ACCUMULATION OF HEAVY METALS IN SOILS AND VEGETATION FROM COPŞA MICĂ AREA

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SUMMARY

The levels of heavy metals in the environment have been seriously increased during the last few decades due to human activities. Soil pollution with heavy metals in Romania is mainly due to the activities concerning non-ferrous ore metallurgy.

For instance, around the most important factory for processing the non-ferrous ores, Copşa Mică, the area with soils affected by heavy metals pollution stretches up to 23000 ha. The severely polluted area, where at least one pollutant exceed the action thresholds (500 mg/kg Cu, 1500 mg/kg Zn, 10 mg/kg Cd and 1000 mg/kg Pb) covers over the 3000 ha.

Heavy metals pollution of soil enhances plant uptake causing accumulation in plant tissues and eventual phytotoxicity and change of plant community. The research was carried out within the area affected by emissions released from Copşa Mică industrial platform. The sampling grid of soil and plant was regular - 118 plant samples and 103 soil samples were collected. The spontaneous vegetation developed in the investigated area includes plants belonging to the following species: Amaranthus retroflexus, Artemisia vulgaris, Asclepias syriaca, Calamagrostis epigeios, Calamagrostis pseudophragmites, Cynodon dactylon, Daucus carota, Equisetum pratense, Phragmites australis, Picris hieracioides, Setaria glauca, Sinapis arvensis, Verbascum phlomoides and Xanthium strumarium. Main crops identified within investigated area were: maize (Zea mays), wheat (Triticum aestivum), oat (Avena sativa), soybean (Glycine max). The high concentrations of heavy metals do not significantly affect the development of vegetation.

The regression curves were used to assess the stochastic dependences between heavy metal content in soil and heavy metal content in plant. These regression curves are suitable to be used for estimation of heavy metal content in aerial parts of plants.

The analyses carried out to determine the heavy metals (Cu, Cd, Zn and Pb) in plants revealed that Equisetum pratense, Cynodon dactylon Verbascum phlomoides, Calamagrostis pseudophragmites and Asclepias syriaca accumulated high amount of heavy metals in their tissue.