

CARCINOGENIC POTENCY OF 16 EPA PAHs IN ARABLE SOIL SAMPLES FROM HUNGARY-SERBIA BORDER REGION

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Polycyclic aromatic hydrocarbons (PAHs) are high-priority semi-volatile organic pollutants that are receiving attention because of their toxicity, probable mutagenic and carcinogenic effects. PAHs originate from combustion processes and they can be also found in crude oil deposits, as well as in oil products (e.g. liquid fuels). The anthropogenic sources of PAHs in the environment are predominant over the natural as a consequence of dominant use of organic matter (fossil fuel, biomass) combustion for energy production, either for heat, power or transport. Soil has been identified as an effective sink for medium to low volatility PAHs emitted from various sources of combustion or oil spills. PAHs occur in the environment, including soil, always as a mixture of different number of compounds, never as one compound. Sixteen PAHs have been identified by the United States Environment Protection Agency (USEPA) as priority environmental pollutants; they differ among each other with respect to their physical and chemical properties as well to the toxicity/carcinogenicity. In order to evaluate the carcinogenic potency of different profiles of PAHs present in soil samples, the toxic equivalency factors (TEFs) are set for each compound to estimate the toxicity equivalent quotient concentrations in a form of BaP_{eq}. The BaP_{eq} value for each sample is calculated by summing the individual PAH concentrations multiplied with the corresponding TEF values defined in relation to the TEF of benz[a]pyrene, BaP, assumed to be 1. BaP has been chosen since it is a well studied compound, important to environmental toxicology.

The aim of this study is to present the carcinogenic potency of PAHs present in 23 composite samples of arable soil taken in the Hungary-Serbia border region. On the base of the contents determined by gas chromatographic analysis with mass selective detection of 16 EPA PAHs in the soil extracts obtained by accelerated solvent extraction, the BaP_{eq} values for each soil samples were calculated applying the relevant TEFs. The obtained values were discussed in



relation to the BaPeq values previously reported for the region in order to indicate the potential health risk in the rural zones particularly of agricultural workers.

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