

Characterization of Polycyclic Aromatic Hydrocarbons in Ambient Air PM_{2.5} in an Urban Site of Győr, Hungary

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Abstract : In Hungary, the measurement of ambient PM₁₀-bound polycyclic aromatic hydrocarbon (PAH) concentrations is great importance for a number of reasons related to human health, the environment and compliance with European Union legislation. However, the monitoring of PAHs associated with PM_{2.5} aerosol fraction is still incomplete. Therefore, the main aim of this study was to investigate the concentration levels of PAHs in PM_{2.5} urban aerosol fraction. PM_{2.5} and associated PAHs were monitored in November 2014 in an urban site of Győr (Northwest Hungary). The aerosol samples were collected every day for 24-hours over two weeks with a high volume air sampler provided with a PM_{2.5} cut-off inlet. The levels of 19 PAH compounds associated with PM_{2.5} aerosol fraction were quantified by a gas chromatographic method. Polluted air quality for PM_{2.5} (>25 µg/m³) was indicated in 50% of the collected samples. The total PAHs concentrations ranged from 2.1 to 37.3 ng/m³ with the mean value of 12.4 ng/m³. Indeno(123-cd)pyrene (IND) and sum of three benzo(a)fluoranthene isomers were the most dominant PAH species followed by benzo(ghi)perylene and benzo(a)pyrene (BaP). Using BaP-equivalent approach on the concentration data of carcinogenic PAH species, BaP, and IND contributed the highest carcinogenic exposure equivalent (1.50 and 0.24 ng/m³ on average). A selected number of concentration ratios of specific PAH compounds were calculated to evaluate the possible sources of PAH contamination. The ratios reflected that the major source of PAH compounds in the PM_{2.5} aerosol fraction of Győr during the study period was fossil fuel combustion from automobiles.

Keywords : air, PM_{2.5}, benzo(a)pyrene, polycyclic aromatic hydrocarbon

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