

Evaluating metal accumulation in lichens. The Romanian experience

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Multi-element composition of lichens and other environmental samples are being evaluated. Rare earth elements (REE) and other rare elements are increasingly involved in industrial processes and released into the environment. Their fate and impact on ecosystems are largely unknown. Understanding metal fixation and release by lichens and the origin of elements is important to refine biomonitoring protocols and to understand the influence of metals (from both natural and anthropogenic sources) on biodiversity. The aim of the present investigation is to compare multi-element including rare earth element composition of lichens with those of bark, soil, waste and ore materials.

Point sources, nowadays very rare in many formerly industrialised regions are natural laboratories to investigate the effects of pollutants and geology on vegetation. One such is Zlatna town, one of the top 10 pollution hotspots in Romania. Following smelter closure in May 2004, extensive mine tailings, slag dumps and waste heaps remain. Lichens were transplanted across a transect established in May 2004 centred on a large metallurgical waste dump in Zlatna.

Lichen and bark multi-element compositions were most similar reflecting fixation of elements of environmental concern and the ability for tree canopies to concentrate substances leading to enhanced deposition to both lichens and bark. Multi-element analysis supports the view that epiphytic lichens, unlike trees, are not influenced by lower groundwater, and are excellent indicators for REE and other rare elements entering the surface environment, difficult to detect by conventional means.

References

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