

E2-39 Development of a low cost sampling and analytical method to determine polycyclic aromatic hydrocarbons in air

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A sampler was constructed for simultaneous collection of airborne particulate matter and volatiles. The sampler consists of 2 components to collect the gas and particulate phases separately. This facilitates the quantitation of airborne pollutants with respect to their distribution in air as gases or particulate matter. The front end of the sampler is equipped with a filter holder which can collect the particulate matter without collecting the gas phase components. Thus particle stripped air is passed through a sorbent bed to collect the gas phase components based on their affinity to the sorbent. The system was designed to use both the components simultaneously or individually as desired.

Furthermore, the filter holder can accommodate several filters at a time which facilitates the segregation of the particulate matter according to their sizes. After demonstrating the phase separation, the sampler was exclusively used to collect particulate matter emitted from a diesel vehicle.

Polycyclic aromatic hydrocarbons (PAHs) are a group of compounds which have demonstrated the carcinogenic and mutagenic activities to humans. The particulate phase PAHs were extracted from the filter after 8 h Soxhlet extraction using dichloromethane as the solvent and cleaned using an alumina column. The cleaned extract was analysed using a high-performance liquid chromatograph equipped with a fluorescence detector. The identity of the signals was determined based on the relative retention times of the compounds with respect to a standard mixture. The identities of the signals were confirmed by analysing the fluorescence intensities of PAHs at different excitation and emission conditions. This method enables qualitative identification of PAHs without using standards. Adaptation of such an analytical method is useful for preliminary investigation of PAHs at a minimal cost, avoiding the use of expensive standards.