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Comparison of volatile PAH concentrations in urban and rural areas in Paijat-Hame

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Polyaromatic hydrocarbons (PAHs) are a group of organic pollutants produced as a result of incomplete combustion or pyrolysis of carbonaccous meterical. First, and the particular pollutants produced as a result of incomplete combustion or pyrolysis of carbonaceous material. Exposure to PAHs is associated with adverse health effects including cancer, respiratory and immunological disorder. The purpose of this study was to examine the difference in the concentration of PAHs in the ambient air between urban and rural sites in Päijät-Häme; a region in Southern Finland and if any significant sources could be identified. The study was based on an assumption that higher gaseous PAH-concentrations would be measured in urban areas than in rural areas because of the greater volume of traffic, higher number of houses and the heating required. The PAHs at the study sites were collected using passive sampling devices (PSD) consisting of low-density polyethylene lay-flat tubing filled with high purity triolein for a period of 2 weeks. Altogether 7 PAH-compounds namely acenaphthylene, acenaphthene, fluorine, phenanthrene, anthracene, fluoranthene and pyrene were identified using Gas-Chromatography-Mass Spectrometry (GC-MS). Phenanthrene was the most abundant chemicals in both urban and rural measurements (44% and 45%, respectively). The mean concentration of total PAHs was higher in the rural sites $(11\pm6.5 \text{ ng/m}^3)$ compared to the urban sites $(9.1\pm1.9 \text{ ng/m}^3)$ m³). The variation of the rural site measurements was significantly larger than those of urban sites (Moses Extreme Reactions Test, p<0.001). The total PAH concentration as well as fluorene, fluoranthene, acenaphthene and phenanthrene correlated negatively with broad-leaved and mixed forests within 200 m and 500 m radius of the study sites in the city area. No such correlation was observed in the rural sites. The farming activity in 16 out of 30 rural sites however seemed to increase the total PAH concentration (Mann-Whitney U-test, p=0.018). This striking difference in PAH levels in rural areas highlights the effect and importance of human activity on ambient air quality and emissions of PAHs with grain dryers along other agricultural heavy machinery identified to be the highest PAH emitters.

Biography

Anirudra Parajuli has completed his Masters and PhD degrees. He is interested in studying how persistent organic anthropogenic pollutants like the polyaromatic hydrocarbons (PAHs) affect the abundance and diversity of the bacteria associated with the human immune system, both in the living environment and in human body.

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