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APPRAISAL OF HEAVY METAL CONTAMINATION IN ROAD DUST AND HUMAN HEALTH RISK IN A MUNICIPALITY OF BANGLADESH

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Abstract

Road dust from atmospheric deposition is considered as one of the significant environmental pollutants for containing toxic heavy metals. In this connection, to explore the present scenario of urban contamination and potential health risk of heavy metals present in road dust; this study was carried out in Tangail Municipality Area of Bangladesh. Road dust samples were collected seasonally from five different sampling sites encompassing different traffic homogeneity. Collected samples were processed and analyzed for Lead (Pb), Chromium (Cr) and Cadmium (Cd) in road dust through the atomic absorption spectrophotometer (AAS). Primarily, all metals under investigation were found in higher concentrations in the wet season, and the ordering of mean contents was Pb>Cr > Cd. Spatial analysis elucidated that the distribution of Pb and Cd was mainly associated with urban traffic activity. Mathematical models such as Contamination Factor (CF), marked Pb and Cd for contamination in road dust. At the same time, considerable disease and pollution potential on the urban environment by Cd were detected by Index of Geo-accumulation (Igeo) and Ecological Risk Factor (ER). However, collectively, no sign of pollution and the ecological risk was detected in Pollution Load Index (PLI) and Potential Ecological Risk (RI) analysis. The health risk numerical model demonstrated that ingestion was the prevalent pathway of metal exposure for both children and adults and hazard index (HI) values for the studied heavy metals were less than safety limit 1. However, hazard index values were found higher for children than adults.

Key words: Bangladesh, heavy metal, human health risk, municipality, pollution indices, road dust

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