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Preliminary Assessment of Indoor Particulate Matter and Microclimate Conditions in Scientific Research Laboratories

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Laboratory activities can increase particulate matter (PM) levels and alter temperature and relative humidity (RH), affecting PM dispersion. Continuous exposure to poor air quality and adverse microclimates can negatively impact human health, highlighting the need to monitor

these in labs in scientific institutions. To determine indoor air quality and its association with microclimate conditions in laboratory areas of a scientific research institution. Concentrations of PM, temperature and RH were measured using Atmotube samplers during working hours. Descriptive statistics summarized PM and climate variables; t-tests and multiple linear regression assessed PM and Air Quality Score (AQS) variations with temperature and humidity

Generally the mean(SD) concentrations of PM1, PM2.5, PM10, temperature and RH in the environmental sample lab (16(7.0) μg/m3, 18.4(7.6) μg/m3, 19.9(8.0) μg/m3, 24.7(1.2) ℃ and 56.0(12.8)), where higher than those in the biological sample lab (9.1(2.3) μg/m3, 10.9(2.4) μg/m3, 11.9(2.5) μg/m3, 28.8(2.9) ℃ and 44.5(9.0)) with statistically significant differences (p= 0.000). AQS ranged from 3 to 92. Regression analysis showed the RH was a significant predictor of PM levels, while both RH and temperature exhibited statistically significant on the AQS (p=0.000). Temperature and RH significantly influence overall air quality in laboratories, underscoring the need for targeted monitoring and control strategies to reduce exposure risks and enhance occupational health within scientific research institutions.

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