

# Marine Fisheries Information Service



Technical and  
Extension Series

**Central Marine Fisheries Research Institute**  
(Indian Council of Agricultural Research)  
Post Box No. 1603, Cochin - 682 018  
[www.cmfri.org.in](http://www.cmfri.org.in)



# New antibacterial compounds from *Ulva fasciata* (Gray)

Kajal Chakraborty, A.P. Iyengar and R. Paul Raj  
Central Marine Fisheries Research Institute, Cochin

Chlorophyten seaweeds, popularly known as green algae, identified in both intertidal and deep water regions of the seas, are of immense bioactive value. A wide range of antimicrobial compounds from green algae, viz., terpenes, polyphenolic compounds and steroids have been detected from various parts of the world. *Ulva fasciata*, a green alga belonging to the family Ulvaceae commonly known as "sea lettuce" that grows in seashore of south India and coastal regions of Asia-Pacific and Arabian Sea. Rapid development of

antibiotic resistance by many pathogens, along with the toxicity of some of the currently used antibiotics prompts the search for, and development of novel antimicrobial agents from renewable sources. This report focuses upon extraction, purification and structural elucidation of antibacterial terpenoids from *Ulva fasciata*.

*Ulva fasciata* was harvested from an exposed intertidal rocky shore in Vizhinjam, and its thalli were air-dried. The dichloromethane extract of air-dried aerial

parts of this macroalga was fractioned by column chromatography using a step gradient of hexane/ethyl acetate to yield different compounds. The invitro antibacterial activity of the biomolecules was tested against marine aquacultural pathogens, *Vibrio parahaemolyticus* and *V. harveyi* by the disc-diffusion method and minimum inhibitory concentration, following established procedures.

Chromatography of the dichloromethane-soluble fraction on neutral alumina using increasing concentrations of ethyl acetate/hexane as eluents yielded labdane diterpenoids and guaiane sesquiterpenoids. Structures of these secondary metabolites were established using spectroscopic

analysis, especially, mass spectroscopy and extensive nuclear magnetic resonance spectroscopic techniques, including proton and carbon nuclear magnetic resonance spectroscopy, two dimensional nuclear overhauser effect correlation spectroscopy, heteronuclear multiple quantum coherence, and heteronuclear multiple bond coherence techniques. The metabolites were found to contain unusual carbon skeletons that are previously undescribed. The antimicrobial assay showed that the compounds labda-14-ene 3a, 8 $\alpha$ -diol and labda-14ene-8 $\alpha$ -hydroxy-3-one were inhibitory to the growth of *Vibrio parahaemolyticus* with minimum inhibitory concentrations (MICs) of 30 ug/ml by the former, and 40 ug/ml by the latter, respectively.