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# Analysis of heavy metal levels in rice grown in CKDu effected Krambankulama in Medawachchiya, Sri Lanka

A. A. S. Dilrukshi* and M. K. B.Weerasooriya

Department of Chemistry, Faculty of Science, University of Kelaniya, Sri Lanka
*sandamalisliit@gmail.com

Chronic Kidney Disease of unknown etiology (CKDu) is a major health problem faced in agricultural areas in North Central Province, Sri Lanka. Among many different causative factors that suspects, heavy metal contamination of food is one of the major issues which can lead to the renal failures in human. Though number of studies have been reported on CKDu, exact causative factor still remains unknown. Since rice (*Oryza sativa*) is the staple diet in these areas, heavy metal content of rice grown in CKDu prone Karambankulama, Medawachchiya was aimed to investigate. Rice samples (n=45) were collected from 5 sites in Karambankulama and in Hettipola, Kuliyapitiya. From each site 9 samples were collected at random locations. For the comparison purpose, Hettipola was selected as negative control site. The rice samples were acid digested in a microwave digester and heavy metals were analyzed using Atomic Absorption Spectrophotometer. Cu, Cr, Pb were detected in flame mode whereas Cd was detected in furnace mode. According to the results obtained mean metal contents of rice samples were as follows. Cu- 0.864±0.090 mg/kg, Cr- 0.903±0.020 mg/kg, Pb- 0.144±0.010 mg/kg and Cd-0.089±0.003 mg/kg for the samples collected from Karambankulama and Cu- 0.804±0.050 mg/kg, Cr- 0.895±0.010 mg/kg , Pb- 0.133±0.001 mg/kg and Cd- 0.061±0.001 mg/kg for the samples from Kuliyapitiya. There were significant difference ($p<0.05$) of the mean levels of Cu, Pb and Cd in rice between Karambankulama and Hettipola while there was no significant difference ($p>0.05$) with respect to the mean levels of Cr. To assess the safety of dietary intake, weekly intake of Cu, Cr, Pb and Cd in rice samples were calculated separately based on the daily consumption of rice and compared with the Provisional Tolerable Weekly Intake (PTWI) established by the WHO/FAO. The results indicated that weekly intake of Cr was higher for ages between 4-5 years and 14 years for both sites and that of Cd was higher for ages between 4-5 years in Karambankulama than the maximum weekly intake levels recommended by WHO/FAO. During the survey 12 CKDu patients were recorded in Karambankulama whereas none was recorded in Hettipola. Hence, Cd accumulation in the body over long period of time could be one of the causes for the present increase in chronic renal failure in the North Central province.

**Keywords**: CKDu, Heavy metals, Rice, Cd, weekly Intake

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