MERCURY CONCENTRATIONS IN THE SOIL ENVIRONMENT OF LONDON, UK – AN EXAMPLE OF POLLUTION IMPACTS

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Mercury is present in trace amounts only in most natural circumstances but anthropogenic sources such as coal combustion[1] enhance environmental loadings. High Hg concentrations are of concern as it has immunotoxic, genotoxic and teratogenic effects on humans and animals[2].

Despite these concerns, because Hg is difficult to analyse, data on its environmental distribution are limited. This is the first time that the UK Geochemical Baseline Survey of the Environment (G-BASE) has systematically determined soil Hg. Over 200 < 2 mm surface soils (0-2 cm) and topsoils (5- 20 cm) were collected at a density of 4 per km^2[3] from two urban test areas in Camden-Hamstead and Hammersmith-Fulham, London. Total Hg was analysed by cold-vapour atomic absorption, involving pre-concentration on Au-amalgam before detection with an Advanced Hg-Analyser[4]. The uncertainty of the analysis was typically better than ± 10%, with 0.0001 mg kg^{-1} the lower limit of quantification[4].

Hg distributions showed a high correlation ($r = 0.88$, $n = 216$) between the two soil depths. Concentrations in surface soil (min 0.09; median 0.66; max 12.2 mg kg^{-1}) and topsoil (min 0.06; median 0.67; max 12.1 mg kg^{-1}) were elevated relative to European topsoils (median 0.04 mg kg^{-1})[4] and English shallow urban soils (median 0.39 mg kg^{-1})[5] reported elsewhere. Our results demonstrate significant enrichment of soil Hg in London almost certainly indicating anthropogenic contamination although natural processes may be locally important. The results were well below the current UK Soil Guideline Value for inorganic Hg^{2+} (80 mg kg^{-1}) [6]. However, further instigations would be required to determine the form of Hg present and therefore the potential impacts on human and ecosystem health.

References:
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