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# SCREENING ON BIOACTIVE COMPOUNDS OF SELECTED MARINE SEAWEEDS AND ITS ANTIFUNGAL ACTIVITY

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**ABSTRACT**

Commonly occurring healthy algae were collected from Hare Island of Tuticorin. Antifungal activities of methanol extracts of five marine algae against four fungal strains were investigated. All the strains used in this study exhibited antifungal activity. Maximum activity (58mm) was observed in 200mg methanolic extract of *Ulva reticulata* against *Aspergillus niger* and minimum activity (9mm) was observed in 50mg methanolic extract of *Gracilaria corticata* against *Aspergillus niger*. The results obtained in this study revealed that the seaweeds are highly effective in screening natural products.

**KEYWORDS:** Marine seaweeds, antifungal activity, methanolic extracts, agar diffusion method.

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## INTRODUCTION

Marine seaweeds are the simplest group of marine algae where they are present nearby seashore and in rocky regions of beaches. These marine algal members possess bioactive substances, which are antibacterial, antiviral, antifungal in nature and it is an universally known fact that marine algae has got rejuvenating properties where they have been used as source of nutrients in many countries. Since the finding of antibacterial and antifungal activities in many species of marine algae from different part of the world and the isolation of some active compounds from them, marine algae have become recognized as potential sources of antibiotics (Rao, 1991). The present study was carried out to investigate the antifungal activities of methanol extracts of five marine algae against four fungal strains.

## MATERIALS AND METHODS

Live and healthy samples of five marine algae species (*Ulva lactuca, Ulva reticulata, Padina pavonica, Padina boergesenii and Gracilaria corticata)* were collected from Hare Island of Tuticorin. The collected samples were cleaned well with seawater to remove all the extraneous matter such as epiphytes, sand particles, pebbles and shells and brought to laboratory in sterile polythene bags. The samples were then thoroughly washed with fresh water and are dried in room temperature under shade and powdered.

### Preparation of extracts

The powdered sample was dissolved with methanol (1/10w.v) and soaked overnight. Then the extract was centrifuged at 2220g for 10min. The pellet was dissolved twice in methanol and the supernatant was filtered using cheese cloth and concentrated in Rotavapour. The dried extracts were dissolved in methanol and stored at 4◦C before testing (Cho *et al.*, 2007).

### Fungal strains used for assay

Fungal strains like *Aspergillus niger, Candida albicans, Aspergillus flavus and Mucor indicus* were used for this study. They were cultured individually on selective broth at 28◦ C for 24hrs, before inoculation for assay (Saidani *et al.*, 2012).

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**Antifungal assay**

Antifungal activity of the extract was performed by agar well diffusion method (Bauer *et al.,* 1996). The prepared culture plates were inoculated with different fungal strains. Wells were made on the surface of agar medium with 5mm cork borer. The crude extracts of algae were poured into the well using sterile syringe. The plates were incubated at 28◦C for 48hrs. The plates were observed for the zone of inhibition and the diameters of the zones were measured in millimeters. Nystatine was used as positive control and methanol was used as negative control (Karabay-Yavasoglu *et al*., 2007).

**RESULTS AND DISCUSSION**

The antifungal activity of methanolic extracts of five seaweeds against four fungal strains was tabulated in Table 1. No antifungal activity was observed in methanol without algal extract, which was used as negative control. Nystatine showed highest activity. The maximum activity (58mm) was observed in 200mg methanolic extract of *Ulva reticulata* against *Aspergillus niger*. The minimum activity (9mm) was observed in 50mg methanolic extract of *Gracilaria corticata* against *Aspergillus niger*. *Gracilaria corticata* showed maximum activity towards *Mucor indicus* and minimal activity towards *Aspergillus niger. Ulva lactuca* showed maximum activity towards *Aspergillus niger* and minimal activity towards *Candida albicans* . *Ulva reticulata* showed maximum activity towards *Aspergillus niger* and minimal activity towards *Candida albicans. Padina pavonica* showed maximum activity towards *Candida albicans* and minimal activity towards *Aspergillus niger. Padina boergesenii* showed maximum activity towards *Mucor indicus* and minimal activity towards *Candida albicans*. In the present study, all the five marine algae species (Ulva *lactuca, Ulva reticulata, Padina pavonica, Padina boergesenii and Gracilaria corticata)* showed antifungal activity against all the four fungal strains *(Aspergillus niger, Candida albicans, Aspergillus flavus and Mucor indicus*). Zovko *et al* in 2012 also obtained the same results against the fungal strains with a high activity of algal extracts against *Candida albicans*. Saidani *et al* in 2012 described that the extracts of the four species of Algerian algae showed antifungal activity against every fungal strain. Tuney *et al.,* 2006 suggested that the ethanolic extract

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of *Padina pavonica* were active against *Candida albicans* but the methanolic and acetonic extracts showed negative result. But the present study revealed a good result for *Padina pavonica* against *Candida albicans.*

**Table 1: Fungal strains showing zone of inhibition (mm) in methanolic extracts of marine algae**

| Marine algae | Concentration (mg) | Fungal strains showing zone of inhibition (mm) | | | |
|---|---|---|---|---|---|
| | | *Aspergillus niger* | *Aspergillus flavus* | *Candida albicans* | *Mucor indicus* |
| ***Gracilaria corticata*** | 50 | 9+ 1.4 | 10±1.0 | - | 16±6.2 |
| | 100 | 14±1.0 | 15±2.8 | 21±1.4 | 22±2.2 |
| | 200 | 17±1.4 | 18±2.4 | 30±7.0 | 32±1.0 |
| ***Ulva lactuca*** | 50 | 20±2.4 | 17±2.6 | 10±1.8 | 26±2.4 |
| | 100 | 34±2.8 | 26±5.1 | 20±4.2 | 34±1.8 |
| | 200 | 56±2.6 | 34±1.7 | 34±1.0 | 48±2.0 |
| ***Ulva reticulata*** | 50 | 24±5.1 | - | - | - |
| | 100 | 34±4.4 | 22±1.7 | 10±2.6 | 18±2.4 |
| | 200 | 58±7.5 | 26±1.0 | 14±1.4 | 22±4.4 |
| ***Padina pavonica*** | 50 | 8±2.8 | 12±2.6 | 11±1.6 | 12±6.2 |
| | 100 | 16±5.1 | 36±2.0 | 38±2.4 | 36±1.0 |
| | 200 | 28±1.0 | 48±1.0 | 52±1.8 | 48±2.8 |
| ***Padina boergesenii*** | 50 | 17±1.4 | - | - | 12±6.2 |
| | 100 | 26±6.2 | 20±2.8 | 10±1.8 | 28±1.6 |
| | 200 | 34±7.5 | 24±1.4 | 22±2.4 | 36±2.4 |

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The result of the present study clearly indicates that the marine algae displays potential values that warrants further investigation. Further, the bioactive compounds that showed high antifungal activity must also be identified.

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