Comparative Analysis of Air Quality Trends: PM_{10} and $PM_{2.5}$ Before, During, and After the COVID-19 Pandemic in Shah Alam, Malaysia

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Abstract

Air pollution particularly fine particulate matter (PM_{10} and $PM_{2.5}$), constitutes a substantial environmental and public health concern. Understanding the differences in pollution sources and intensity between urban and suburban areas is crucial for developing specific mitigation strategies. A study was conducted to analyse air pollution trends in Malaysia from 2019 to 2023, aiming to ascertain the levels, variability, and association of PM_{10} and $PM_{2.5}$ in an urban environment (Shah Alam) and a suburban setting (Banting). A dataset of PM_{10} and $PM_{2.5}$ values was acquired from the Air Quality Division of the Department of Environment Malaysia (DOE). This study utilised 365 records for each of the air quality monitoring station. The XLSTAT add-in from 2014 was utilised to evaluate the daily readings of PM_{10} and $PM_{2.5}$. Analysis indicates that the air monitoring station in urban and suburban areas exhibits nearly identical air quality patterns across the five-year period from 2019 to 2023. In 2019, Banting, situated in a suburban region, exhibited the greatest concentrations of PM_{10} (159.43 μg/m³) and $PM_{2.5}$ (143.87 μg/m³), while Shah Alam, located in an urban area, also recorded the peak concentrations of PM_{10} (156.55 μg/m³) and $PM_{2.5}$ (144.92 μg/m³) during the same year. This indicates robust relationships between PM_{10} and $PM_{2.5}$ in both regions. However, Banting demonstrated lesser associations with traffic-related pollution, implying that biomass burning is the primary cause.

Keywords: Air pollution trends; PM_{10}; $PM_{2.5}$; Urban; Suburban.