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Sensitivity of *Chlorella vulgaris* (Microalgae) and *Lemna perpusilla* (Duckweed) to Copper and Cadmium under empirical conditions

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Environmental quality standards for freshwater life protection under tropical exposures are limited. Copper (Cu) and Cadmium (Cd) are two common contaminants in the Sri Lankan freshwater bodies. The objective of this study was to develop freshwater chronic ecotoxicity data for Cu and Cd for tropical temperature exposures using two model primary producers, *Chlorella vulgaris* (microalgae) and *Lemna perpusilla* (duckweed). Ecologically relevant toxicity endpoints were obtained at tropical temperature exposures (28°C - 30°C) and low water hardness (≤ 66 mg/L as CaCO₃) using standard toxicity protocols. Two concentration series of Cu²⁺ and Cd²⁺ each in triplicate were prepared by diluting appropriate stock solutions. Growth rate inhibition of algae was computed based on absorbance at 680 nm for 72 hours. Growth rate inhibition of the duckweed at 7 days was computed based on total number of fronds, green fronds and the green frond area. Concentrations of Cu and Cd in the exposure media were determined using atomic absorption spectrophotometry. Based on non-linear regression modelling, the estimated 72 hour median effective concentration (EC₅₀) values of Cu and Cd for growth inhibition of *C. vulgaris* were 342 and 4229 µg/L respectively. The estimated 7 day EC₅₀ values of Cu and Cd for *L. perpusilla* were 498 and 405 µg/L respectively based on total number of fronds. The algal species was more sensitive to Cu than Cd exposure under tropical temperature while the duckweed had an equal level of sensitivity to both heavy metals. The estimated EC₅₀ values for growth inhibition of the two model primary producers are greater than the reported levels of Cu and Cd in most freshwater bodies in Sri Lanka. In order to derive water quality criteria for freshwater life protection under tropical exposure conditions, additional freshwater chronic ecotoxicity data on more native organisms belonging to different trophic levels is required.

Keywords: Copper, cadmium, toxicity, species sensitivity, tropical temperature

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