

# POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) IN SOILS OF THE ALMALYK INDUSTRIAL COMPLEX, UZBEKISTAN: SPATIAL DISTRIBUTION AND RELATIONSHIP WITH SOIL NEMATODES AND MICROBIAL PROPERTIES

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We examined the relationship of PAHs concentrations with soil biological properties. We aim to determine the spatial variation of PAHs concentrations in soils along a transect, and examine the relationships of PAH concentrations with physicochemical and biological soil properties. Soil samples were collected from 11 sampling locations (0-10, 10-20cm soil depths) along a 20km transect downwind from the Almalyk industrial complex. PAHs were analyzed using GC-EI-MSD after sample extraction using pressurized liquid extraction, clean-up and fractionation on a silicagel column. Microbiological properties were assessed as soil total nematode abundance ( $T_{NEM}$ ), basal respiration ( $R_B$ ), microbial C and N concentrations, and microbial community functioning coefficients like the metabolic quotient ( $qCO_2$ ),  $C_{mic}/C_{org}$  and  $C_{mic}/N_{mic}$  ratios. There was a significant spatial dependence of all soil chemical and microbiological parameters tested revealing the strong influence of the industrial activity on soil properties. PAHs concentrations in the upper soil layers were highest near the metal smelter followed by a chemical plant suggesting that these pollutants are derived from local stack emissions. Areas far from these emission sources had progressively lower PAH concentration. Soil microorganisms were negatively affected where PAHs concentrations were highest near the pollution source. Similarly, highest  $T_{NEM}$  was found most distant from the industrial emission sources with comparatively lower PAHs concentrations. The positive correlation between PAHs concentrations and  $qCO_2$ , and the negative correlations between PAHs concentrations and  $T_{NEM}$  and  $C_{mic}$  suggested that PAHs concentrations might have contributed to the negative impact on biological properties.

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