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PHYTOREMEDIATION OF BAUXITE-DERIVED RED MUD BY GIANT REED

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ABSTRACT

In 2010 the pond dam of an aluminium manufacturing plant in Hungary broke and flooded many towns with toxic red mud. At least 10 people were dead and over 150 hospitalized. Bauxite residue is often referred as red mud due to the colour of the bauxite ore and iron oxides. Red mud is separated during the refining process. The production of 1 t of alumina generally results in the creation of 1–1.5 t of red mud. Red mud is toxic for the environment due to high alkalinity, salinity and trace metals. Here, we used the plant Arundo donax L. (giant reed) to uptake trace metals and decrease salinity and pH of red mud. We measured plant toxicity, trace metal availability and biomass production. Results show a 25 % decrease in electrical conductivity of red mud and a 6 % decrease in electrical conductivity of mud-polluted soil. Giant reed cultivation decreases available Cd, Pb, Co, Ni and Fe. Biomass of giant reed seedlings in red mud and mud/control soil mixture was increased by 40.4 and 47.2 %, respectively, comparing with control soil. Our findings show that giant reed is promising to decontaminate soils contaminated by red mud.