

# AIR QUALITY AND PM 10 -ASSOCIATED POLY-AROMATIC HYDROCARBONS AROUND THE RAILWAY TRAFFIC AREA: STATISTICAL AND AIR MASS TRAJECTORY APPROACHES

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## Abstract

Diesel engine railway traffic causes atmosphere pollution due to the exhaust emission which may be harmful to the passengers as well as workers. In this study, the air quality and PM 10 concentrations were evaluated around a railway station in Northeast India where trains are operated with diesel engines. The gaseous pollutant (e.g. SO<sub>2</sub>, NO<sub>2</sub>, and NH<sub>3</sub>) was collected and measured by using ultraviolet–visible spectroscopy. The advanced level characterizations of the PM<sub>10</sub> samples were carried out by using ion chromatography, Fourier-transform infrared, X-ray diffraction, inductively coupled plasma optical emission spectrometry, X-ray photoelectron spectroscopy, field-emission scanning electron microscopy with energy-dispersive spectroscopy, and high-resolution transmission electron microscopy with energy-dispersive spectroscopy techniques to know their possible environmental contaminants. High-performance liquid chromatography technique was used to determine the concentration of polycyclic aromatic hydrocarbons to estimate the possible atmospheric pollution level caused by the rail traffic in the enclosure. The average PM 10 concentration was found to be 262.11 µg m<sup>-3</sup> (maximum 24 hour) which indicates poor air quality (AQI category) around the rail traffic. The statistical and air mass trajectory analysis was also done to know their mutual correlation and source apportionment. This study will modify traditional studies where only models are used to simulate the origins.

## Keywords

Aerosol, Air mass trajectory analysis, Air quality, PM<sub>10</sub>, Railway traffic, Statistical analysis