



# MUTAGENIC/GENOTOXIC EFFECT OF PM<sub>0.5</sub> COLLECTED IN FIVE ITALIAN TOWNS IN TWO SEASONS: RESULTS OF THE MAPEC STUDY



Bonetta Sa.<sup>1</sup>, Bonetta Si<sup>1</sup>, Ceretti E.<sup>2</sup>, Viola G.C.V.<sup>2</sup>, Zerbini I.<sup>2</sup>, Romanazzi V.<sup>1</sup>, Levorato S.<sup>3</sup>, Salvatori T.<sup>3</sup>, Vannini S.<sup>3</sup>, Schilirò T.<sup>1</sup>, Carducci A.<sup>4</sup>, Pignata C.<sup>1</sup>, Grassi T.<sup>5</sup>, Gilli G.<sup>1</sup>, Bonizzoni S.<sup>6</sup>, Bonetti A.<sup>7</sup>, Carraro E.<sup>1</sup>, Gelatti U.<sup>2</sup>, MAPEC\_LIFE Study Group.

**LIFE12 ENV/IT/000614**  
**Monitoring air pollution effects on children for supporting Public Health Policy**

**MULTICENTRIC PROJECT (5 Italian town)**

**Beneficiary:**  
 Type of beneficiary: University  
 Name of beneficiary: University of Brescia  
 Postal address: Piazza Del Mercato, 15  
 I - 25121 Brescia  
 ITALY  
 Phone: +39 0303717692  
 Fax: +39 0303717688  
 Email: gelatti@med.unibs.it  
 Name of contact person: Umberto GELATTI

**Duration of project:**  
 36 months (01/01/2014 - 31/12/2016)

**Total budget in euro:**  
 2,328,852.00

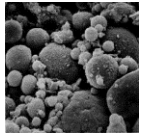
**EC contribution in euro with %:**  
 1,153,354.00 (50.00%)

**Theme:** Risk management: Human health protection - Risk assessment and monitoring

- to evaluate the associations between air pollution and biomarkers of early biological effects in oral mucosa cells of 6-8 year old children recruited from first grade schools
- to propose a model for estimating the global risk of early biological effects due to air pollutants and other factors in school children



**Aim: to evaluate children's exposure to urban air pollution, investigating the mutagenic and genotoxic effect of PM<sub>0.5</sub> samples**



**PM<sub>0.5</sub>  
SCHOOLS**



- PM in the school area, on the same days of biological samplings
- HiVol multistage cascade impactor (72 h) and glass fiber filters
- 2 season (winter 2014 and spring-summer 2015)
- Different fractions: 10.0-7.2, 7.2-3.0, 3.0-1.5, 1.5-0.95, 0.95-0.49, and <u>0.5 μm</u>



✓ Gravimetric analysis

✓ Sample extraction

(PM<sub>0.5</sub>)



**CHEMICAL ANALYSES** (PAHs, Nitro-PAHs...)

**BIOLOGICAL ANALYSES**

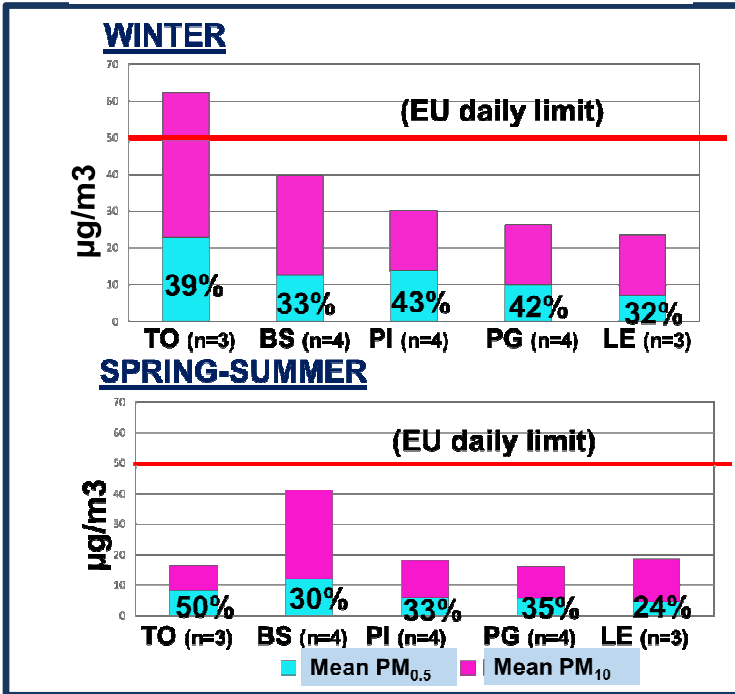
**COMET ASSAY (+/-Fpg)**  
**MICRONUCLEUS TEST**  
**CITOTOXICITY TEST**

