

Mutagenic and genotoxic effect of PM_{0.5} in different Italian towns: the MAPEC_LIFE study



MAPEC_LIFE Project – Monitoring air pollution effects on children for supporting public health policy. Funded by European LIFE+ Programme (LIFE12 ENV/IT/000614)

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CONCLUSIONS:

- Results may be helpful for public health policies suggesting that PAHs, Nitro-PAHs and genotoxic evaluation (Ames test) of PM_{0.5} are useful for air quality assessment
- Chemical and toxicological evaluation of PM fractions could improve the air quality assessment

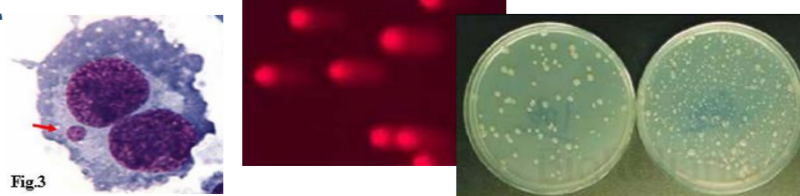
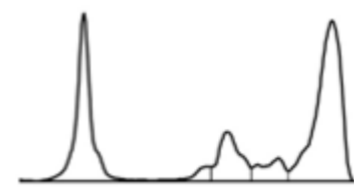
AIM: Evaluate children exposure to urban air pollution investigating the genotoxic effect of PM_{0.5} samples

METHODS:

- HiVol cascade impactor
- 2 season: (winter vs spring-summer)
- 5 towns

PM_{0.5}:

- gravimetric analysis
- chemical analysis (PAHs, nitro-PAHs)
- biological test (Ames test, Comet assay, MN test)



RESULTS:

AMES TEST:

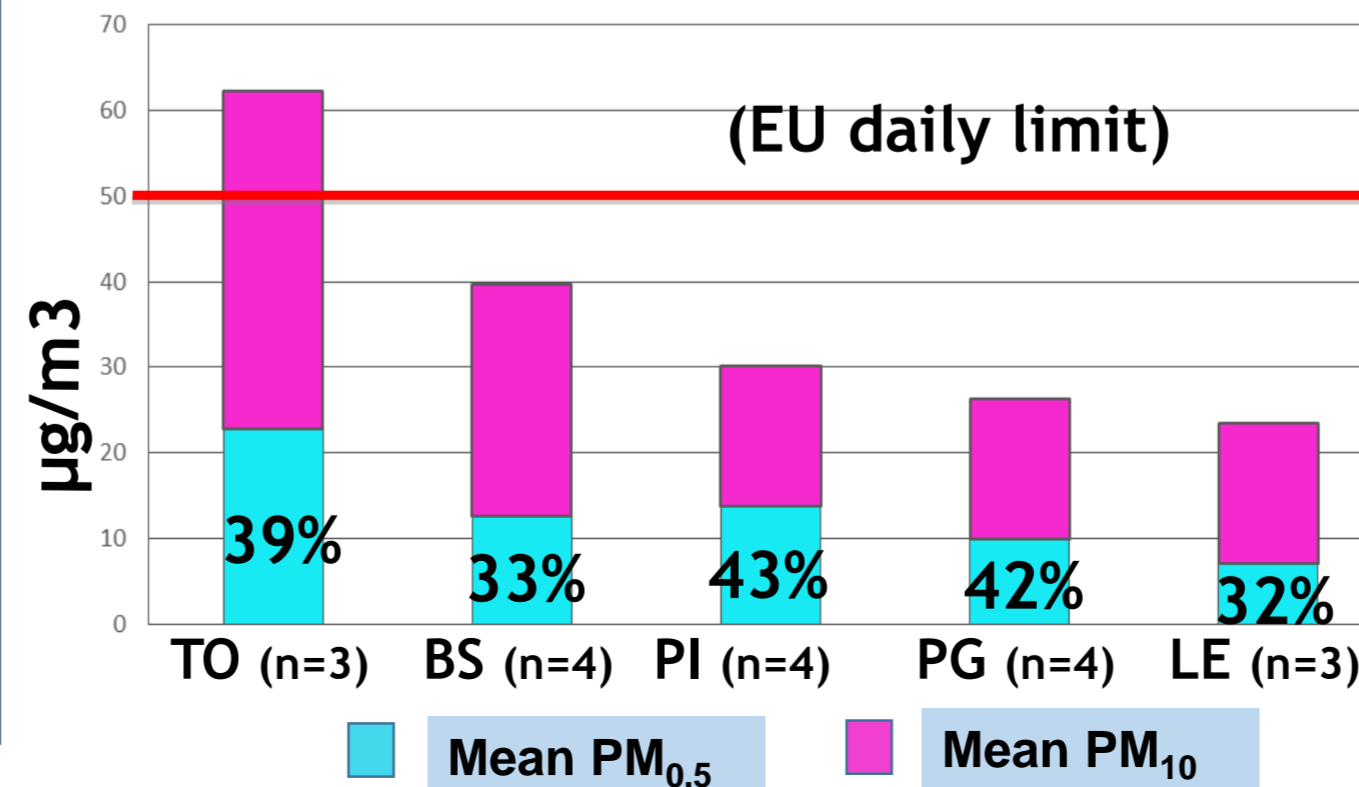
- Higher mutagenic effect in winter (in particular YG1021)
- Lower effect in spring-summer
- Association with chemical pollutants

COMET ASSAY AND MN TEST: No genotoxic or oxidative effect of PM_{0.5} in both season



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

GRAVIMETRIC ANALYSIS: WINTER



RESULTS:

- PM_{0.5}: very variable PM₁₀ percentage
- PM₁₀: generally < 50µg/m³; highest values in the Padana plain (winter)
- PAHs-NitroPAHs > in winter