



Sequential Extraction of Heavy Metals in Sediment and Sulphate rich Tailings

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The mobility of metals in soil systems is strictly dependant on the chemical form of soil-metal interaction. Metal associated with the aqueous phase of soils can be transported to groundwater whereas metals immobilized by adsorption and precipitation mechanisms are retained by soils and can not be transported unless the metal retention capacity is overloaded or particular changes in soil environment conditions (such as degradation of organic compounds, change of pH, redox potential or soil solution composition) enhance metal mobility. Environmental pollution by heavy metals originated from mines can become a very important source of contamination both in soil and water. Therefore, chemical as well as physical characterization of mining tailings is very important to assess the risk of potential environmental mobility of toxic trace metals that are contained in this kind of waste. Similarly sediments are generally the sinks for metals in aquatic environment and constitute an enriched metal pool that can be potentially accumulated by the benthic animals. These two matrices are considered in the present study for heavy metal partitioning.

In this paper the total concentration and the distribution of metals (Fe, Cu, Ni, Mn, Zn, Cr, Co and Pb) in different geological phases in the sea sediments of an industrially polluted area and in sulphate rich mine tailings were investigated. A modified five stage Tessier's procedure has been used to discriminate heavy metal bound to different geological phases and to detect the possible trend of metal mobilization in different types of environmental conditions. The five stages include the metal association in

exchangeable and water soluble, carbonates or specifically adsorbed, Fe-Mn oxides, organic matter and sulphides and the residual fraction. Sequential extraction in bulk as well as in size fractionated sediment and tailings were also carried out. High extractability was observed for most of the metals in the residual fraction in sediment and tailings with an exception of lead in tailings at neutral condition. A significant difference in the phase distribution is observed for Mn, Ni and Cu in tailings than the sediment. More amounts of Mn, Ni and Cu extracted in the exchangeable fraction under acidic condition in tailings. So the mobility and bioavailability of metal is decided on the basis at which form and environment it exists.