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Bioaccumulation capacity assessment for lead uptake by *Azolla* sp

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Heavy metals pollution represents an important environmental problem due to toxic effects of metals and their accumulation throughout the food chain leading to serious ecological and health problems. Unlike organic pollutants, heavy metals are not degraded through biological processes. Traditional technologies for the removal of heavy metal are often ineffective and / or very expensive when used for the removal of heavy metal ions to very low concentrations. Plants based bioremediation technologies have recent attention as strategies to clean up contaminated soil and water.

The objectives of the research presented in this paper were to determine

- the effect of the strength of the ambient nutrient solution for uptake of Lead by Azolla sp – Nutrient analysis.
- the capacity for Lead uptake by Azolla sp – Capacity assessment.

In the nutrient analysis, plants were exposed to nutrient solution at different strength and with varying Pb concentration. To estimate the capacity for lead uptake by Azolla sp, the plants were exposed to different concentration of Pb at 10 % Hoagland nutrient solution. Pb uptake was analyzed in the plant bio mass using Atomic absorption spectrometer.

In nutrient enriched environments, the bio-availability fraction of metals may be reduced as a result of binding to nutrient anions. The uptake of heavy metals in plants may be affected by competition, since nutrient captions compete with metals for uptake sites. In the present study, at 10% nutrient, *Azolla* sp showed toxic symptoms due to high uptake of Pb with increasing concentration of Pb. In capacity assessment, Relative Growth decreased significantly with increasing concentration of Pb. However, Pb uptake increased significantly with increasing concentration of Pb. *Azolla* sp. showed highest absorption (11000 mg/kg) at 12 ppm of Pb solution.

Bio Concentration Factor (BCF) is the ratio of metal concentration in the dry plant biomass to initial concentration of metal in the feed solution which evaluates the ability of plants to accumulate heavy metal[2]. At low Pb concentration (1,5- 3.5 ppm) the BCF was a little under 1000. It was more than 1000 at around 5-7.5 ppm Pb. For Phytoremediation, a good accumulator should accumulate the elements with a BCF >1000 in its tissue.

High concentration of available nutrients mitigates Pb toxicity on *Azolla* sp. Pb uptake is high at low nutrient concentrations in the ambient solution. Above results indicate that *Azolla* is a potential candidate for removal of Pb at low concentrations (5-7.5 ppm) in waterways polluted with effluents.

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