ABSTRACT

Due to the anthropogenic activities in the vicinity of urban parks, the load of heavy metals deposition in to the soil is increasing. Therefore, it is necessary to determine the spatial distribution of heavy metal contamination as well as to evaluate the associated health risks. This study was designed to investigate the concentration of heavy metals in the dust and soil of parks in Lahore and their associated health risks to children and adults. A total of 90 samples were collected including both of soil and dust from four well-known parks i.e., Racecourse Park, Shalimar Park, Model Town Park, Gulshan Iqbal Park in Lahore city, Pakistan. The concentration of heavy metals i.e., Ni (nickel), Cd (cadmium) and Zn (zinc) in the dust and soil was determined using Atomic Absorption Spectrophotometer. The contamination factor and single pollution index were used to determine the contamination level of each metal analyzed in the current study. The health risks associated with dermal, inhalation and ingestion exposure to heavy metals were also assessed. The results revealed that only Cd mean concentration was reported higher than the geochemical background value. The highest soil and dust Cd concentration was observed in samples of Shalimar Park (7.02 mg/kg) and Racecourse Park (5.03 mg/kg) respectively. Soil and dust Cd concentration trend of the current study was in order; Shalimar Park > Gulshan Iqbal Park > Racecourse Park > Model Town Park and Racecourse Park > Shalimar Park > Gulshan Iqbal Park > Model Town Park, respectively. Ni and Zn mean concentration revealed no to low contamination. The single pollution index, in each park was reported absent (PI <1) for Ni, very strong (PI >5) for Cd and low (1< PI< 2) for Zn concentrations from all the four parks. The contamination factor revealed low to moderate pollution (Cf 1-3) for Ni, very strong (Cf > 6) pollution for Cd and low pollution (Cf < 1) for Zn. The results indicated that there might be unknown anthropogenic sources of Cd pollution posing risk to both human health and environment. The health risk posed by heavy metals according to hazard quotient values was highest for Zn followed by Ni and Cd. The geochemical mapping revealed that the central part of all the four study sites was neutral in terms of heavy metals pollution whereas the boundaries were suffering from metal pollution more than other areas, that was might be due to high anthropogenic activities at the boundary areas relative to central parts of the parks. The inquiry in this study allowed for the assessment of health risks from potential contamination sources, and the findings offer environmental researchers with useful information on health risk reduction techniques. For the source identification and mitigation of heavy metal pollution from parks, more research needs to be done.