HEAVY METALS CONTAMINATION IN LEAFY VEGETABLES AND THEIR HEALTH RISK

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ABSTRACT

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Leafy vegetables are essential in human diet but unfortunately they will form a group of food which may contributes maximally to heavy metal consumption. Heavy metals in leafy vegetables at rural, urban and agricultural areas are related with direct and indirect adverse health effects. This study determined the concentration of selected heavy metals (Fe, Zn, Mn and Cu) content in leafy vegetables such as Spinach (*Amaranthus Gangeticus*) and Water Spinach (*Ipomoea Aquatica*) that grown at urban and agricultural areas in Kelantan and compared with those grown in clean (rural) area. The aim of this study also was to estimate the potential risk index of heavy metals to human health. The concentrations of heavy metals were analyzed using the methods of Quant-express (Fast screening) by X-Ray Fluorescence (XRF S8 Tiger) Spectrometer. The leafy vegetables samples were high in copper rather than other studied metals. The average concentrations of heavy metals in tested vegetables those grown at agricultural area were higher than urban area for most heavy metals due to excess fertilizer applied to the soil and the use of pesticides to prevent insect's attack. Most of heavy metals except copper were deficiency to moderately enriched ($2 \leq EF < 5$) since the EF values of the metals were more than 2. Most vegetables samples have showed no hazard levels since the HQ values were less than 0.1. All tested leafy vegetables samples were safe to be consumed and did not pose any risk to human health since the HI values for all vegetables were lower than 1.

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