

Sources of organic Compounds in urban aerosols over National Capital Region (NCR), India

Ranu Gadi and Shivani

Indira Gandhi Delhi Technical University for Women, India



Abstract

The National Capital Region (NCR) of India is experiencing high atmospheric pollution with increasing population and intensive human activities, including economic and social activities. The impact of anthropogenic emissions on the air quality revealed the high particulate levels in the atmosphere. Atmospheric particulate matter includes organic aerosols as significant and variable fraction. Estimation of organic matter in the ambient atmosphere is important due to their carcinogenic and/or mutagenic properties and association with indirect climate forcing. Organic aerosols contain numerous compounds including molecular markers (n-alkanes, hopanes and steranes, PAHs, levoglucosan, phthalates) which are defined as chemically inert and source-specific compounds. Hence, they can be used as tracers to determine the source contribution to particulate matter levels in the ambient atmosphere. This study emphasizes the effort made to characterize organic matter in fine ambient aerosols (PM_{2.5}) over the NCR of India. Aerosols samples for PM_{2.5} (24 hour average) were collected at three (Delhi, Modinagar, Harayana) sites in the NCR during December 2016-December 2017. The average PM_{2.5} concentration were 124.9 ± 81 , 120.1 ± 84.2 and $93.5 \pm 59.5 \mu\text{g m}^{-3}$ at IG, MN and HR site respectively. The samples were analyzed for the different classes of organic compounds. The source contribution for organic compounds was assessed using Positive Matrix Factorization (PMF) and Principal Component Analysis (PCA). PCA and PMF has extracted five major emission sources: vehicular emissions, biomass burning, cooking emissions, plastic and waste burning and secondary organic carbon for PM_{2.5} over NCR. Source apportionment inferences signifies the immediate implementation of emissions reduction strategies with special target on transport sector and biomass burning over the NCR

of India. Health risk associated with human exposure to PAHs and Phthalates was assessed via inhalation pathway. 3-day backward trajectory analysis explained the local, regional and long range transport routes of PM_{2.5} for all sites. These results provide important information for future assessment of health risk to the local population, levels of exposure and implementation of pollution control strategies.



Biography:

Dr Ranu Gadi has her expertise in the areas of Atmospheric Chemistry and Climate Change, Biomass emissions, Characterization of atmospheric aerosols (elemental, organics, carbonaceous, metals), Environmental Analytical Chemistry, Speciation and Bioremediation of priority pollutants in water/wastewater. She is presently working as Associate Professor in Department of Applied Sciences and Humanities. She is also holding the charge of Deputy Dean (Industrial Research & Development) along with being the Chief Warden of IGDTUW Hostels. She has twenty five years of research experience and more than seventeen years of teaching experience. She has authored/co-authored more than ninety research papers in International refereed journals and National/International conferences.

Speaker Publications:

1. Ranu Gadi, Shivani, Sudhir Kumar Sharma, Tuhin Kumar Mandal (2019) Source apportionment and health risk assessment of organic constituents in fine ambient aerosols (PM_{2.5}): a complete year study over National Capital Region of India. Chemosphere, Elsevier 221: 583-596
2. Shivani, Gadi Ranu, Sharma, S. K., & Mandal, T. K. (2019) Seasonal variation, source apportionment and source attributed health risk of carbonaceous aerosols in fine particulate matter over National Capital Region, India Chemosphere (Elsevier) 237.
3. Shivani, Ranu Gadi, Mohit Saxena, Sudhir Kumar Sharma, Tuhin Kumar Mandal (2019). Short Term Degradation of Air Quality during Major Firework Events in Delhi, India. MeteorolAtmosPhys, Springer, 131(4), 753-764.
4. Shivani, Ranu Gadi, Ravi Kumar, Mona Sharma, Sudhir Kumar Sharma, Tuhin Kumar Mandal, Sachin Kumar, Sanchit Kumar (2018). Levels and Sources of organic compounds in Fine Particulate Matter (PM_{2.5}) over Delhi and National Capital Region of India. Environ SciPollut Res, Springer 25(31): 31071-90.
5. Gupta, S., Gadi Ranu, Sharma, S. K., & Mandal, T. K. (2018). Characterization and source apportionment of organic compounds in PM₁₀ using PCA and PMF at a traffic hotspot of Delhi. Sustainable Cities and Society, 39, 52-67.

9th World Conference on Climate Change October 12-13, 2020 Zurich, Switzerland

Abstract Citation:

Ranu Gadi, Sources of organic Compounds in urban aerosols over National Capital Region (NCR), India. Climate Change 2020, 9th World Conference on Climate Change Zurich, Switzerland October 12-13, 2020.

<https://climatechange.insightconferences.com/speaker/2020/ranu-gadi-indira-gandhi-delhi-technical-university-for-women-india>