

Simultaneous bioaccumulation and translocation of iron and aluminium from mining wastewater by *Scirpus grossus*

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ABSTRACT

Iron (Fe) and aluminium (Al) contamination due to mining activities has increased considerably and became a serious environmental problem. Phytoremediation is an emerging green technology that uses plants to treat heavy metal contaminated environment. In this study, *Scirpus grossus* was exposed to synthetic mining wastewater (binary mixture of Fe and Al with a mass ratio of 3:1) to assess its ability to phytoremediate Fe and Al with different treatment concentrations (90 mg/L Fe + 30 mg/L Al – 450 mg/L Fe + 150 mg/L Al). The plants were exposed for 102 d in a subsurface batch system. The results show that the *S. grossus* accumulated Fe and Al simultaneously in biomass throughout the study. The maximum accumulations of Fe and Al were found on Day 42 in the plant roots (50,277 mg/kg Fe in 450 mg/L Fe + 150 mg/L Al treatment and 7,744 mg/kg Al in 300 mg/L Fe + 100 mg/L Al treatment). The bioaccumulation factor and translocation factor of *S. grossus* were found to be greater than 1 and less than 1, respectively, for the two metals, indicating that this species is a hyperaccumulator that uses phytostabilization in the phytoremediation of Fe and Al.

Keywords: Phytoremediation; Bioaccumulation; Translocation; Heavy metals; Mining wastewater; *Scirpus grossus*

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