

BIOACCESSIBILITY OF Pb IN URBAN SOILS AND INFLUENCE OF TEMPORAL VARIATION AND SOIL PARTICLES SIZE RELEVANT TO INGESTION

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Since the ingestion of soil particles is great source of human exposure to a variety of metals, it is essential to understand its toxicity to assess the risks they bring to health. Physiologically based extraction tests, or bioaccessibility test, which simulates sequentially the chemicals conditions encountered in the human stomach and intestine are widely employed to determine the amount of metals that is absorbed by the human body if contaminated soil is ingested [1]. Metal chosen in this work was Pb, an indicator of environmental pollution due to its history of use. The soils used in this study were collected in São Paulo, for a period of 8-months in five locations with different traffic to investigate their influences on the bioaccessibility of Pb. São Paulo was chosen because this city is considered as one of the main cities in Brazil, its population and economic growth allowed that the pollution, caused mainly for vehicles and industries, reached critical levels. Due to these anthropogenic activities, the toxic metal content, as lead, is generally high. Intake of urban soil can thereby result in significant amounts of the adults' and children's daily metal intake. The samples were sieved in order to separate soil particle fractions representing deliberate (<2 mm) and involuntary (<53 µm) soil ingestion by children, as well as a third size fraction of 53-100 µm representing soil that is easily transported by suspension. Quantification measurements were performed by ET AAS. Concentration of Pb in all samples' fraction were above reference value for São Paulo State (17 mg/kg), with maximum values of 322,4±1,7 mg/kg (Ibirapuera Park), 214,2±9,3 mg/kg (Sumaré Ave.), 227,36±1,2 mg/kg (Marginal Ave.), 120,20±3,6 mg/kg (Paulista Ave.) and 47,24±0,6 mg/kg (Nove de Julho Ave.). The bioaccessibility of Pb ranged from 7,1% to 77,8% in gastric fluid, and 1,9% to 64,8% in intestinal fluid. Changes in bioaccessibility were a function of soil particles size, in the order crescent 2mm<10053µm<53µm in gastric fluid and the opposite for intestinal fluid, and depends of temporal variation (driving style, traffic volume, matrix composts and climate conditions).

[1] YU, C. H.; YIIN, L.; LIOY, P. J. The bioaccessibility of lead (Pb) from vacuumed house dust on carpets in urban residences. Risk Analysis: An Official Publication of the Society for Risk Analysis, v. 26, n. 1, p. 125-134 (2006).

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