

MERCURY CONTAMINATION IN TOP SOIL AND SELECTED PLANT SPECIES IN AREA OF VEĽKÁ STUDŇA Hg-DEPOSIT (MALACHOV, SLOVAKIA)

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High concentrations of mercury represent a big risk to the environment due to the high toxicity of this metal. One of anthropic sources of up-ground environmental mercury contamination is mining industry. Analysis of the contamination and its prevention should be the essential part of the environmental policy for every company, dealing with this element.

The dump-field Veľká Studňa presents the rest of one of the most frequent mining activities in Slovakia for the last century. In the area of Malachov, where the dump is situated, Hg mine industry was well known in the past. The main source of mercury in this region is cinnabar (HgS), which was quarried in the locality centuries ago. The dump-field Veľká Studňa is situated in the site where the last attempt of mining was performed in early 1990s. The dump itself is approximately 20 years old with an area of 57,000 m². It is situated by a considerable distance from the urban area.

In the recent time, the dump-field presents the habitat for numerous plant species. Due to the fact that it is surrounded by woods and well developed ecosystems the succession at the field is quite fast. But a couple of anomalies in the plant growth is noticeable.

Our study was focused on Hg concentration in the soil substrate of the dump-field and accumulation by selected plants, which consisted of the representatives of gramineous, herbaceous and woody species. The study area was divided into several plots, based on physiognomic features of plant communities. In total 16 soil samples were taken from the field. In order to predict the Hg distribution for the whole study area, interpolation methods were used in GIS. The plant material consisted of 4 species: *Calamagrostis epigejos*, *Lotus corniculatus*, *Leontodon hispidus* and *Picea abies*. The samples were dried, grained, dissolved in HNO₃ and HCl solution and subsequently measured by inductively coupled plasma mass-spectrometry (ICP-MS).

The results show a widespread contamination of the dump-field environment by mercury. The values in soil vary from 11 to 910 mg kg⁻¹. The analyses of potentially bioavailable forms of mercury in the soil samples indicates, that only roughly 0.1 % of Hg content is potentially available for plants. However, the bioaccumulation potential of some plant species was significant. The Hg content in *Picea abies* reached 24 mg kg⁻¹. With regard to the presented data, the dump-field must be clearly considered as a risk for the local environment and its monitoring is essential to prevent environmental contamination in the future.

Key words: Mercury, Dump-Field, Contamination, Bioavailability, Plants