

Toxic Trace Elements in Soils and Edible Parts of Root and Tuber Crops in Up Country Wet and Intermediate Zones of Sri Lanka

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ABSTRACT

Contamination of vegetables by toxic trace elements is a great concern because of the potential risk to human health. In this study toxic trace elements of As, Cd, Cu, Cr, Pb and Zn contents were determined in vegetable samples of beet (*Beta vulgaris*), carrot (*Daucus carota*) potato (*Solanum tuberosum*), and corresponding soil samples collected from the same field from up country wet zone and intermediate zones. Trace metal contents in vegetables were expressed in fresh weight basis. Bioaccumulation factors of toxic trace metals were also investigated. Mean values of the toxic trace element contents of all beet samples were 8.8 ± 0.4 mg/kg for Cu, 10.5 ± 1.7 mg/kg for Zn, 0.25 ± 0.066 mg/kg for Pb, 0.056 ± 0.01 mg/kg for Cd, 1.1 ± 0.22 mg/kg for Cr and 0.012 ± 0.002 mg/kg for As. Mean toxic trace element contents in potato samples were 2.0 ± 0.2 mg/kg for Cu, 7.8 ± 0.72 mg/kg for Zn, 0.24 ± 0.02 mg/kg for Pb, 0.07 ± 0.009 mg/kg for Cd, 1.6 ± 0.25 mg/kg for Cr and 0.015 ± 0.004 mg/kg for As. Mean toxic mean trace metal contents of Cu, Zn, Pb, Cd, Cr and As in carrot were 10.9 ± 1.9 mg/kg, 12.3 ± 2.3 mg/kg, 0.33 ± 0.07 mg/kg, 0.07 ± 0.011 mg/kg, 1.35 ± 0.16 mg/kg, 0.025 ± 0.009 mg/kg respectively. Highest Zn, Pb, As and Cd contents in carrot, Cu in beet and Cr content in potato were observed. The overall mean contents of toxic trace elements observed in tested vegetables were below the maximum permissible limit. Estimated dietary intakes of the toxic trace elements in all vegetables tested were within the tolerable dietary intakes established by WHO/FAO. Bioaccumulation factors of all toxic trace metals in all tested vegetables were also lower than one showing carrots, beets and potato are not accumulators of toxic trace metals.

Key words: Bioaccumulation, Health risk, Maximum permissible limit