

## 2016 CONFERENCE

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### Mutagenic and Genotoxic Effect of PM<sub>0.5</sub> in Different Italian Towns: The MAPEC (Monitoring Air Pollution Effects on Children for supporting public health policy) Study

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#### Introduction

Exposure to particulate matter (PM) is associated with respiratory and cardiovascular disease and lung cancer. The finest fractions of PM (PM<sub>2.5</sub> µm and less) play the major role in causing chronic diseases. The structure and composition of PM influence the biological properties of particles. The aim of the MAPEC study is to evaluate the association between air pollution and early biomarkers in oral mucosa of children recruited from first grade schools of 5 Italian towns characterized by different PM levels.

#### Methods

To evaluate children exposure, PM<sub>0.5</sub> samples (n=20) were collected (72h) in the school area on the same days of biological samplings (winter 2014-2015) using a high-volume air sampler. PM<sub>0.5</sub> organic extracts were chemically analyzed (PAH, Nitro-PAH) and tested on A549 by the comet assay and micronucleus test and on Salmonella strains (TA100, TA98, TA98NR and YG1021) by Ames test.

#### Results

Results showed that PM<sub>0.5</sub> represents a high variable PM<sub>10</sub> percentage (range 19.6-63%). PM<sub>10</sub> concentration were generally lower than 50µg/m<sup>3</sup> (EU daily limit). All PM<sub>0.5</sub> extracts showed a mutagenic effect with TA98 strain (net revertant/m<sup>3</sup> range 0.3-1.5) and suggested the presence of indirect mutagens, while lower effect was observed with TA100 strain. The results with the TA98NR and YG1021 strains showed the presence of nitroaromatic compounds as confirmed by the chemical analysis. No genotoxic or oxidative effect of PM<sub>0.5</sub> extracts was observed using the comet assay (with/without Fpg enzyme) and micronucleus test except for some sporadic samples. The low biological effect observed could be related to the low level of air pollution observed in this winter sampling associated to a high atmospheric instability.

#### Conclusions

For a greater understanding of the relationship between PM size, composition and biological effects the results obtained in this study suggest to investigate the biological effect of the other PM fractions and in particular of the PM<sub>0.5-1</sub> fraction.



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