Determination of Heavy Metal Contamination of Some Aquatic Plants and Assessment of Health Risk

E.M.N.S. Senarathne[1] E.M.R.K.B. Edirisinghe[2]

Heavy metal contamination has become a crucial health matter to public health as they cannot be destroyed or degraded and persist in the environment for long time. People who live in North Central Province of Sri Lanka are victims of many health issues related to heavy metal consumption with their food and water. During last few decades, the soil and water in Sri Lanka are contaminated by heavy metals such as Arsenic, Cadmium, Mercury and Lead. Aquatic plants which grow in these contaminated water sources can absorb heavy metals through their roots, stems, leaves and store in plant body. This study was carried out to assess the toxicity levels of some aquatic food plants due to Cadmium and Arsenic. In this study, heavy metal contamination of some aquatic plant parts was assessed by Atomic Absorption Spectrometry (AAS). Forty two samples of three different aquatic food plants, leaves of Joyweed (Mugunuwenna, *Alternantherasessilis*, n = 15), seeds of Water lily (Olu, *Nymphaeapubescens*, n = 12) and tubes of Lotus (Nelum, *Nelumbonucifera*, n=15) were obtained from Madawachchiya area of Anuradhapura district of North Central province of Sri Lanka. The samples were digested by microwave accelerated digestion system and analyzed for Cadmium (Cd) and Arsenic (As) by AAS. The highest and the lowest Cd levels, 51.17 and 19.55 µg/kg, were reported in Lotus roots and joyweed respectively, while the highest and lowest levels of As, 420.57 and 121.54 µg/kg, were reported in joyweed and Lotus roots respectively. The Provisional Tolerable Weekly Intake (PTWI) of Cd, calculated based on standard value of 7 µg/Kg body weight, for extreme exposure of these plants were recorded as 8.21 Kg (lotus tubes), 17.60 Kg (water lily seeds) and 21.48 Kg (joyweed) per week of 60 Kg for body weight. However, the average vegetable consumption of a Sri Lankan is nearly 2.5 Kg/ week, thus not posing any health risk due to Cd. The PTWI values calculated for As, based on standard value of 15 µg/Kg body weight, were recorded as 2.14 Kg (joyweed), 3.36 Kg (water lily seeds) and 7.41 Kg (lotus tubes), thus contamination levels of As may cause health risk over long term consumption of joyweed and water lily seeds.

Keywords:Arsenic, Cadmium, Aquatic food plants, Atomic Absorption Spectroscopy

Acknowledgement: Financial Assistance of Project “Accelerating Higher Education Expansion and Development Operation (AHEAD), DOR Grant No 79 of the Faculty ofApplied Sciences, Rajarata University of Sri Lanka, Mihintale” is acknowledged.

[1] Department of Physical Sciences, Faculty of Applied Sciences, Rajarata University of Sri Lanka, Mihintale, Sri Lanka, *sathsarasenarathne@gmail.com*
[2] Department of Physical Sciences, Faculty of Applied Sciences, Rajarata University of Sri Lanka, Mihintale, Sri Lanka