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Trace Element Accumulation in Selected Bioindicators Exposed to Emissions along the Industrial Facilities of Danube Lowland

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Abstract: The scope of this study was to investigate the effects of the atmospheric emissions of two significant industrial centres of the Danube Lowland: the Schwechat and Slovnaft refineries. In this connection the environmental pollution of emission zones by heavy metals on the base of selected bioindicators (soil, lucerne, wheat, earthworms) should be evaluated. The phenomenon of the atmospheric impact of heavy metal aerosols on the food chain and substance transfer for the model studied (soil - plants - terrestrial invertebrates) was quantified by transfer (bioaccumulation) factors. Due to the orographic depression between the Eastern Alps and Western Carpathian Mountains and the characteristic atmospheric circulation with a predomint an north-west wind direction, heavy metal aerosols from closed industrial activities are expected to influence the quality of the surrounding environment. However, most of the 112 top soil samples taken from arable fields in the Schwechat District (Austria) showed natural levels of heavy metals. Heavy metal uptake by wheat via the soil was also rather low. At the Slovakian monitoring site the heavy metal bioaccumulation within the lucerne, as a consequence of availability from the soil, was slightly increased and a considerably higher transfer factor was recorded in related earthworm tissues. Cadmium content in the earthworms exceeded the recommended limit for agricultural feed.

Key Words: heavy metals, soil, lucerne, wheat, earthworms, bioaccumulation.

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