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Geochemical distribution of selected trace elements in the soil-plant system from Mănăila mining area, Romania

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Abstract

This study presents the geochemical distribution of several trace elements (TE) (Ni, Cu, Zn, As, Pb) in a soil-plant system, taking into account the lingonberry, a shrub most widely spread around the Mănăila mining region in Suceava County. A number of 34 samples (soil and the plant above), collected arround the open pit, was prepared for the analysis of soils – using ED-XRF method and separated plant organs (roots, leaves, fruits) – using ICP-MS, after HNO_3 microwave digestion.
Compared with Romanian legislative values, the soil from the surroundings of the Mănăila open pit present contents for Ni and Zn within the normal values; Cu ranges between normal and alert threshold, while As and Pb exceed the alert threshold. The geo-accumulation index (I_{geo}) average values point out to a moderate contamination with As, Pb and Cu and support a higher potential toxicity risk for these elements. Based on the bioconcentration factor (BCF), the lingonberry behaves as an indicator for Cu and Zn and as an excluder for Ni, As and Pb. The transfer factor (TF) values show an accumulation at the aboveground plant parts for Ni and Cu.

Keywords: TE, TF, BCF, soil-plant system, mining area, *Vaccinium vitis idaea*.

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