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HEAVY METALS BIOCONCENTRATION AND TRANSLOCATION IN PLANTS: THE INFLUENCE OF A THERMAL POWER SITE

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Abstract

Soil and plant samples were collected from agricultural areas under the influence of thermal power plant and ash samples were collected from ash storage area. In samples, As, Cd, Co, Cr, Cu, Mn, Mo, Ni, Pb, V, Zn, Al, Ca, Fe, K, Na and S were analyzed using ICP-MS. The aim of the study is to determine the set of elements mainly emitted from the components of the thermal power plant, as well as the major sources influencing the plant elemental levels. In the ash samples, significant enrichments of S, Mo, As, Ca, Cd and Cr were determined. Sugar beet leaves were considered to be a potential Na hyperaccumulator due to the translocation factor (TF) of 13525 calculated in its leaves. As a result of the Principal Component Analysis applied to the bioconcentration factors (BCFs) determined in plant parts, the main source of Co, Pb, Ni, Cr, Fe, Al, V, As, Mn and Cd was determined as geochemical background level of soil. Cu, Zn, and Mo enrichment in plant parts were found linked with agrochemicals used on the site, while another source of Cd was detected as phosphate fertilizers. Mo and S are identified as the main elements sourced from thermal power plant units.

Key words: bioconcentration, heavy metals, hyperaccumulation, principal component analysis, thermal power plant

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