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**Risk assessment and bioavailability of mercury from dust in gold mining areas in Johannesburg, South Africa**

Ingestion and inhalation have been identified as major pathways for exposure to many dust contaminants. Particle size affects dust deposition efficiency in the human respiratory system upon inhalation. The natural mechanisms are simulated by the use of different reagents having an increasing extractability power. The results obtained are operationally defined. Mercury bioavailability/bio-accessibility was assessed by determining the metal fraction leached out using simulated gastric and lung fluids together with chemical sequential extraction. Total mercury ( $Hg_{TOT}$ ) concentration was determined in road dust. The results showed that  $Hg_{TOT}$  ranged from 323 to 1349  $\mu g\ kg^{-1}$  for  $PM_{2.5}$  particle size fraction. The finer fraction ( $PM_{2.5}$ ) had the highest Hg concentration and distribution in the samples was as follows:  $Hg_{INDUSTRIAL} > Hg_{CBD} > Hg_{RESIDENTIAL}$ . In order to assess the mobility and bioavailability of mercury, Artificial Lung Fluid (ALF) representing the upper parts of the lung and Artificial Gastric Juice (AGJ) representing the stomach juice were used. ALF extracted 1.7%  $Hg_{TOT}$  while the AGJ leached out 0.5% Hg. Sequential extraction procedure demonstrated the predominance of non-soluble Hg species (90-98%) in studied dust samples. The most bioavailable Hg fraction (water, acid soluble fraction) averaged 2.0% of  $Hg_{TOT}$ . The results showed that gold mining and its related activities around Johannesburg are the major sources of mercury in the area.

**Biography**

Ewa Cukrowska is a Professor of Environmental Analytical Chemistry at the University of the Witwatersrand, South Africa. She has received her MSc and PhD degrees from the Maria Curie-Skłodowska University in Poland in 1982. Her research interests is in speciation of heavy metals in industrial, environmental and biomedical samples with development and application of different analytical techniques and remediation methods; metals transport, fate, seasonal changes, biological uptake with chemometric evaluation and modeling of solution equilibria. She has over 200 publications to her credit.

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