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Health Impacts of Size Segregated Particulate Matter and Black Carbon in Industrial Area of Firozabad

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Abstract : Particulates are ubiquitous in the air environment and cause serious threats to human beings, such as lung cancer, Chronic obstructive pulmonary disease (COPD), and Asthma. Particulates mainly arise from industrial effluent, vehicular emission, and other anthropogenic activities. In the glass industrial city Firozabad, real-time monitoring (mass as well as a number) of size segregated Particulate Matter (PM) and black carbon was done by Aerosol Black Carbon Detector (ABCD) and GRIMM portable aerosol Spectrometer at two different sites in which one site is urban, and another is rural. The average mass concentration of size segregated PM during the study period (March & April 2022) was recorded as PM_{10} (223.73 μg/m-³), $PM_{5.0}$ (44.955 μg/m-³), $PM_{2.5}$ (59.275 μg/m-³), $PM_{1.0}$ (33.02 μg/m-³), $PM_{0.5}$ (2.05 μg/m-³), and $PM_{0.25}$ (2.99 μg/m- ³). In number mode, PM concentration was found as PM_{10} (27.46μg/m-³), $PM_{5.0}$ (233.48μg/m-³), $PM_{2.5}$ (646.61μg/m-³), $PM_{1.0}$ (1134.94 μg/m-³), $PM_{0.5}$ (14056.04μg/m-³), and $PM_{0.25}$ (182906.4 μg/m-³). The highest concentration of BC was found in Urban due to the emissions from diesel engines and wood burning while NO2 was highest at the rural sites. The concentrations of PM_{10} and $PM_{2.5}$ exceeded the NAAQS and WHO guidelines. The sensitive, exposed population may be at risk of developing health-related problems from exposure to size-segregated PM and BC.

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