

Abstract citation ID: ckae144.1412

Unveiling mercury exposure sources in e-waste recycling with biomonitoring - A Portuguese case study

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Background: Mercury (Hg), a global pollutant, poses risks to both human and environmental health. The management and recycling of electrical and electronic waste (e-waste) is recognized as having the potential to promote workers' exposure to this pollutant. Human biomonitoring (HBM) is a tool that can be used to evaluate exposure and monitor the health of workers. The objective of this study was to characterize exposure of workers from an e-waste recycling company and to analyze the relevance that HBM holds in the detailed characterization of exposure.

Methods: A cross-sectional observational study was conducted using data collected within the framework of the European Human Biomonitoring Initiative (HBM4EU). Data from environmental monitoring (settled dust) and biological monitoring (urine and hair) of 30 workers potentially exposed to Hg were analyzed in comparison with 12 unexposed workers from other occupational settings (controls).

Results: Exposed workers did not exhibit significantly higher concentrations of Hg in urine when compared to control workers. We found a significantly positive correlation between the concentration of Hg in urine ($\rho = 0.688$; $p \leq 0.001$) and hair ($\rho = 0.470$; $p \leq 0.01$) and the consumption of fish and shellfish.

Conclusions: Diet appears to be the most significant source of Hg in this context. These results suggest the importance of information and dietary habits to prevent mercury exposure. HBM stands out as an essential tool for identifying the most relevant exposure sources and risk management measures for workers and the general population.

Key messages:

- Diet appears to be the most significant Hg source in workers from a Portuguese e-waste company.
- HBM stands out as essential for identifying the most relevant exposure sources and risk management.