

Development and Application of Amphiphilic Adsorbent Materials for Monitoring Trace Emerging Contaminants in Water

Jiao Wei*

School of the Environment, Nanjing University, Nanjing, China

Email address:

Jiaowei1912@126.com (Jiao Wei)

*Corresponding author

Abstract

A novel amphiphilic porous adsorbent material was prepared via micelle-emulsion polymerization for use as a solid-phase extraction (SPE) sorbent. In parallel, a fully automated SPE sampling device (LVED) was developed for on-site large-volume enrichment of trace contaminants in water. Using this newly developed device, an LVED-HPLC-MS/MS method was established for the rapid determination of 40 trace emerging contaminants in environmental water samples. The large-volume SPE conditions were systematically optimized, and method validation demonstrated good linearity ($r^2 \geq 0.992$) and low limits of detection ranging from 0.002 to 0.10 ng/L. The method was applied to on-site enrichment and detection of emerging contaminants in real environmental water samples, with spiked recoveries for various contaminants ranging from 78.0% to 107%, and actual detected concentrations of some contaminants between 0.05 and 90.5 ng/L. This method represents a simple, rapid, and efficient approach for on-site large-volume extraction of trace emerging contaminants in environmental waters, showing broad application and promotion potential.

Keywords

Emerging Contaminants, Trace Enrichment, In-situ Solid-phase Extraction