Assessment of the Contamination of Heavy Metals in Groundwater in Monaragala District, Sri Lanka

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Monaragala district in Uva Province with a geographical area of 5636 km^2 lies in both Dry and Intermediate Zones of Sri Lanka. Most of the people living in this area engage in the agricultural sector as their major occupation. Paddy is the major cultivation crop while vegetables, maize, banana, sugarcane and several grains are also cultivated in the area. Excessive use of inorganic fertilizers and agrochemicals has become a common practice in agriculture hence there is a high risk of contamination of groundwater with heavy metals in agricultural areas. As the majority of people live in this area use groundwater for drinking purposes, there is a greater risk of health hazards caused by heavy metal contaminated groundwater sources. This study aimed at assessing the heavy metal contamination levels in groundwater based on the Sri Lanka standards for potable water, SLS 614, 2013. A total of 78 water samples were collected from dug wells and tube wells which were used for drinking purposes in the area from September 2017 to February 2018. The samples were filtered and acid preserved at the field and were analyzed for Al, Cr, Mn, Fe, Co, Ni, Cu, Zn, As, Sr, Cd and Pb using Inductively Coupled Plasma Mass Spectrometer (ICP-MS). According to the results, none of the mean values of heavy metals exceeded their Maximum Permissible Level of Sri Lankan Standards, 2013. Only two samples (1.409, 0.494 ppm) exceeded the MPL of Iron (0.3 ppm) while three samples (0.885, 0.190, 0.105 ppm) exceeded the MPL of Manganese (0.1 ppm). Comparatively Al, Mn, Fe, Sr and Zn showed higher mean concentrations than Cr, Co, Ni, Cu, As, Cd and Pb. The mean concentrations of Cr, Co, As, Cd and Pb recorded were lower than their Maximum Permissible Levels and all of them are below 0.001ppm. These results indicated that groundwater in the study area contained much lower levels of heavy metals and the samples exceeded the Maximum Permissible Levels of Fe and Mn perhaps due to the application of inorganic fertilizers in agricultural fields.

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