Occurrence of Heavy Metal Contamination and *In Vitro* Bioaccessibilitiy of Heavy Metals in Widely Consumed Green Leafy Vegetables Obtained from Colombo Area, Sri Lanka.

Thilini Kananke[a]*, Jagath Wansapala[b] and Anil Gunaratne[c]

[a]*Department of Food Science and Technology, Sabaragamuwa University of Sri Lanka, P.O. Box 02, Belihuloya 70140, Sri Lanka.*
[b]*Department of Food Science and Technology, Faculty of Applied Sciences, University of Sri Jayewardenepura, Gangodawila, Nugegoda, Sri Lanka.*
[c]*Department of Livestock Production, Sabaragamuwa University of Sri Lanka, P.O. Box 02, Belihuloya 70140, Sri Lanka.*

*Correspondence: *thilini.kananke@yahoo.com*

This research was aimed to investigate the occurrence of heavy metal contaminations (Ni, Cd, Cr, Pb and Cu) in five key Sri Lankan green leafy vegetables (GLV) ["Kankun" (*Ipomoea aquatica*), "Mukunuwenna (*Alternanthera sessilis*), "Thampala" (*Amaranthus viridis*), "Nivithi" (*Basella alba*) and "Kohila leaves" (*Lasia spinosa*)] grown and marketed in and around Colombo District, Sri Lanka. The study was focused on the heavy metal contents in soils, fertilizer and irrigated water, distribution patterns, bio-accumulation between different GLV species and an *in vitro* gastrointestinal extraction to find the fractions of heavy metals available for absorption after dietary ingestion of raw and cooked forms of GLV.

According to results, the average concentrations of Cd, Cu, Ni, Cr and Pb in the tested soils were 1.45±1.15, 66.5±59.52, 51.5±45.51, 48.4±42.9 and 39.7±32.26 mg kg^{-1}, respectively in the tested areas. Pb, Cd, Cu and Cr levels in the irrigated water samples collected from the cultivation areas were complied with the recommended guidelines, except for Ni. The mean concentrations of heavy metals tested in all GLV exceeded the WHO/FAO safe limits, except for Cu. Among the GLV analyzed, Kohila leaves showed the highest tendency to accumulate metals from the environment. Irrespective of the species and the location, all the collected GLV showed the distribution pattern for the heavy metals as: roots>stems>leaves. Despite the higher total heavy metal concentrations found in GLV, the bioaccessible fractions of heavy metals were significantly low (at $P<0.05$) in raw, cooked and stir-fried GLV samples.

Keywords: Green leafy vegetables, Heavy metals, *In vitro* bioaccessibility