

Distribution and availability of heavy metals in particle size fractions of urban road-deposited sediments and roadside soils

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Road-deposited sediments (RDS) are recognized as one of the main sink of pollutants in urban environments. Their position at the interface between environmental compartments increase their importance, since fine particles can be carried to rivers and roadside soils after runoff and re-suspension or affect human health. Many studies on RDS and roadside soils have concentrated on total concentrations, but few studies have assessed concentrations and bioavailability of heavy metals in grain size fractions. Therefore, we have assessed the metal availability and bioaccessibility in the fine fractions (in particular, particles less than 10 μm), considered to be the most important in relation to human health. Sediment and soil samples were collected from the outskirts to the city centre, in main and secondary roads. In selected roads we sampled near a roundabout or a traffic light and on the straight. We determined the pseudo-total content of Pb, Zn, Ni, Cu, Cr, Cd, Sb, Mn and Fe in the bulk samples as well as the mass loadings in the selected grain size fractions (10-2.5 and <2.5 μm). The enrichment with respect to the local background was then calculated and metal availability and accessibility to the human body was determined with different extractions (Acetic acid, DTPA) and estimated with the Simple Bioaccessibility Extraction Test (SBET). The results show that some elements concentrate in the finest fractions and may represent a relevant threat to human health and the environment.