

TOXICITY OF LEAD AND CADMIUM TO TROPICAL MARINE PHYTOPLANKTON

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ABSTRACT

The toxicity of Pb and Cd to three tropical, marine phytoplankton species isolated from the Andaman Sea off Phuket Thailand were determined. The phytoplankton species included one diatom, *Chaetoceros calcitrans*, one green alga, *Chlorella* sp., and one chrysophyte, *Dunaliella tertiolecta*. The test method was a two day mini scale (10 mL) modified International Standard (ISO) growth inhibition test with natural and artificial seawater. Citric acid was added as a metal chelator instead of the more strongly metal complexing and photodegradable EDTA. Tests were carried out at 26–27 °C and under continuous white fluorescent light of a 10 to 12 klux intensity, and a 48 h test duration. Concentrations resulting in 50% reduced growth rate (EC50) were for *C. calcitrans*, *Chlorella* sp. and *D. tertiolecta*, respectively: Cd in artificial seawater; 3.28, 0.74, and 25.6 mg L⁻¹, and in natural seawater; 3.02, 0.32, and 34.6 mg L⁻¹. EC50 values for Pb in artificial seawater were 1.4, 0.12, and 5.25 mg L⁻¹ d and in natural seawater 0.18, 0.4, and 6.77 mg L⁻¹. Pb was consistently more toxic to the algae than Cd, and *Chlorella* sp was generally most sensitive followed by *C. calcitrans* while *D. tertiolecta* was the least sensitive. Toxicity levels in the natural and synthetic seawater media were similar except for Pb toxicity with *C. calcitrans*, which was more sensitive in natural seawater than in the synthetic medium. The test medium contained a minimum amount of iron and chelator and it appears to have worked although the medium may not be stable in the long-term, which could have been achieved with a large chelator surplus.