

## **Biomass combustions and biomonitoring of airborne particulate: suggestions for preventive actions?**

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Biomass combustions generated by both forest fires and home heating in urban centers produce a huge amount of pollutants which can be adsorbed on the particulate matter (PM) and subsequently carried within the human respiratory system. Moreover the occurrence of forest fires is growing due to climate change and it poses a great risk both to environment and to human health.

The aim of this study was to investigate different biological effects of PM collected during a big forest fires phenomenon that occurred in Piedmont (Northern Italy) in autumn 2017. PM<sub>2.5</sub> and PM<sub>10</sub> were collected near the forest fires and in three other areas of Piedmont (two urban and one rural areas). Mutagenicity of organic extracts was assessed on different strains of *Salmonella typhimurium* using Ames assay while cytotoxicity (WST-1 and LDH assays) and genotoxicity (Comet assay) were evaluated on human bronchial epithelial cells (BEAS-2B). The estrogenic activity of organic extracts was estimated through a gene reporter assay on MELN cells, in order to analyse the presence of endocrine disruptors adsorbed on PM.

The contribution of fires to urban mutagenicity was low moreover samples did not induce any significant cytotoxic or genotoxic effect. A slight increase in estrogenic activity was

detected in samples from urban and rural areas, while an anti-estrogenic effect was induced by forest fires samples. The biological effects induced by extracts were low respect to what is normally observed in urban sites but are probably due to the tested concentrations, which are closer to realistic human exposure but are insufficient to show differences among areas. These findings may be helpful for public health policies, suggesting to include in the monitoring of traditional parameters the contribution of biomass combustion to the air quality. Finally the PM biomonitoring could improve the air quality assessment, which is essential to plan strategies focused on environment and health protection.

**Key messages:**

- The PM biomonitoring could improve the air quality assessment, which is essential to plan strategies focused on environment and health protection.
- Public health policies should consider the contribution of biomass combustion to the air quality in monitoring plans.