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Pollution characteristics and human health risks of potentially toxic elements in road dust from the central metropolitan area of Havana city (Cuba) using X-ray fluorescence analysis

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Our study aimed to investigate road dust from relevant locations in Havana city and the associated health risks of potentially toxic elements (PTEs) to humans using X-ray fluorescence analysis. The Geoaccumulation Index, Enrichment Factor and Integral Pollution Index were used to describe pollution characteristics of roadside dust in urban areas associated with traffic and child activities (schools, parks, etc.) from Havana city central metropolitan area (Old Havana, Central Havana, San Miguel del Padrón and Regla municipalities and the Alamar district). Results indicate that industrial roadside dust is contaminated with Pb near high traffic, as well as power and gas station locations, and with Zn and Cu in areas where reconstruction works were performed. The Hazard Quotient (HQ) and Hazard Index (HI) values for all the exposure routes (ingestion, inhalation, and dermal contact) were below the international established limits, except for Pb, Zn and Cu in mentioned areas. The risk of contracting cancer from the studied metals was found to be in safe levels as the RI (carcinogenic risks) values were below the international established limits.

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