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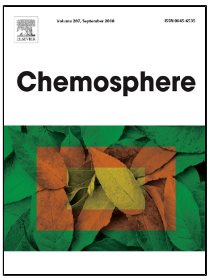

Eichhornia crassipes mediated copper phytoremediation and its success using catfish bioassay

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Eichhornia crassipes mediated copper phytoremediation and its success using catfish bioassay

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Abstract

Copper (Cu) pollution in aquaculture ponds poses substantial ecological threats. Most phytoremediation studies deal with the efforts of removing Cu from water, but seldom, such endeavors are validated by suitable bioassays. The present study undertook a two-pronged effort to remediate Cu by phytoextraction with an aquatic macrophyte, *Eichhornia crassipes,* and establish the efficacy of such endeavors by *Clarias batrachus* bioassay. For phytoextraction trials, *E. crassipes* was exposed to Cu concentration 0, 5, 10, 15 and 20 mg L^{-1} in Hoagland solution for 21 days. The highest uptake of 2168 µg g^{-1} dw was at 10 mg L^{-1} Cu exposure, and efficient root to leaf translocation was seen for 5-10 mg Cu L^{-1}. For these doses, there was 55-57% decline in Cu from test waters. We evaluated morphological, physiological and biochemical response of plants towards Cu stress to gauge its phytomediation capacity. For bioassays, fish were reared for 7 days in phytoremediated Cu doses of 5 and 10 mg L^{-1}. The accumulation of Cu followed the pattern: kidney>liver>gill>muscle. Fish muscle accumulated 21.8-27.0 µg Cu g^{-1} dw after 7d, however, for *E. crassipes* remediated doses, muscle accumulated 8.2-10.9 µg Cu g^{-1} dw, which was within the safe levels of Cu in edible tissues. Metal doses declined protein