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### Livro de Resumos

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## Assessment of PTE in soils associated with the Regoufe Mining area

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### Abstract

Potential toxic elements (PTE's) are naturally present in the environment, being constituents of rocks, sediments, and soils, but in excess concentrations can cause changes in ecosystems and risks to public health. PTE's associated with mining activities can accumulate and disperse, constituting a potential environmental hazard. This work aims to assess the environmental risk of soils associated with the former exploration of Regoufe W-Sn Mine. The contamination of soils was assessed using various contamination indices: Geo-accumulation Index (Igeo), Contamination factor (CF), modified degree of contamination (mCd), Potential ecological risk index (PERI), and Potential toxicity response index (RI) [1-3].

Soil samples were collected in a valley next to the old mining facilities, in a linear transect, along the watercourse. Samples were dried, disaggregated, homogenized, sieved below 2 mm, ground and reduced. Concentration of PTE, As, Mn, Zn, Cu, Cr, Ni, Pb, Cd and Co were evaluated by ICP-MS at BV Mineral Laboratories-Canada. Average concentrations of the studied elements varied widely: As (421→10000 ppm), Mn (567–1133 ppm), Zn (84.5–504.5 ppm), Cu (2.6–87.4 ppm), Cr (3–22 ppm), Ni (3.3–19.3 ppm), Pb (13.1–1977.4 ppm), and Cd (0.1–12.0 ppm). The overall PTEs' soil contamination, calculated through the mCd index, indicates an ultra-high degree of contamination, with the highest local mCd (>32) observed around the drainage area of the former ore processing plant.

According to the PERI index and based on the CF values, most of the samples presented concentrations of the selected PTEs higher than the average world background soils [4]. There were observed very highly levels of As and Cd, high levels of Pb and Zn, and moderately levels of Mn and Cu. The average Igeo index was: As>Cd>Pb>Zn>Mn>Cu>Ni>Cr, being those of most concern As, Cd, Pb and Zn, with most samples classified as moderate to highly contaminated with these elements. Overall, the global impact of PTEs in Regoufe mine surface soils, ascertained by the RI index was higher than 600 (3076.3), classified as having serious ecological risk level mainly related with As and Cd PERIs.

**Key words:** PTE's; mining; contamination.

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