

Abstract EN

The aim of this thesis was to determine the content of selected elements, namely arsenic, cadmium, copper, nickel, lead, calcium, and zinc in leaf and soil samples. The analysed samples were received from many locations in the Czech Republic and various European countries.

Leaf samples were dried and digested in a microwave digestion system for the determination of the total content of elements. Soil samples were analysed using an extraction procedure with aqua regia as the extractant according to ISO 11466. This method was also applied to certified reference materials to verify the usage of this procedure. The content of elements in leaf and soil samples was analysed by inductively coupled plasma mass spectrometry (ICP-MS).

The content of elements in leaves showed a wide range of values for each element. Concentrations of elements ranged for calcium 0.98 to 16.6 mg g⁻¹, nickel 0.16 to 10.20 µg g⁻¹, copper 2.60 to 43.80 µg g⁻¹, zinc 13.4 to 489 µg g⁻¹, arsenic 0.01 to 11.60 µg g⁻¹, cadmium < LOD to 7.02 µg g⁻¹, and lead 0.03 to 71.40 µg g⁻¹, respectively. Generally, higher values of heavy metals were obtained for samples from areas with mining activities or from industrial zones.

Recovery of elements in the used certified reference materials showed values ranging from 68.4% to 121%. Two types of reference materials were used, and the recovery showed the same order for the elements in both used materials: As > Ni > Zn > Cd > Cu > Pb.

Soil extracts also showed a wide range of concentrations for determined elements (calcium < LOD to 3.47 mg g⁻¹, nickel 0.186 to 413 µg g⁻¹, copper < LOD to 997 µg g⁻¹, zinc < LOD to 832 µg g⁻¹, arsenic 0.115 to 86.50 µg g⁻¹, cadmium 0.005 to 120 µg g⁻¹, and lead 7.35 to 4560 µg g⁻¹, respectively). Higher content of heavy metals was observed for soil samples from areas with higher environmental contamination.