

Bioprospecting for Indigenous Ruderal Plants with Potentials for Phytoremediation of Soil Heavy Metals in the Southern Guinea Savanna of North Western Nigeria

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Abstract : In a study to evaluate the response of indigenous ruderal plants to the metal deposition regime imposed by anthropogenic modification in the Southern Guinea Savanna of north Western Nigeria during the dry and wet seasons, herbaceous plants and samples of soils were collected in three 5m by 5m quadrats laid around the environs of the Kaduna Refinery and Petrochemical Company and the banks of River Kaduna. Heavy metal concentration (Cd, Ni, Cr, Cu, Fe, Mn and Zn) in soil and plant samples was determined using Energy Dispersive X-ray Fluorescence. Concentrations of heavy metals in soils were generally observed to be higher during the wet season in both locations although the differences were not statistically significant ($P > 0.05$). Concentrations of Cd, Zn, Cr, Cu and Ni in all the plants observed were found to be below levels described as phytotoxic to plants. However, above 'normal' concentrations of Cr was observed in most of the plant species sampled. The concentrations of Cr, Cu, Ni and Zn in soils around the KRPC and RKB were found to be above the acceptable limits. Although no hyper accumulator plant species was encountered in this study, twenty (20) plant species were identified to have high bioconcentration (BCF > 1.0) of Cd and Cu, which indicated tolerance of these plants to excessive or phytotoxic concentrations of these metals. In addition, they generally produce high above ground biomass, due to rapid vegetative growth. These are likely species for phytoextraction. Elevated concentration of metals in both soil and plant materials may cause a decrease in biodiversity due to direct toxicity. There are also risks to humans and other animals due to bioaccumulation across the food chain. There are further possibilities of further evaluating and genetically improving metal tolerance traits in some of these plant species in relation to their potential use in phytoremediation programmes in metal polluted sites.

Keywords : bioprospecting, phytoremediation, heavy metals, Nigeria

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