(144)

Analysis of Selected Trace Element Contamination and Soil Phosphate in Agricultural Lands in CKD Prevalence Areas in North Central Province of Sri Lanka

Dissanayake D.M.U.C.[*], Perera W.P.R.T., Liyanage J.A.

Department of Chemistry, University of Kelaniya, Kelaniya, Sri Lanka
*upekshadissanayaka00@gmail.com

Abstract

Chronic Kidney Disease of Unknown etiology (CKDu) is an increasing public health issue mainly distributed in North Central Province of Sri Lanka over past 20 years. Eppawala and Ambagaswewa areas were selected as CKD prevalence areas for the soil sampling in order to measure metal concentrations by comparing with the reference area as Ampara. Soil samples were collected from paddy fields, other type of cultivations and reservoirs during dry season from Ambagaswewa area (15 samples) in Polonnaruwa District and from Eppawala area (15 samples) in Anuradhapura District and Ampara area (15 samples) as the reference with triplicates. Those samples were subjected to analysis for metal concentrations using Inductive Coupled Plasma-Mass Spectrometer. There was a significant difference between metal concentrations in endemic areas and reference area. The average Cr concentration in Eppawala (49.92 mg/kg) and Ambagaswewa (33.01 mg/kg) was higher than Ampara area (8.87 mg/kg). The average Cd concentration in Eppawla (0.107 mg/kg) and Ambagaswewa (0.100 mg/kg) was recorded as higher value than Ampara (0.043 mk/kg). The average As concentration in Eppawala (5.033 mg/kg) and Ambagaswewa (3.300 mg/kg) was higher than Ampara area (0.475 mg/kg). However the average Pb concentration was higher in Ampara (36.570 mg/kg) compared to Eppawala (9.882 mg/kg) and Ambagaswewa (6.800 mg/kg). The phosphate concentrations of above samples were analysed using Modified Truog Method and used UV-visible spectrophotometer. There was positive significant correlation between Cd conc. and phosphate conc. (0.05 level, r=0.361, two-tailed). Also there was positive significant correlation between Cr conc. and phosphate conc. (0.01 level, r=0.712, two-tailed). However there were no any significant correlation between other metals conc. (As, Cu, Zn, Mn, Pb, Fe) and phosphate conc. According to the results, high phosphate concentrations may be facilitate the uptake of some heavy metals to rice plant from soil and selected agricultural lands in the CKD prevalence areas have been contaminated with some heavy metals. This situation can be due to the high usage of fertilizers.

Keywords: Chronic Kidney Disease, Heavy metals, Phosphate, Correlation

Proceedings of the 24th International Forestry and Environment Symposium 2019 of the Department of Forestry and Environmental Science, University of Sri Jayewardenepura, Sri Lanka

128