

Title: Monitoring exposure to airborne ultrafine particles in Lisbon, Portugal

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Abstract: The aim of this study is to contribute to the assessment of exposure levels of ultrafine particles (UFP) in the urban environment of Lisbon, Portugal, due to automobile traffic, by monitoring lung-deposited alveolar surface area (resulting from exposure to UFP) in a major avenue leading to the town centre during late Spring, as well as in indoor buildings facing it. This study revealed differentiated patterns for week days and weekends, consistent with PM_{2.5} and PM₁₀ patterns currently monitored by air quality stations in Lisbon. The observed ultrafine particulate levels could be directly related with the fluxes of automobile traffic. During a typical week, UFP alveolar deposited surface area varied between 35.0 and 89.2 $\mu\text{m}^2/\text{cm}^3$, which is comparable with levels reported for other towns such in Germany and United States. The measured values allowed the determination of the number of UFP per cm^3 , which are comparable to levels reported for Madrid and Brisbane. In what concerns outdoor/indoor levels, we observed higher levels (32-63%) outdoor, which is somewhat lower than levels observed in houses in Ontario.

Author Keywords: Airborne Ultrafine Particles; Urban Environment; Indoor/Outdoor

KeyWords Plus: Particulate Air- Pollution; Surface-Area; Number; Mass

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