Phytoremediation of Heavy Metals in mimics of Chemically Polluted Soils and Wastewater

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A thesis submitted in partial fulfillment for the Degree of Master of Science in Chemistry in the Jomo Kenyatta University of Agriculture and Technology

2008

ABSTRACT

Soils frequently receive a wide range of contaminants from industrial activities, sewage sludge disposal, metal processing and energy production and in many cases; remediation is both expensive and intrusive to the ecosystem. Phytoremediation is the use of plants and plant processes to remove, degrade or render harmless hazardous materials present in the soil or ground water.

In this study, the uptake of heavy metals by plants grown on contaminated soil and water were investigated by determining the levels of heavy metals in plants grown in soils and water contaminated with different levels of heavy metals. Zinc (Zn), copper (Cu), lead (Pb) and cadmium (Cd) were determined in *Amaranthus hybridus*, *Zea mays*, *Helianthus annuus* and *Commelina bengalensis.*

In contaminated soils, *C bengalensis* showed a superior bioaccumulation ability of Pb, Cd and Cu than *Z. mays* and *A. hybridus* while *Z. mays* showed more potential for bioaccumulating Zn. In contaminated solutions, *H. annuus* was found to have the highest ability to remove Pb, Zn and Cu.

It was observed that the uptake of Zn, Cu, Pb and Cd by *Z. mays* and *A. hybridus* from solutions contaminated with single metals was not significantly different from the uptake from solutions contaminated with a mixture combination of the metals. Determination of initial and final Pb, Cu, Zn and Cd concentration in contaminated solutions in which *C. bengalensis* plants were grown for 12 days revealed that in each case, the final metal concentration was lower than the initial concentration**.**