The solubility of heavy metals in mine tailings and soils from Kamegai mine, Toyama prefecture in Japan

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Mining extraction and processing generate large volumes of metal- rich waste tailings. This waste is considered be a principal cause of soil contamination in mining areas (Rashed, 2010; Pe-Leve Santos et al., 2014). Once these toxic metals are introduced into soils, they can be transported deeply into the soil and into groundwater, threatening environmental health. The objectives of this research were to analyze the concentration of several heavy metals (Zn, Pb, As and Cd) in soils from a Kamegai mining waste area, determining the chemical partitioning of those heavy metals using the sequential extraction procedure. It can help to understand the mobility of heavy metals and predict their effect.

The chemical associations of Cd, Cu, Pb, and Zn in thirty-four soil samples (<63mm) from the Kamegai mine waste site have been investigated by a five- step sequential extraction procedure. Sequential extraction showed that most of the As and Cu was associated with the poorly crystalized iron oxide and residual fractions, while Zn, Cd, and Pb was mainly associated with the exchangeable and carbonate fraction.

The in-field magnetic susceptibility of top soils was clearly correlated with Fe, Zn, Pb and As concentrations.

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