

Comparison of Sensitivity of Tropical Freshwater Microalgae to Environmentally Relevant Concentrations of Cadmium and Hexavalent Chromium in Three Types of Growth Media

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Abstract

Sensitivity of tropical freshwater microalgae (*Mesotaenium* sp., *Chlorococcum* sp. and *Scenedesmus* sp.) to environmentally relevant concentrations of hexavalent chromium (Cr⁶⁺) and cadmium (Cd²⁺) was compared individually in three growth media viz. Bold's Basal Medium (BBM), Test Medium 1 (TM1) and Test Medium 2 (TM2) based on fluorescence reduction. Free metal content of growth media was determined by Visual MINTEQ (version 3.1). After 24 h, relative fluorescence of microalgae in the three media decreased with increased metal concentration showing a concentration dependent graded toxicity response. All microalgae were more sensitive to the metals when grown in TM1, when compared, more sensitive to Cr⁶⁺ than Cd²⁺. Metal speciation indicated that TM1 and TM2 media have higher percentage of bioavailable Cd²⁺ than BBM, and chromium was present mainly as CrO₄²⁻ and HCrO₄⁻. The results suggest that the TM1 medium is more suitable under short term exposure of microalgae to metals in environmental monitoring.

Keywords: Tropical microalgae · Hexavalent chromium · Cadmium · Fluorescence · Growth media