

Ultrafine particles concentrations at different microenvironments during MILAGRO-MCMA2006.

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Objective.

Microenvironmental concentrations of PM_{2.5}, PM₁, PM_{0.5}, PM_{0.25} and PM_{<0.25} fractions were studied during the MILAGRO-MACM2006 campaign to observe their patterns in the different sites.

Methods.

Ultrafine samples were collected at outdoors and indoors at homes, schools and fixed sites at three selected sites in the MCMA: two urban sites: T0-Iztapalapa, D.F. and T1-Tecamac, México, and one semi-rural site T2-San Pedro, Hidalgo (T2). The sampling period was of 24 hr.

For the ultrafine particles monitoring the Sioutas cascade sampler with 25 and 37 mm Teflon filters and the Leland pump (9 L/m flow rate) were used (SKC Inc., St Louis, MI). Per each sampler four 25 mm and one 37 mm Teflon filters were used. The filters were analyzed by a gravimetric protocol (CENICA, 2003).

Results.

The outdoor PM_{2.5} particles were higher at T0 and T1 than T2 (19, 20 and 7 ug/m³, respectively), while the indoor concentrations were similar at the three sites (14, 18, 17 ug/m³). The PM₁ concentrations were higher at outdoors than indoors in all sites, T2 presented the highest concentrations (9.48 vs. 4.3 ug/m³). The PM_{0.5} concentrations were almost the same at outdoors and indoors, the highest concentration was observed at T1 (4.31 vs. 4.06 ug/m³). The PM_{0.25} outdoor concentrations were 3 times greater than the indoor ones at T0 and T1 (9.5 vs. 3.2 ug/m³). The outdoor PM_{<0.25} was the most abundant fraction in all the sites with the higher concentrations at T1 (50.67 vs. 23.74 ug/m³).

In a comparison between the total mass collected by the Sioutas sampler and the mass sampled with the SKC single stage PM_{2.5} sampler a good agreement was observed between them.

Conclusions.

The observed ultrafine particles concentrations, mostly the smaller ones, were higher in the three studied sites and showed a different pattern probably related with specific local sources in each of the sites. These levels of ultrafine particles present in the MCMA may be associated with some health problems such as production of air pollution-related oxidative stress effects in the studied populations.