

Cadmium, Chromium and Lead Burden in Cooked Rice in Chronic Kidney Disease of Unknown Etiology (CKDu) Prevalent Areas

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Chronic Kidney Disease of unknown etiology (CKDu) is a serious health problem in Sri Lanka since the 19th century. Still there is no permanent remedy for this problem. Madawachchiya is the area with highest number of CKDu patients and in this area people have stopped drinking well water as a precaution but they continue to use well water for cooking purposes. Heavy metals are among the suspected causes for CKDu. Heavy metal burden in rice may be increased when polluted water is used for cooking. However, studies have not been conducted to investigate the heavy metals fluctuation during cooking process in this area.

Milled rice samples of BG 300 and well water used for cooking were collected from each area. Those collected rice samples were cooked traditionally. Samples were analyzed to determine the selected three heavy metal concentrations (Cadmium, Lead and Chromium).

In this area 16% of raw rice samples contained high levels of Lead and 29% percent of raw rice samples contained high levels of Chromium which were higher than the maximum permissible level (MPL) recommended by the FAO/WHO (Codex Alimentarius). The Cadmium contents of all rice samples were less than MPL. But 45% percent of water samples had exceeded the Sri Lankan Standards (SLS) recommended level for Cadmium and thirteen percent of samples had exceeded SLS recommended levels for Chromium. But none of sample had exceeded the WHO recommended levels of Cadmium, Lead and Chromium. There was no significant change in Lead content during the cooking process ($p>0.05$), but Cadmium and Chromium were significantly decreased ($p<0.05$). The mean contents of Cadmium, Lead and Chromium in cooked rice samples were 0.057 ± 0.031 mg/kg, 0.13 ± 0.09 mg/kg and 0.77 ± 0.211 mg/kg respectively.

Even though having elevated levels of Chromium and Lead in raw rice samples and elevated levels of Cadmium and Lead in water used for cooking, those heavy metal concentrations of cooked rice were lower than the maximum permissible levels recommended by the FAO/WHO. Using well water for cooking purposes in Madawachchiya area has not increased the Cadmium, Lead and Chromium levels in cooked rice. To recommend using well water for cooking purposes further analyzing of other parameters in cooked rice is required.

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