

Study of *Salvinia cucullata Roxb.* to tolerate and accumulate arsenic

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The Gangetic Plain of Bihar has abundance of arsenic contaminated aquifers. Many arsenic mitigation structures have been installed by different Governmental and non-governmental agencies to supply safe drinking water in this area. Most of the arsenic mitigation structures are based on principle of reverse osmosis or adsorption. Huge quantity of arsenic containing sludge is generated and disposed without proper treatment. The present research was planned to provide a scientific basis for sludge disposal of arsenic treatment units through bioremediation. The accumulation potential of the As (V) ion from aqueous solution has been studied using the water fern *Salvinia cucullata Roxb.* for phytoremediation of aquatic arsenic. The aquatic water fern *Salvinia cucullata Roxb.* were collected from the wetlands of Bihar. Sodium arsenate was used to prepare the stock solution of As (V). Different concentrations of arsenic solution were used to irrigate the plants under pot experiment. Different known concentrations of arsenic were added in nutrients solutions. During plant growth period, at regular intervals of 120 hours, the arsenic content in the plant samples were examined using Silver diethyl dithiocarbamate (SDDC) method by UV spectrophotometer. The tolerance capacity of plants against arsenic toxicity was also analyzed. Biochemical parameters such as chlorophyll content and soluble sugars (Glucose) content were analyzed in the test plants after harvesting. The effect of biomass quantities on sorption rate was also investigated. The experimental data were fitted for regression analysis between rates of arsenic accumulation and concentration in the plant samples. Test results indicated that effective uptake of As(V) by the plant samples were 0.035mg/kg, or 70% of the As in the 0.05 mg/l As irrigation solution and 1.6 mg/kg or 32% of the As in the 5.0 mg/l As irrigation solution. It was also found that after repetitive doses of 5 mg/l arsenic nutrient solution, the metabolic activity declined sharply as indicated by spreading Chlorosis. Thereafter, the plant samples could not survive.

Key Words: Arsenic, Water fern (*Salvinia cucullata Roxb.*), phytoremediation, Chlorosis, biomass