

## **An influence of PAHs, gaseous pollutants, and meteorological conditions on the mutagenic activity of soluble organic fraction of airborne particles collected in central Tokyo**

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The extent of human exposure to airborne PAHs is dependent on the size of the airborne particles containing PAHs as well as their concentration. Thus, from hygienic point of view, the following two studies are important: To know how much portion of total airborne PAHs presents in PM<sub>2.5</sub>, which are efficiently inhaled and to elucidate the factors that influence the concentration and lifetime of PAHs, such as the concentration of gaseous pollutants and the meteorological conditions such as ambient temperature or wind speed and direction. However, both of the two have not been sufficiently understood yet. In this work, PM<sub>2.5</sub> and PM<sub>10</sub> were collected over 24-h interval in winter at a typical urban source site in central Tokyo to analyze PAHs and the bacterial mutagenicity of soluble organic fraction (SOF) of the samples. The concentrations of NO<sub>x</sub> and oxidants were also monitored to examine their relevance to the variation of PAH concentration and the mutagenicity.

The mutagenicity of the SOF and concentrations of PAHs were higher in autumn and winter than those in spring and summer while mass concentration of PM<sub>10</sub> did not vary significantly with season. High PM<sub>10</sub> mass concentrations were observed in March and it was attributed to the yellow sand particles from China. Actually such high concentrations were observed at several sites in Tokyo. A good correlation between the mutagenicity and the concentration of PAHs throughout the year indicates that the mutagenicity is originated from vehicular exhaust at this site. Higher mutagenicity and PAH concentrations in winter are considered to be due to lower mixing height of the air mass containing direct emissions at high concentration as well as lower solar intensity, which considerably affects the residence time of airborne mutagens than in summer. The concentrations of PAHs obtained from PM<sub>2.5</sub> were identical to those from PM<sub>10</sub> and the mass concentration of PM<sub>2.5</sub> reached 80% of that of PM<sub>10</sub>. Diurnal variations of the mutagenicity and PAH concentrations should be investigated by comparing with those of nitrogen monoxide and PM<sub>2.5</sub> concentration.