



Assessing the sources and bioaccessibility of Lead in Soils from London

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The lead content of soil is important since it is toxic to humans and particularly because children tend to more readily absorb lead than do adults: children absorb up to 40% into the bloodstream from ingested or inhaled lead, versus 5-15% in adults. Studies have shown that relatively low concentrations of lead in blood can lead to significant decrease in IQ of children (e.g. Jakubowski, 2011) leading to neuropathy and hypertension in adults. The British Geological Survey has recently completed a systematic high-density geochemical soil survey of the Greater London Area (GLA) in which over 6000 surface soil samples were collected and analysed for 50 elements. The Pb content of the soils range from 11 mg/kg to greater than 10000 mg/kg with mean and median values of 301 and 185 mg/kg, respectively. The ingestion bioaccessible fraction of Pb was measured using an in-vitro bioaccessibility test showing that 68% of the total Pb in London soils is bioaccessible. Measurement of Pb isotopic ratios in selected soils matched with those found in London air particulates and, to a lesser extent, with petrol lead. Self modelling mixture resolution of the 50 element geochemical data set was used to identify geochemically distinct components in the data with Pb being associated with 11 of the components which were of both natural and anthropogenic origin. Relationships between the soil components, the bioaccessible fraction and the Pb isotope ratios provided an indication of the sources of mobile lead in the London soils.

References

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