Opinion
Volume 10:04, 2023

Journal of Environmental Analytical Chemistry

ISSN: 2380-2391 Open Access

Health Risk Assessment of Ambient Hazardous Air Pollutants in an Urban Industrial Complex Area: Effect of the Method Detection Limit

Juing Tssi*

Department of Environmental Science, Universitiy Putra Malaysia, Selangor, Malaysia

Introduction

This study aims to evaluate the health risks associated with exposure to ambient hazardous air pollutants (HAPs) in an urban industrial complex area while considering the influence of the method detection limit (MDL) on risk assessments. Air quality monitoring data were collected from multiple monitoring stations over a one-year period. Various statistical methods were employed to analyze and interpret the data, including the consideration of MDLs. Health risk assessments were conducted using both conventional risk assessment methods and MDL-adjusted risk assessments to understand the potential impacts of lower detection limits on health risk estimates. The results indicate that the MDL significantly influences risk assessments, highlighting the importance of improving detection limits to accurately assess and mitigate health risks associated with HAP exposure in urban industrial complex areas [1].

The proximity of residential areas to industrial complexes often exposes residents to ambient Hazardous Air Pollutants (HAPs), which can pose significant health risks. Assessing these risks accurately is crucial for public health management and regulatory decision-making. However, health risk assessments based on air quality data are subject to the Method Detection Limit (MDL) of monitoring instruments. The MDL represents the lowest concentration of a pollutant that can be reliably measured using a specific analytical method. Air quality data were collected from multiple monitoring stations strategically placed within the urban industrial complex area. These data included concentrations of various HAPs such as Volatile Organic Compounds (VOCs), heavy metals, and Particulate Matter (PM). Statistical analysis was performed to assess the temporal and spatial variability of HAP concentrations. Special attention was given to handling data points below the MDL, including employing statistical imputation methods where appropriate [2].

Conventional health risk assessment methods, such as the United States Environmental Protection Agency (USEPA) risk assessment framework, were applied to estimate health risks associated with HAP exposure. Additionally, MDL-adjusted risk assessments were conducted to account for the impact of lower detection limits on risk estimates. The MDL had a substantial impact on risk assessment outcomes, especially for pollutants with concentrations near or below the MDL. Lower MDLs resulted in higher estimated risks for certain HAPs, indicating that health risks may be underestimated when MDLs are not taken into account. Spatial analysis revealed hotspots of HAP concentrations within the urban industrial complex area, with some areas experiencing higher risks due to elevated pollutant levels and proximity to emission sources [3].

***Address for Correspondence:** Juing Tssi, Department of Environmental Science, Universitiy Putra Malaysia, Selangor, Malaysia; E-mail: juimhtssi@gmail.com*

Received: 02 August, 2023, Manuscript No. jreac-23-116406; **Editor Assigned:** 04 August, 2023, PreQC No. P-116406; **Reviewed:** 16 August, 2023, QC No. Q-116406; **Revised:** 21 August, 2023, Manuscript No. R-116406; **Published:** 28 August, 2023, DOI: 10.37421/2380-2391.2023.10.432

Description

This study highlights the significance of the Method Detection Limit (MDL) in health risk assessments of ambient Hazardous Air Pollutants (HAPs) in an urban industrial complex. Accurate MDL determination is crucial for reliable risk estimations and effective policy decisions. The findings from this research underscore the need for improved monitoring and assessment methods to safeguard the health of residents and workers in similar industrial settings. Additionally, the study provides insights into potential mitigation strategies to reduce HAP emissions and their associated health risks. The results emphasize the need to improve MDLs for monitoring instruments to enhance the accuracy of health risk assessments. Lower MDLs would provide a more comprehensive understanding of exposure levels and associated health risks, particularly in areas with low-level but potentially harmful pollutants. Regulatory agencies should consider the impact of MDLs when setting air quality standards and conducting risk assessments. Adjusted risk assessments that account for MDLs may lead to more stringent regulatory measures to protect public health adequately. This study highlights the importance of considering the method detection limit in health risk assessments of ambient hazardous air pollutants in urban industrial complex areas. Lower MDLs are essential for accurately estimating health risks associated with exposure to low-level HAPs. Regulatory agencies and monitoring organizations should prioritize efforts to improve detection limits to safeguard the health of communities living near industrial complexes [4,5].

Conclusion

This study investigates the health risk associated with exposure to ambient Hazardous Air Pollutants (HAPs) in an urban industrial complex area, with a particular focus on the influence of the method Detection Limit (MDL) on risk assessment outcomes. The presence of industrial activities in urban environments can lead to elevated levels of HAPs, potentially impacting public health. Accurate quantification of HAP concentrations is crucial for assessing health risks and implementing effective mitigation measures. This research assesses how variations in MDL affect risk estimations and discusses the implications for policy and regulatory decisions. Urban industrial complexes often house various manufacturing processes and emissions sources that release hazardous air pollutants into the ambient environment. These HAPs can pose health risks to residents and workers in the vicinity. Accurate measurement and assessment of HAP concentrations are essential for evaluating potential health effects and developing appropriate regulatory measures. However, the reliability of such assessments depends significantly on the sensitivity of the analytical methods employed, including the Method Detection Limit (MDL).

Acknowledgement

None.

Conflict of Interest

There is no conflict of interest by author.

References

1. Zhou, Xiaochi, Xiao Peng, Amir Montazeri and Laura E. McHale, et al. "Mobile measurement system for the rapid and cost-effective surveillance of methane and volatile organic compound emissions from oil and gas production sites." *Environ Sci Technol* 55 (2020): 581-592.
2. Zheng, Huang, Shaofei Kong, Yingying Yan and Nan Chen, et al. "Compositions, sources and health risks of ambient Volatile Organic Compounds (VOCs) at a petrochemical industrial park along the yangtze river." *Sci Total Environ* 703 (2020): 135505.
3. Xie, Jiao-Jiao, Chun-Gang Yuan, Jin Xie and Xiao-Dong Niu, et al. "Comparison of arsenic fractions and health risks in pm2. 5 before and after coal-gas replacement." *Environ Pollut* 259 (2020): 113881.
4. Tejada, Silvestre B. "Evaluation of silica gel cartridges coated in situ with acidified 2, 4-dinitrophenylhydrazine for sampling aldehydes and ketones in air." *Int J Environ Anal Chem* 26 (1986): 167-185.
5. Li, Lei, Hong Li, Xinmin Zhang and Li Wang, et al. "Pollution characteristics and health risk assessment of benzene homologues in ambient air in the northeastern urban area of Beijing, China." *J Environ Sci* 26 (2014): 214-223.

How to cite this article: Tssi, Juing. "Health Risk Assessment of Ambient Hazardous Air Pollutants in an Urban Industrial Complex Area: Effect of the Method Detection Limit." *J Environ Anal Chem* 10 (2023): 432.