

Heavy Metal Contaminated Dust in Kindergartens and Elementary Schools in Kelaniya, Sri Lanka

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Toxic heavy metal containing street dust can be accumulated in the human body. Heavy metals pose potentially deleterious effects in young children, who are more sensitive than adults. There is a lack of information related the presence of heavy metals in dust found in kindergartens and elementary schools. The aim of this study was to quantify the amounts of heavy metals in kindergartens and elementary schools in the metropolitan city of Kelaniya, Sri Lanka. Concentrations of Fe, Zn, Cu, Cr, and Pb in dust and soil (i.e., 0-15 cm depth) of 21 kindergartens were analyzed using Atomic Absorption Spectrometry and to calculate the geo accumulation index (I_{geo}). Minimum Detection Limit (MDL), Instrument Detection Limit (IDL), and Lowest Detection Limit (LOD) were obtained for Cu, Cd, Pb, and Ni to ensure quality control and assurance. The calculated I_{geo} levels reveal the order as $Cu > Pb > Ni > Zn > Cd > Control$. The mean concentration order of the studied metals in dust was; $C_{Pb} > C_{Cu} > C_{Zn} > C_{Ni(control)} > C_{Ni} > C_{Cd} > C_{Control}$. The observed concentration of Cu, Cd, Ni, Pb, and Zn in the dust samples were within the acceptable limits. The calculated I_{geo} values depict the uncontaminated or moderately contaminated for Pb, Cd, Zn, Ni and I_{geo} value of Cu depicts moderately or strongly contaminated. Rapid development, increased traffic emissions and industrial activities could be the sources of heavy metal pollution in the area. The findings suggest more attention is required in the future to minimize heavy metal pollution in kindergartens of Kelaniya area.

Keywords: Heavy metals, Contamination assessment, Street dust, Geo accumulation