

Assessment of lead and cadmium levels in selected soils of Jaffna District of Sri Lanka

S.Vijayakumar^{1*}, R.Ratnayake² and N.Gnanavelrajah¹

¹ Department of Agricultural Chemistry, Faculty of Agriculture, University of Jaffna, Sri Lanka

² Institute of Fundamental Studies, Kandy, Sri Lanka

*sowthini@gmail.com

Cadmium (Cd) and lead (Pb) are hazardous metals which can cause deleterious health effects when consumed above safe limits. These two cations could enter the human body through plant based food for which soil is the major contributor. The main source of Cd in soils is suspected to be phosphorus fertilizers while emission from vehicles via fossil fuel burning is the major source for Pb. A study was conducted to assess the total and available Cd and Pb in soils from different land use system in Jaffna. Soil samples were collected from up land/low lands of cultivated and uncultivated soils. Design was complete randomized design in a three factor factorial with three replicates. The total Cd and Pb and available Cd and Pb in the soils were determined. In addition other soil properties such as total organic carbon (TOC), microbial biomass carbon (MBC), water soluble carbon (WSC), and permanganate oxidizable carbon (POC) were also measured. Total Cd and available Cd were not in the detectable limits by the Atomic absorption spectrophotometer. As the lowest detectable limit is 0.02 ppm they were below 0.02 ppm in soils from Jaffna district. The total Pb and available Pb ranged between 0.81 to 26.41 ppm and 0.428 to 13.808 ppm respectively (The European Community set standard values for maximum permissible level of soil Pb is 150–300 ppm). Total Pb and available Pb did not show any significant difference with soils, elevation, land-use and depth. Total Pb and available Pb showed high negative correlation with distance from main road in both districts. Both total and available Pb showed weak negative correlations with TOC and water soluble carbon whereas both total and available Pb showed significant negative correlation at 95% confidence level with MBC.

Keywords: Cadmium, Carbon fractions, Lead, Soils.