

OR36 - Paula Marinho-Reis: Lead Isotope Analysis And Oral Bioaccessibility Testing For Source Apportionment In Kindergarten Microenvironments.

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Due to the hand-to-mouth activities, frequently observed among the youngest children, these are likely to ingest higher amounts of indoor dust than adults. Hence, preschoolers are further prone to exposure through the ingestion route. Characterising environmental pollution within kindergarten microenvironments is, therefore, paramount for children who spend considerable time in school.

The present study was carried out in Estarreja, an industrial city in the north of Portugal, where elevated concentrations of potentially toxic elements (PTEs) in the environment have been reported. Indoor dust (ID), playgrounds dust (OD), and garden soil (S) samples were collected from the kindergartens. Near total concentrations were determined by ICP-MS and the oral bioaccessibility of chromium (Cr), cobalt (Co), nickel (Ni), cadmium (Cd), arsenic (As) and lead (Pb) was estimated using the Unified BARGE Method (UBM). Isotopic measurements of lead were performed by ICP-MS in bulk samples and solid residues resulting from the UBM extractions.

Differences in Cd, Ni, and Pb contents between garden soil and indoor dust are significant ($P < 0.05$). The bioaccessible fraction of the Pb and Ni is significantly higher ($P < 0.05$) in indoor dust samples than in garden soil. The isotope ratios $^{206}\text{Pb}/^{207}\text{Pb}$ and $^{208}\text{Pb}/^{206}\text{Pb}$ of garden soil are significantly different ($P < 0.05$) of those measured in the dust. Differences between the isotopic composition of bulk samples and UBM residues are not statistically significant. We propose a methodology for source apportionment and provenance analysis, using the bulk sample and the residues of the UBM extractions. The results suggest that lead associated with industrial emissions is more bioaccessible than that associated with construction works or natural soils.