

INFLUENCE OF WASTE WATER IRRIGATION ON HEAVY METAL ACCUMULATION IN SOIL & PLANT

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ABSTRACT

Concentrations of heavy metals in soils of the investigated areas are high; especially Cd is above the worldwide natural background concentration of surface soils. To study the effects of Chittagong city waste water irrigation on the heavy metal contamination of soils and their uptake by plants, soil and plant samples were collected from sixteen wastewater irrigated sites belonging four locations namely Syedpara, Hazipara, Jungalpara and Nazirpara and from another four sites belonging the location namely Chalidatoli selected as control location. Mean total Cd, Pb, Zn, Cu, Mn and Fe content in 0-15 cm depth of the study area ranged between 0.08 to 2.39, 13.96 to 50.29, 14.73 to 21.12, 27.07 to 59.13, 116.25 to 326.63 and 1523 to 2798 mg kg⁻¹, respectively. The metals content in 15-30 cm depth was in the ranges 0.01 to 1.98, 8.96 to 33.29, 51.44 to 267.31, 18.63 to 43.79, 68.89 to 271.74 and 1126 to 2054 mg kg⁻¹, respectively. Total and 0.1 N HCl extractable Cd, Pb, Zn, Cu, Mn and Fe contents of soils were significantly higher in wastewater irrigated location than those in the control location. Total Cd, Pb, Zn and Cu contents of surface soil in waste water irrigated locations were above the normal ranges of these metals for soils. Concentration of Cd, Pb, Zn, Cu, Mn and Fe in different plants (plant parts of rice, radish and aurum) varied from 0.02 to 16.65, 0.08 to 35.55, 0.84 to 102.75, 0.86 to 32.67, 0.95 to 185.50 and 3.23 to 485.23 mg kg⁻¹, respectively. Bioaccumulation coefficient of Cd, Pb, Zn, Cu, Mn and Fe in plants ranged from 0.20 to 13.91, 0.008 - 0.72, 0.006 - 1.60, 0.03-0.64, 0.01 - 0.73 and 0.002 - 0.18, respectively. An establishment of soil quality standards for heavy metals to predict human induced soil pollution in Bangladesh is needed.

KEY WORDS: Wastewater, Soil, Plant, Heavy metal.