

Evaluation of Heavy Metals Concentrations in Surface Water Bodies in Selected Rice Fields in Trincomalee District

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Agrochemicals can pollute water bodies, posing a serious danger to aquatic ecosystems and drinking water resources. In Sri Lanka, the use of agrochemicals has risen dramatically in recent decades. Many agrochemicals have been shown to contain harmful trace elements. The objective of this study was to measure the occurrence of heavy metals in surface water sources in rice-growing areas in the Trincomalee District. The study was conducted in three Divisional Secretariat divisions, including both CKD-endemic (Padavi Sripura) and non-endemic (Kanthala, Seruvila) areas. Ninety-three (93) water samples were randomly collected from the surface water bodies related to the rice fields in the above DSDs before and after the application of agrochemicals during 2019/2020 *Maha* season. Flame Atomic Absorption Spectrometry was used to assess the concentrations of five heavy metals. Results showed that mean and standard deviation of Arsenic (As), Lead (Pb), Cadmium (Cd), Copper (Cu) and Zinc (Zn) concentrations ($\mu\text{g/L}$) before and after the application of the agrochemicals were $\{0.048\pm 0.363$ and $6.220\pm 8.798\}$, $\{0.014\pm 0.139$ and $0.371\pm 1.847\}$, $\{\text{not detected and } 4.4212\pm 6.865\}$, $\{1.583\pm 3.832$ and $1.262\pm 1.591\}$ $\{\text{not detected and } 6.403\pm 3.525\}$, and for pH was $\{7.13\pm 0.34$ and $7.19\pm 0.35\}$, respectively. Findings revealed that concentrations of As, Cd, Pb and Zn were significant ($p < 0.001$) between before and after the application of agrochemicals and not significant for Cu. However, the measured heavy metal concentrations were well below the permissible levels for irrigation water, ambient water and drinking water quality set by the Food and Agriculture Organization, Central Environmental Authority and Sri Lankan Standard Institute, respectively. Furthermore, the concentrations of heavy metals in surface water samples from CKD-endemic and non-endemic areas were significantly not differed ($p > 0.05$). Continuous studies are needed to understand the distributional pattern of agrochemicals in the water bodies.

Keywords: Agriculture, Agrochemicals, Flame Atomic Absorption Spectroscopy