

**Dispersive liquid-liquid microextraction combined with dispersive solid phase extraction for gas chromatography-mass spectrometric determination of polycyclic aromatic hydrocarbons in aqueous matrices**

ABSTRACT

This study describes a dispersive liquid–liquid microextraction combined with dispersive solid-phase extraction method based on phenyl-functionalized magnetic sorbent for the preconcentration of polycyclic aromatic hydrocarbons from environmental water, sugarcane juice, and tea samples prior to gas chromatography with mass spectrometry analysis. Several important parameters affecting the extraction efficiency were investigated thoroughly, including the mass of sorbent, type and volume of extraction solvent, extraction time, type of desorption solvent, desorption time, type and amount of salt-induced demulsifier, and sample volume. Under the optimized extraction and gas chromatography-mass spectrometric conditions, the method revealed good linearity (10–100000 ng/L) with coefficient of determination ( $R^2$ ) of  $\geq 0.9951$ , low limits of detection (3–16 ng/L), high enrichment factors (61–239), and satisfactory analyte recoveries (86.3–109.1%) with the relative standard deviations  $< 10\%$  ( $n = 5$ ). The entire sample preparation procedure was simple, rapid and can be accomplished within 10 min. This method was applied (after pretreatment) to 30 selected samples, and the presence of studied analytes was quantified in 17 samples.

**Keyword:** Aqueous matrices; Dispersive liquid-liquid microextraction; Dispersive solid-phase extraction; Gas chromatography; Polycyclic aromatic hydrocarbons