

Studies on the Bioactivity of Different Solvents Extracts of Selected Marine Macroalgae against Fish Pathogens

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Abstract : Marine macroalgae have proven to be rich source of bioactive compounds with biomedical potential, not only for human but also for veterinary medicine. Emergence of microbial disease in aquaculture industries implies serious losses. Usage of commercial antibiotics for fish disease treatment produces undesirable side effects. Marine organisms are a rich source of structurally novel biologically active metabolites. Competition for space and nutrients led to the evolution of antimicrobial defense strategies in the aquatic environment. The interest in marine organisms as a potential and promising source of pharmaceutical agents has increased in the last years. Many bioactive and pharmacologically active substances have been isolated from microalgae. Compounds with antibacterial, antifungal and antiviral activities have been also detected in green, brown and red algae. Selected species of marine benthic algae belonging to the Phaeophyta and Rhodophyta, collected from different coastal areas of Alexandria (Egypt), were investigated for their antibacterial and antifungal, activities. Macroalgae samples were collected during low tide from the Alexandria Mediterranean coast. Samples were air dried under shade at room temperature. The dry algae were ground, using electric mixer grinder. They were soaked in 10 ml of each of the solvents acetone, ethanol, methanol and hexane. Antimicrobial activity was evaluated using well-cut diffusion technique. In vitro screening of organic solvent extracts from the marine macroalgae *Laurencia pinnatifida*, *Pterocladia capillacea*, *Stepopodium zonale*, *Halopteris scoparia* and *Sargassum hystrix*, showed specific activity in inhibiting the growth of five virulent strains of bacteria pathogenic to fish *Pseudomonas fluorescens*, *Aeromonas hydrophila*, *Vibrio anguillarum*, *V. tandara*, *Escherichia coli* and two fungi *Aspergillus flavus* and *A. niger*. Results showed that, acetone and ethanol extracts of all test macroalgae exhibited antibacterial activity, while acetone extract of the brown *Sargassum hystrix* displayed the highest antifungal activity. The extracts of seaweeds inhibited bacteria more strongly than fungi and species of the Rhodophyta showed the greatest activity against the bacteria rather than fungi tested. The gas liquid chromatography coupled with mass spectrometry detection technique allows good qualitative and quantitative analysis of the fractionated extracts with high sensitivity to the smaller amounts of components. Results indicated that, the main common component in the acetone extracts of *L. pinnatifida* and *P. capillacea* is 4-hydroxy-4-methyl-2-pentanone representing 64.38 and 58.60%. Thus, the extracts derived from the red macroalgae were more efficient than those obtained from the brown macroalgae in combating bacterial pathogens rather than pathogenic fungi. The most preferred species over all was the red *Laurencia pinnatifida*. In conclusion, the present study provides the potential of red and brown macroalgae extracts for development of anti-pathogenic agents for use in fish aquaculture.

Keywords : bacteria, fungi, extracts, solvents

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