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Antimicrobial activity of extracts of some Sri Lankan marine macroalgae

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Macroalgae are considered as a source of antimicrobial compounds with a broad spectrum of biological activities. The present study was aimed at discovering the potential antimicrobial activity from some marine macroalgae. Seven species of macroalgae were collected from Negombo and Mount-Lavinia beaches. Crude extracts were successively extracted with chloroform, diethyl ether, dichloromethane and methanol using the soxhlet extraction method. The extracts were evaluated for their antibacterial properties towards *Staphylococcus aureus* (ATCC 25923) and *Escherichia coli* (ATCC 35218), and antifungal properties towards *Candida albicans* using disk diffusion method in 03 replicates at a disc strength of 1.0 mg/disc. Gentamicine (0.025 mg/disc) and Fluconazole (0.02 mg/disc) were used as positive controls for antibacterial and antifungal bioassays respectively, with the respective solvents as negative controls. Antibacterial properties of chloroform and methanolic extracts of *Chaetomorpha antennina,* methanolic extracts of *Ulva fasciata* and *Chnoospora minima* were observed towards *E. coli* with mean inhibition zone diameters of 7.41 ± 0.51 mm, 8.41 ± 1.86 mm, 9.90 ± 1.65 mm and 7.00 ± 0.00 mm, respectively. Only the diethyl ether extract of *Sargassum cervicone* (8.50 ± 2.27 mm) showed an inhibitory activity towards *S. aureus*. Methanolic extracts of *U. fasciata* and *Padina commersonii*, chloroform and dichloromethane extracts of *Grateloupia lithophila* exhibited antifungal properties towards *C. albicans* with mean inhibition zone diameters of 6.33 ± 0.56 mm, 6.76 ± 0.65 mm, 8.08 ± 1.58 mm and 7.25 ± 0.60 mm, respectively. Negative controls showed no inhibition to any of the organisms.The methanolic extract of *U. fasciata* was fractionated in four steps with different combinations of hexane, ethyl acetate and methanol as solvent systems using liquid solid column chromatography and micro scale flash column chromatography. In the first step, the first two fractions showed antibacterial activity towards *E. coli* with mean inhibition zone diameters of 9.29 ± 1.07 mm and 8.79 ± 0.87 mm, respectively at the disk strength of 0.125 mg/disc. In the second step, three consecutive fractions (0.05 mg/disc) showed antibacterial activity with mean inhibition zone diameters of 9.63 ± 1.02 mm, 9.06 ± 1.56 mm and 9.54 ± 0.77 mm. In the third fractionation step, the first three fractions showed the activity. In the present study, out of seven macroalgal species evaluated from the Western coastal region of Sri Lanka, six species possessed antimicrobial properties towards at least one of the pathogens tested. Hence, efficient extraction methods and further purification of the antimicrobial compounds should be developed in order to isolate and identify the pure antimicrobial compounds.

Keywords: Antimicrobial activity, disk diffusion method, marine macroalgae

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