



Heavy metals concentration in street dust from different land uses in Murcia (SE Spain)

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There are evidences that street dust is an important pathway in the exposure of people to toxic elements. In fact, street dust has been linked to adverse human health conditions. The implication of the intake of dust particles with high concentration of toxics, especially heavy metals, poses potentially deleterious effects on the health of humans. Therefore the monitoring of this material should be a priority in risk assessment programs in order to evaluate the risk for human, especially for children. The main aim of the present study was to assess the degree of pollution of Cu, Pb, Cd and Zn in street dusts from different scenarios, including urban, suburban, industrial, highways and natural areas around city of Murcia (SE Spain), by comparison with other cities and guidelines of maximum allowed concentration of each metal.

In order to achieve this objective, three samples of street dust, composed by three subsamples, were collected in each area (urban areas, suburban areas, highways, natural areas and two industrial areas in northwest (NW) and southwest (SW)). Samples were then placed in plastic bags and taken for analysis. The following properties were analyzed in the samples: soil organic carbon by dichromate method; soil pH in H₂O using glass electrode in a 1:1 soil/water suspension; electrical conductivity in a 1:5 soil/water suspension; calcium carbonate equivalent by volumetric method using Bernard's calcimeter and cation exchange capacity (CEC), total metals concentration. Results indicated that the street dust from different uses in Murcia has the following characteristics: pH alkaline due to high presence of carbonates (calcite and dolomite), which could react with Zn and Cu to form metal-carbonate complex/minerals. Salinity is very variable and affects positively to Cd concentration likely forming sulfate or chloride complexes. Organic carbon is high and come from both natural organic matter and anthropic material (organic waste, oil and gasoline).

If the results from this study are compared with those reported in other cities (Hong Kong, Oslo, Istanbul, London, Ontario, Dhaka, Taejo and Xi'an) it is evidenced the high variability in metal concentrations in the dust, indicating that sources of metals, human habits, populations, etc. of each city affect intensely on metal concentration in dust samples. According to selected European legislation dust from Murcia is not polluted by any metal analyzed, except Industrial-SW for Pb and Industrial-NW for Cd; however, dust in every use is enriched for all metals. Therefore, a monitoring plan is necessary to evaluate the evolution of metal concentration in dust in order to apply the proper measures for reducing the risk for human and environment. In addition, the concentration of all metals in the dust is markedly affected by the use, associated with the metals sources; therefore we think that a suitable risk assessment should evaluate specifically each use and avoid mix samples from different uses.

Acknowledgements: to "Fundación Séneca" of "Comunidad Autónoma de Murcia" for its financial support.