HEAVY METAL AND POPs BIOMONITORING AND QUANTIFICATION

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Moss-monitoring technique was firstly introduced in Eastern Romania in 2000 to evaluate the atmospheric heavy metal deposition within the Prut River catchment. It represents a relatively small area, where the epiphytic Hypnum cupressiforme was the most abundant moss species (Cucu-Man et al., 2004). In 2002, when the sampling network was extended over the whole Eastern part of the country, tree bark samples were collected beside moss samples, in order to investigate their suitability for monitoring purposes. Applications of tree bark in monitoring studies are known, but bark is a less specific biomonitor by way of comparison with mosses. Previous use of bark was almost entirely restricted to monitoring heavy metal pollution on a local scale. Soil samples were also collected from the same locations as vegetation, in order to obtain an overall picture of the pollution level in the investigated area. Beside that, soils are natural sinks where persistent and hydrophobic POPs may be accumulated and be retained for many years (Motelay-Massei et al., 2004; Schmid et al., 2005).

V, Cr, Ni, Cu, Zn, As, Mo, Cd, In, Ti, Pb and Bi were determined by ICP-MS in all samples. Selected persistent organic pollutants were for the first time determined in soil samples at regional level (Dragan et al., accepted). The OCPs under investigation were α-, β-, γ-HCH, DDT and analogues (o,p'-DDE; p,p'-DDE; o,p'-DDD; p,p'-DDD; p,p'-DDT) and hexachlorobenzene (HCB). The following congeners (IUPAC numbers) were targeted: 28, 31, 52, 74, 95, 99, 101, 105, 110, 118, 128, 138, 149, 153, 156, 170, 180, 183, 187, 194 and 199. Significant correlation between concentration of heavy metals in moss and bark for 7 of 12 elements indicates atmospheric deposition of some metals as the main source of these also in bark. The use of tree bark for monitoring purposes might be an (valid) alternative in areas where there is a scarcity of mosses. Sampling points were located at least 200-500 m from any principal road in forest zone. The PCB levels were lower than the levels of DDTs and HCHs. The presence of PCBs in soil samples, together with a predominance of low chlorinated congeners (more volatile) points to atmospheric transport and deposition as principal mechanisms of PCB pollution in the investigated area.


