

A rapid preconcentration method using modified GP-MSE for sensitive determination of trace semivolatile organic pollutants in the gas phase of ambient air

ABSTRACT

A sensitive concentration method utilising modified gas-purge microsyringe extraction (GP-MSE) was developed. Concentration (reduction in volume) to a microlitre volume was achieved. PAHs were utilised as semivolatile analytes to optimise the various parameters that affect the concentration efficiency. The injection rate and temperature were the key factors that affected the concentration efficiency. An efficient concentration (75.0–96.1%) of PAHs was obtained under the optimised conditions. The method exhibited good reproducibility (RSD values that ranged from 1.5 to 9.0%). The GP-MSE concentration method enhances the volume reduction (concentration factor), leading to a low method detection limit (0.5–15 ng L⁻¹). Furthermore, this method offers the advantage of small-volume sampling, enabling even the detection of diurnal hourly changes in the concentration of PAHs in ambient air. Utilising this method in combination with GC–MS, the diurnal hourly flux of PAHs from the gas phase of ambient air was measured. Indeed, the proposed technique is a simple, fast, low-cost and environmentally friendly.

Keyword: Gas purge; Microextraction; Concentration; Atmospheric; Trace pollutants