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**Comparison of sensitivity of *Lemna perpusilla* (minute duckweed) to chromium, nickel, and zinc ions**

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In recent times, the pollution of tropical aquatic ecosystems due to heavy metals has become a great issue. The major sources of heavy metal pollution in aquatic ecosystems are effluents from metal-based industries and municipal wastewater. Duck weeds (*Lemna* species) are widely used in the treatment of wastewater and sewage effluents as they have the ability to absorb nutrients in the wastewater effectively. The species, *Lemna minor* and *L. gibba* generally represent temperate areas while *L. perpusilla* is native to Southeast Asia. Objective of the present study was to compare the sensitivity of *L. perpusilla* to chromium (Cr), nickel (Ni), and zinc (Zn) ions under tropical temperature exposure based on standard laboratory ecotoxicity tests. Growth reduction of *L. perpusilla* under Cr, Ni, and Zn exposure was assessed using a standard ecotoxicity procedure with a range of metal ion concentrations (Cr<sup>6+</sup>: 0, 12, 30, 60, 90 and 120 mg/L; Ni<sup>2+</sup>: 0, 0.03, 0.06, 0.15, 0.30 and 0.60 mg/L; Zn<sup>2+</sup>: 0, 0.1, 0.25, 0.5, 1.0 and 2.0 mg/L). Toxicity thresholds of Cr<sup>6+</sup>, Ni<sup>2+</sup> and Zn<sup>2+</sup> for the duckweed *L. perpusilla* under tropical temperature exposure (27°C - 29°C) were estimated based on multiple endpoints (total number of fronds, percentage of green fronds and green frond area). Triplicate test vessels were used for each concentration and the controls. The average specific growth rate and percent inhibition growth rate for each treatment and control replicate were determined. Metal contents in the exposure media were analytically verified using atomic absorption spectrophotometry. One way ANOVA followed by Dunnett's test was used to estimate the lowest observed effect concentration (LOEC) for each endpoint. Effective concentrations of metals at different percentile effect levels (EC50, EC20, EC10 and EC5) were estimated through nonlinear regression modelling using USEPA Toxicity Relationship Analysis Program software. Based on different endpoints used for the toxicity assessments, lowest observed adverse effect concentrations (7 day LOAEC) for growth reduction of *L. perpusilla* for Cr<sup>6+</sup>, Ni<sup>2+</sup>, and Zn<sup>2+</sup> were estimated as 21 mg/L, 0.06 mg/L, and 0.26 mg/L, respectively. For growth reduction of *L. perpusilla*, the most sensitive 7-day effective concentration for 10% effect (EC10) for Cr<sup>6+</sup>, Ni<sup>2+</sup>, and Zn<sup>2+</sup> were 21 mg/L, 0.021 mg/L, and 0.2 mg/L, respectively. In conclusion, the sensitivity of *L. perpusilla* to the three metal ions followed the decreasing order: Ni<sup>2+</sup> > Zn<sup>2+</sup> > Cr<sup>6+</sup>. This study revealed that *L. perpusilla* is more sensitive to Ni<sup>2+</sup> than Cr<sup>6+</sup> and Zn<sup>2+</sup>. Of the three metals tested, Cr<sup>6+</sup> exposure could be most tolerated by *L. perpusilla*.

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