

Assessment of the Heavy Metals in Rice Grains Grown in Paddy Soil in CKDu Endemic Area in Eppawala, Anuradhapura

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Global public health attention is being focused on Chronic kidney disease due to significant prevalence and the enormous cost of the treatment process. It was revealed that longterm consumption of bioavailable metals in grains causes CKD in humans. Therefore, the present study was planned to assess the levels of heavy metals in rice grains grown in paddy soil in CKDu endemic area in Eppawala, Anuradhapura. The soil samples (n=30) were collected from paddy fields in Eppawala GN division. Rice plants with rice grains (n=30) were also collected from the same fields. Collected samples (soil, rice roots and rice grains) were digested using the microwave digester (MDS-6G). Concentrations of heavy metals (Cr, Fe, Cu, Zn, As, Cd, Pb) of the paddy soil, rice roots and rice grain samples were analyzed by ICP-MS (Agilent 7800). Based on the analyzed concentrations, Geo accumulation indices were calculated to evaluate the heavy metal contamination conditions in the agricultural soil. The results indicated that the average concentrations of Cr, Cd, As and Pb in soil were 49.918 mg/kg, 0.107 mg/kg, 5.033 mg/kg and 9.882 mg/kg respectively and they were 1.709 mg/kg, 0.027 mg/kg, 0.217 mg/kg, 0.566 mg/kg respectively in roots. Nevertheless, the lowest levels of metals were observed from rice grains (Cr, Cd, As and Pb were recorded as 0.342 mg/kg, 0.011 mg/kg, 0.035 mg/kg, 0.112 mg/kg respectively). According to the Igeo calculations, agricultural paddy soil in the Eppawala area has been moderately contaminated with Pb, As, Zn, and Cu. (Class 2). Nevertheless, Cd and Cr levels were between near to moderate contamination level. (Class 1). Although the levels of metals in rice grains were low, long term consumption of metal contaminated rice may contribute to chronic failure.

Keywords: Heavy metals; CKDu; Soil; Contamination; Igeo

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