

Phytoextraction of Some Heavy Metals from Artificially Polluted soil

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Abstract : The bioaccumulation of heavy metals in the environment has become a matter of public interest because it persists in the soil longer than other components of the biosphere. Bioremediation has emerged as the ideal alternative environmentally friendly and ecological sound technology for removing pollutants from polluted sites. Phytoremediation is an attractive remediation technology that makes use of plants to remove contaminants from the environment. A pot experiment was conducted under lath house conditions to evaluate the ability of plants (*H. Annuus*, *S. Bicolor*, and *Z. Mays*) to phytoextract heavy metals from artificially polluted soils by different concentrations of Cadmium, Lead, and Copper (0, 100, 200, 200 + EDTA). The Seed germination was influenced by the presence of heavy metals and inhibition increased by increasing the heavy metals concentration. A significant difference was observed in the effect of lead and copper. Generally, the length of root, shoot, and intact plant was reduced by all the concentrations used in the experiments. The root system was affected more than the shoot system of the same plants. All heavy metals concentrations caused a reduction in the dry weight and chlorophyll content of all tested plant species; the reduction was increased by increasing the concentration of all heavy metals, especially when EDTA was added. The Bioaccumulation of heavy metals concentration of all the tested plants increased by increasing the concentration. The highest accumulation of cadmium was (81.77mg kg^{-1}), and copper was (65.07 mg kg^{-1}) in *S. bicolor*, while lead-in *H. annuus* was (60.74 mg kg^{-1}). The order of accumulation of heavy metals in all the tested plant species in the root system and the intact plant was as follows: *H. annuus* > *S. bicolor* > *Z. mays* and shoot system was: *H. annuus* > *Z. mays* > *S. bicolor*. The highest TF of cadmium was (0.41) in *H. annuus*; lead was (0.72) in *Z. mays* and *S. bicolor*, and copper was (0.44) in *Z. mays*. The tested plant species varied in their response to the heavy metals and the inhibition was concentration depended. In general, the roots system was more affected by heavy metals toxicity than the shoots system; the roots system accumulated more heavy metals in the roots than the shoots system. The addition of EDTA to the last concentration of heavy metals facilitated the availability and absorption of heavy metals from the polluted soil by all tested plant species.

Keywords : phytoextraction, phytoremediation, translocation, heavy metals, soil pollution

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