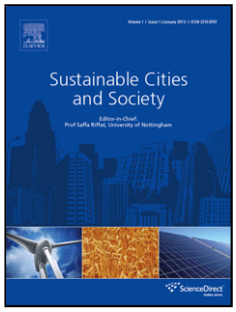
Accepted Manuscript



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PII: S2210-6707(17)30291-3
DOI: https://doi.org/10.1016/j.scs.2018.01.006
Reference: SCS 919

To appear in:

Received date: 21-3-2017
Revised date: 8-12-2017
Accepted date: 6-1-2018

Please cite this article as: Gope, Manash., Masto, Reginald Ebhin., George, Joshy., & Balachandran, Srinivasan., Exposure and cancer risk assessment of polycyclic aromatic hydrocarbons (PAHs) in the street dust of Asansol city, India.*Sustainable Cities and Society* https://doi.org/10.1016/j.scs.2018.01.006

Exposure and cancer risk assessment of polycyclic aromatic hydrocarbons (PAHs) in the street dust of Asansol city, India

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Highlights

- Elevated concentration of 16 polycyclic aromatic hydrocarbons (PAHs) in street dust in winter season.
- The 2-ring to 3-ring PAHs dominated in winter season whereas 5-ring to 6-ring PAHs contributed maximum in summer season.
- Principal component analysis (PCA) and ratio determination were performed to identify the potential sources of PAHs.
- Total cancer risk for children and adults were maximum at industrial sites i e., 1.4E-05 and 1.5E-05 respectively.

Abstract

The sources, distribution and total concentration of 16 polycyclic aromatic hydrocarbons (PAHs) in 15 urban street dust samples (each for summer, winter and monsoon season) from Asansol, an industrial city were investigated to evaluate and understand the carcinogenic risk of urban inhabitants exposed to street dust. The results showed that the total PAHs (∑PAHs) in urban street dust at Asansol ranged from 1708 ± 1345 ng/g to 9688± 3257 ng/g with an average value of 4532 ± 2031 ng/g. The 2-ring to 3-ring PAHs dominated in winter; whereas 5-ring to 6-ring PAHs contributed maximum in summer. Principal component analysis (PCA) and ratio determination were performed to identify the potential sources of PAHs. Anth/(Phe+Anth), BaP/BghiP, Fla/(Pyr+ Fla), IP/(IP+BghiP), Flt/Pyr, Phen/Anth, and BaA/Chry ratios indicated mixed sources of PAHs. Our result concluded that at Asansol, biomass combustion, coal combustion, traffic emission (gasoline and diesel powered vehicles), thrash burning and domestic coal utilization activity, along with temperature and meteorological dependent played an important role in controlling the distribution of PAHs in street dust. According to the Incremental Lifetime Cancer Risk (ILCR) model, the total cancer risk for children and adults were maximum at industrial sites, i e., 1.4E-05 and 1.5E-05 respectively.

Keywords: **Street dust, PAHs, PCA, ILCR, Carcinogenic health risk**