

Abstract No: MO-02

Investigation of heavy metal concentrations and distribution in road dust from large and small urban areas in Gampaha district, Sri Lanka

L. O. Wijesinghe* and W. A. P. J. Premaratne

Department of Chemistry, University of Kelaniya, Kelaniya, Sri Lanka
avanthaaheadpa@gmail.com*

Heavy metal contamination has become one of the major problems in metropolitan areas all around the world. Gampaha district in Sri Lanka is one such hotspot that experiences extensive heavy metal contamination. Road dust contains several types of potential pollutants resulting from diversified anthropogenic sources which are observed commonly in urban areas. Acceleration of anthropogenic activities leads to the increment of heavy metal levels in the earth's crust. Therefore, heavy metal content analysis in road dust is a worthwhile measure to evaluate the pollution level of the environment. This indicates toxic heavy metal levels in living systems and therefore the potential threat to human health. This investigation was carried out by selecting twelve sampling sites from large and small urban areas in the Gampaha district. Sampling sites lie in the GPS range of 6.96920 °N to 7.022829 °N and from 79.912284 °E to 80.049099 °E. Six sampling sites from highly polluted large urban areas in the vicinity of Kandy- Colombo main road (A1) and six sampling sites from less polluted small urban areas away from the A1 main road in Gampaha area were selected. Dust samples were collected by the wiping method and analyzed in triplicate for six consecutive weeks from July to August 2020. There was no significant change in the rainfall during the study period. Samples were analyzed for pH, conductivity, moisture, phosphorous content and organic matter. Contents of five heavy metals Pb, Cu, Zn, Cr and Fe in the samples were determined using Atomic Absorption Spectroscopy (AAS). The factors that favor accumulation of heavy metals in the environment were investigated and analyzed. Fe content in road dust samples from both large and small urban areas was very high (14.2×10^4 , 9.5×10^4 mg/kg respectively) The road dust from large urban areas contained reasonably high Pb (71.1 mg/kg) and Zn levels (108.8 mg/kg) compared to the levels in small urban areas (15.1, 86.0 mg/kg respectively). Cr (52.0, 25.1 mg/kg) and Cu (6.8, 0.6 mg/kg) were relatively abundant in almost all the samples. The results revealed that Pb, Cu, Zn, Cr and Fe levels were higher in road dust from large urban areas compared to small urban areas.

Keywords: Heavy metal, Lead, Road dust, Correlation, Toxicity