Variations of oxidative potential in airborne particle (PM_{10} and $PM_{2.5}$) collected in the Metropolitan Area of México City, using electron paramagnetic resonance (EPR) and its correlation with DNA degradation.

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Exposures to airborne particles, have been epidemiologically related to increases in human mortality and morbidity. Experimental studies have provided plausibility for those findings. Oxidative potential of the particles (PMs) has been related to different toxic effects, including DNA damage.

The aim of the present study is to evaluate the oxidative potential of urban PMs collected in different zones of the metropolitan area of Mexico Cit, using Electron Paramagnetic Resonance technology and its correlation with the potential of inducing *in vitro* DNA degradation.

PMs will be collected with Andersen High Vol. samplers (Model 1200 VFC) (24 hrs. @ 1.13 m^3/min, 5 weeks, 7 days a week) using nitro cellulose filters with a 3µm nominal pore (Sartorius, Germany). Sampling will be performed in the assigned sites in the north of the Metropolitan Area (T_0, and T_1). PMs will be recovered from each filter and stored under dark and dry conditions in a vial free of endotoxins. Samples collected at the National Autonomous University (South) will serve as controls.

PMs suspensions (0.33 mg/mL) will be prepared in the presence and the absence of hydrogen peroxide (0.05 M) in order to determine the capability of PMs of inducing OH radicals.

5,5—dimethyl—1—pirroline—N—oxide (DMPO) will be used as spin trapper to detect the presence of OH•. The concentration of OH• will be determined in the presence and absence of deferoxamine (1.25 mM) or manitol (1 mM). The samples will be analyzed in a RPE spectrometer JEOL JES TE-300 (magnetic field intensity between 70 y 600 mT). Spectra will be analyzed with an ESPRIT-382 v. 196 (JEOL) simulation program.

Balb c 3T3 confluent cultures will be used to obtain DNA with a commercial kit. (DNA isolation kit for cells and tissues; Boehringer, Mannheim, Germany).

DNA samples will be stored at 4°C until its use. 400 ng of DNA will be exposed to 5, 10, 20, 40, 80 and 160 µg/mL of PM_{10} y $PM_{2.5}$ during 24 hrs in a final volume of 40 µL. Experiments will be performed in the presence or absence of H_2O_2 (1 mM), deferoxamine (1.25 mM) and manitol (1 mM). Electrophoretic mobility will be evaluated in 1.5 % agarose gels. Mount St. Helen ash and cupper sulfite will serve as control.

This project will allow identification of the degree of correlation between oxidative potential and DNA degradation of Mexico City's PMs. High correlations are expected, probably mediated by Fenton like reactions. Oxidative potential will depend of the site of PM collection and the PM composition.

The results need to be incorporated with the rest of the compositional studies performed by other work groups participating in the sampling campaign, in order to establish composition-effects correlations.

The purpose of the present project is to identify an air sampling methodology that could indicate the toxic potential of the PM. PM composition would be related with its toxic potential. Validation of the EPR methodology to evaluate the potential toxicity of PM, in time and space, would be an important tool to indicate the risk related to exposure to PM.