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INDOOR/OUTDOOR CORRELATIONS REGARDING INDOOR AIR POLLUTION WITH PARTICULATE MATTER

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Abstract

This paper presents the results of a case study conducted between 2.04 and 24.04.2013 in order to establish the most relevant indicators that characterize the influence of outdoor air pollution, with particulate matter having a nominal diameter less than 2.5 μm (PM_{2.5}), on the quality of indoor air from a new building. The tests consisted in simultaneous determination of the daily average PM_{2.5} concentrations at four indoor sites and at one outside, nearby the building.

The average PM_{2.5} concentration was $38.41 \pm 7.4 \mu\text{g}/\text{m}^3$, but only 70% of the outdoor performed tests were above the daily limit of $35 \mu\text{g}/\text{m}^3$, set by the U.S. Environmental Protection Agency. The indoor air pollution with PM_{2.5} was lower than outdoor with an average concentration of $21.78 \pm 6.22 \mu\text{g}/\text{m}^3$.

Both Pearson's statistical correlation analysis and linear regression analysis showed a good direct correlation between indoor and outdoor PM_{2.5} concentrations, the proper insulation of the building and the absence of major indoor sources of PM_{2.5} particles. The results of this study demonstrated that for a new building the indoor/outdoor (I/O) ratio and infiltration factor (F_{in}) could give a correct estimation of the outdoor air pollution influence on the indoor air quality.

Further information could be provided by statistical correlation and linear regression analysis; the value of the intercept could be a good indicator of the presence of indoor sources.

Keywords: I/O ratio, indoor air, infiltration factor, penetration factor, PM_{2.5}

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