Accumulation of Cadmium in Intensive Vegetable Growing soils in the Up Country

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The accumulation of heavy metals such as Cd in soils, is a considerable concern to human health, and agricultural, livestock and aquatic industries. The objectives of this study were to determine the Cd concentrations in some vegetable growing soils and in vegetables of up country; and to establish relationships between vegetable Cd concentrations and soil properties. Crop and soil samples were collected from Kandapola, Sita-Eliya, Bogahakumbura, Haputale and Rahangala. The crops selected were carrot (Dacus carota), leeks (Allium ampeloprasum), potato (Solanum tuberosum) cabbage (Brassica oleracea) knol-khol (Brassica oleracea L.) and lettuce (Lactuca sativa). Soil and plant samples were analysed for total and plant available Cd and Zn. The highest concentrations of soil Cd we re found in Haputale (3.85 mg/kg) and Kandapola (1.96 mg/kg). The Cd concentrations of vegetables were greater than 0.2 mg/kg. Based on the bio concentration factor (BCF), the tested samples can be arranged as follows; carrot (183.5) > potato (66.4) = knol-khol (63.4)= leeks (62.3) > cabbage (40.3) > lettuce (28.6). Positive relationships were observed between the total Cd and exchangeable Cd in soils and exchangeable Zn in soils and plant Cd concentrations and the r^2 were 0.81 and 0.86, respectively. A negative relationship was observed with soil pH and plant Cd concentrations and the r^2 was 0.71. Soils collected from many fields in Bogahakumbura, Haputale, Kandapola and Rahangala had Cd concentrations greater than 1 mg/Kg. Total Cd concentration, exchangeable Zn and low pH values in soils were the contributing factors for higher plant Cd levels. This study emphasizes the importance of investigating the sources of heavy metals in up country soils and possible control measures to reduce the associated risk due to food chain transfer of toxic heavy metals.

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