

Exposure of children to air pollution in the industrial zone of Metropolitan Area of Mexico City

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An air quality monitoring in three schools located in the most important industrial zone at the Northeast of the Metropolitan Area of Mexico City (MAMC) was conducted in order to determine the exposure of children to toxics contained in PM₁₀. Particles were analyzed for metals, polycyclic aromatic hydrocarbons (PAH), organic and elemental carbon by ICP-AES, GC-MS and TOT (Sunset lab) respectively. Average concentration of PM₁₀ was $108.4 \pm 11.6 \mu\text{g}/\text{m}^3$. Most abundant metals were Fe, Zn and Pb with concentrations ranged by $1.1\text{-}5.4 \mu\text{g}/\text{m}^3$, $0.3\text{-}2 \mu\text{g}/\text{m}^3$, and $0.18\text{-}0.63 \mu\text{g}/\text{m}^3$ respectively; the sum of the seventeen PAHs varied from 1.4 to 3.3 ng/m³ where most abundant PAH were indene[1,2,3-c,d]pyrene, benzo[b]fluoranthene, benzo[a]anthracene, chrysene, and benzo[a]pyrene. The sum of the seven carcinogenic PAH contributed in average with the 48% of the total mixture. Carcinogenic potential of PAH were obtained using toxic equivalent factors determined by Nisbet and La Goy which varied from 0.3 to 0.6 ng/ m³ of benzo[a]pyrene equivalent (BAPEq), this value is lower than the standard proposed for the European Community of 1 ng/ m³, but higher than the standard from the United Kingdom of 0.25 ng/ m³. Principal component analysis for source apportionment showed that vehicular and industrial emissions are the main sources of PM in the zone. In general, the concentrations of particles as well as concentration of metals and PAHs are lower than concentrations measured six year before, showing that the established measures have improved the air quality. Nevertheless these PM₁₀ concentrations exceeded frequently the Mexican Standard and children are especially susceptible due to the higher risk to develop diseases if the exposure occurs at early age.