhibition zone around the disc was measured.

Antifungal activity: Petri dishes with Potato Dextrose agar were inoculated with three different species of fungus. *S. littoreus* extracts were sterilized by passing each through a 0.22 µm Millipore GV filter (Millipore, USA) Round paper discs with a radius of 0.8 cm were dipped into each *S. littoreus* extract and placed in the center on inoculated petri dishes. Fungal colonies were allowed to grow 48 h at 28°C and then the inhibition zone around the disc was measured.

RESULTS AND DISCUSSION

The present study reveals that the grass extract of *Spinifex littoreus* were very effective against bacteria and some fungal strains than the other species. The aqueous extract of the grass were more antagonistic than the respective methanolic extracts both bacterial and fungal tested. The aqueous plant extracts of showed good antifungal and anti bacterial activity. Among the zone maximum was found in *Bacillus pumilus* and minimum in *Esherichia coil*, and followed by the fungal zone of inhibition was maximum shows in *Candida albicans* and minimum shows in *Penicillium chrysogenum* both are aqueous and methanol extract was good activity showed.

The present study reveals that the grass extracts of *Spinifex littoreus* were very effective against gram positive bacteria such as *Staphylococcus aureus*, *Bacillus pumilus*, *Bacillus subtilis*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae* and *Esherichia coli* than the other species tested. The aqueous extracts of the grass were more antagonistic than the respective chloroform extracts showed (Table 1). The antibacterial activity may be due to the presence of alkaloids, flavonoids, tannin, polyphenolic and oil as reported by (Irobi and Daranola, 1994) and (Brantner *et al.*, 1996). No antibacterial activity could be obtained against the Gram-negative bacteria. This is not unusual as, in general, these bacteria are more resistant than Gram-Positive ones (Martin, 1995). The volatile oil of *Artimisia afra* has greater activity as an antimycotic than as an antibacterial agent (Graven, 1992).

The present study both aqueous and methanol extract of *Spinifex littoreus* grass very good effective in some fungal strains. The aqueous and methanol extras of the *Spinifex littoreus* grass showed good anti fungal activity against the stains of screened. The maximum zone inhibition was shows in *Trichosporon begelli*, and *Candida albicans* and minimum zone inhibition was shows in *Aspergillus niger*, and *Penicillium chrysogenum* showed (Table 2). The antifungal activity of the studied plant extracts was compared with standard a similar study

Table 1: Anti bacterial activity of *Spinifex littoreus* grass and zone of inhibition

Species name	Aqueous extracts and Zone of inhibition in (mm)100 mg/mL	Chloroform extracts and zone of inhibition in (mm) 100 mg/mL
<i>Staphylococcus aureus</i>	5	3
<i>Bacillus pumilus</i>	9	6
<i>Bacillus subtilis</i>	7	4
<i>Pseudomonas aeruginosa</i>	6	4
<i>Klebsiella pneumoniae</i>	4	5
<i>Esherichia coli</i>	1	2

Table 2: Anti fungal activity of *Spinifex littoreus* grass and zone of inhibition

Species name	Aqueous extracts and Zone of inhibition 100 mg/mL	Chloroform extracts and zone of inhibition 100 mg/mL
<i>Candida albicans</i>	4	4
<i>Aspergillus niger</i>	2	2
<i>Penicillium chrysogenum</i>	2	1
<i>Trichosporon begelli</i>	5	4

of screening natural plant extracts against different fungal pathogens was well recorded in literature (Ahmad *et al.*, 2000; Rani and Murty, 2006).

CONCLUSION

In this endeavor, traditional coastal medicines must perforce to be granted the benefit of modern science and technology to serves further global needs. The drugs derived from sea have the possibility of using in medicine because of its good antimicrobial activity as well as less toxic effects, A novel drug should not contain any toxic side effects, Hence the present study aimed to focus the antimicrobial effects of *Spinifex littoreus* of different extract.

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