Human cells  
- A549

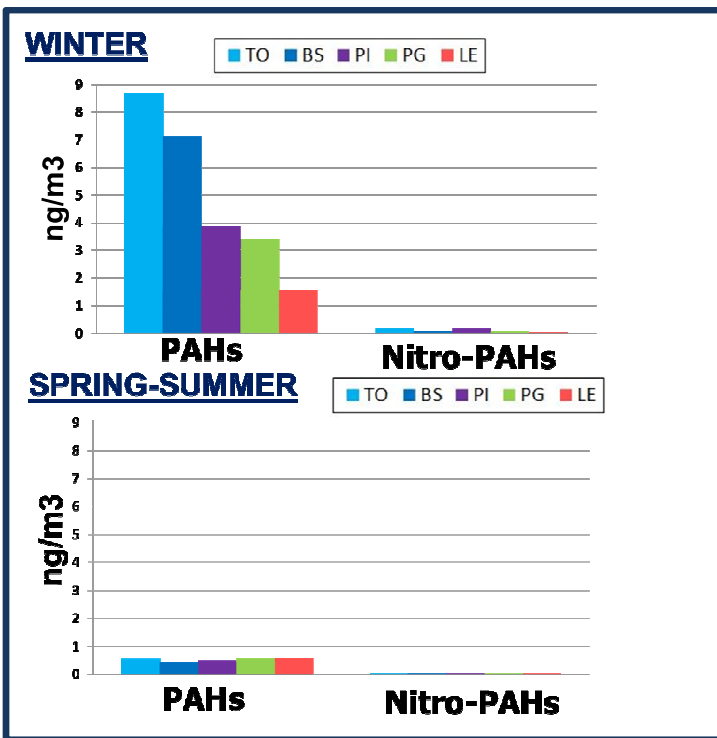
**AMES TEST**  
*S.typhimurium*

-Strain TA 98  
-Strain TA 100 (+/- S9)  
-Strain TA 98NR  
-Strain YG1021

# GRAVIMETRIC ANALYSIS



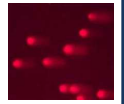
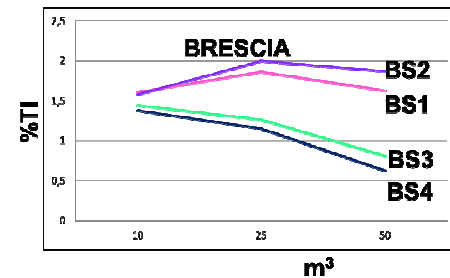
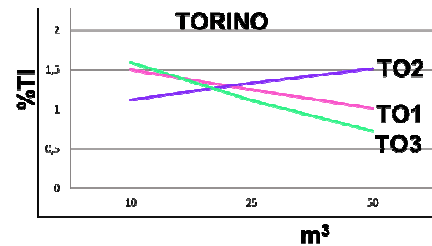
# CHEMICAL ANALYSIS



# AMES TEST

SITE	Net revertants/m <sup>3</sup>															
	- S9				+ S9											
	TA100	TA98	TA98NR	YG1021	TA100	TA98	TA98NR	YG1021								
<b>BRESCIA</b>																
BS 1	-	-	0.5	-	-	-	7.7	0.8	-	-	-	-	-	-	12.9	0.7
BS 2	-	-	0.4	-	-	-	10.7	1.8	-	-	0.9	-	-	-	16.8	2.6
BS 3	-	-	-	-	-	-	9.7	0.9	-	-	0.6	-	-	-	14.6	1.1
BS 4	-	-	0.6	-	-	-	7.6	0.8	-	-	1.0	-	-	-	20.0	1.0
<b>TORINO</b>																
TO 1	4.8	-	1.3	-	1.0	-	30.8	1.7	-	-	1.5	-	0.9	-	34.3	1.6
TO 2	3.0	-	1.5	-	1.2	-	16.5	2.3	-	-	1.9	-	0.9	-	35.8	1.5
TO 3	-	-	0.9	-	0.6	-	17.7	0.7	-	-	1.0	-	0.7	-	36.6	0.8
<b>PISA</b>																
PI 1	-	-	-	-	-	1.9	0.9	-	-	-	-	-	-	3.0	1.0	
PI 2	-	-	-	-	-	2.9	0.4	-	-	0.7	-	-	-	7.0	0.6	
PI 3	-	-	-	-	-	7.4	2.3	-	-	0.9	-	-	-	14.3	3.5	
PI 4	-	-	0.8	-	-	-	6.8	1.0	-	-	0.8	-	-	-	19.8	0.9
<b>PERUGIA</b>																
PG 1	-	-	0.5	-	-	-	7.2	7.1	-	-	0.9	-	-	-	16.4	1.5
PG 2	-	-	0.3	-	-	-	7.1	0.6	-	-	0.6	-	-	-	17.8	17.8
PG 3	-	-	-	-	-	-	3.0	0.8	-	-	-	-	-	-	7.2	7.2
PG 4	-	-	0.4	-	-	-	3.4	0.4	-	-	-	-	-	-	10.1	0.1
<b>LECCE</b>																
LE 1	-	-	0.4	-	-	-	1.7	1.7	-	-	-	-	-	-	4.8	4.7
LE 2	-	-	0.5	-	0.4	-	4.5	4.5	-	-	0.6	-	-	-	8.2	8.2
LE 3	-	-	-	-	-	-	1.4	1.4	-	-	-	-	-	-	2.5	2.5

# COMET ASSAY



# MICRONUCLEUS TEST

