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Application of aquatic plant phytoremediation as green technology treatment of lead in polluted water

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Lead is an element of considerable environmental and toxicological interest because of its potential deleterious effects upon human health. In this research, a laboratory-constructed hydroponic system was employed to characterize bioremoval of lead by a submerged, rootless aquatic plant, *Ceratophyllum demersum* L. (Coontail or hornwort). Three concentrations of lead were used (0.125, 0.250, and 0.500 µg/ml). Results indicated that maximum lead removal of 65.6%, 58.2% and 56.4% were achieved from nutrient media with low, medium and high initial concentrations, respectively, after 25 days. Generally, lead uptake (absorbed fraction) increases with time till reaching equilibrium at the last five days of the experiment. The highest lead uptake rate was recorded in the first five days in all treatments. On the other hand, the adsorbed (exchangeable) fraction of lead onto *C. demersum* showed a remarkable decrease with increasing metal concentration in the nutrient media. Results also showed that *C. demersum* can accumulate and adsorb high amount of lead in concentration and duration dependent manner. This research indicated the remarkable bioremoval potentialities of *C. demersum* as it is capable to remove 32.2% of the lead under relatively high concentration (0.500 µg/ml) within five days. Accordingly, this plant can be useful for the design of cost effective and eco-friendly wastewater treatment plants.

Biography

Nadia Badr El-Sayed has completed her PhD at the age of 35 years from Wayne State University USA. She is the Professor of Environmental Chemistry, Faculty of Science, Alexandria University. She has published more than 38 papers in reputed journals, worked in 4 international scientific projects and supervised 10 master and doctorate thesis. Her research interest focuses on monitoring, assessment, management and treatment for hazardous inorganic and organic wastes using modern technologies as water quality modeling as well as biological and nano remediation processes.

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