

Determination of partition coefficient and analysis of nitrophenols by three-phase liquid-phase microextraction coupled with capillary electrophoresis

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Abstract	<p>A three-phase hollow fiber liquid-phase microextraction method coupled with CE was developed and used for the determination of partition coefficients and analysis of selected nitrophenols in water samples. The selected nitrophenols were extracted from 14 mL of aqueous solution (donor solution) with the pH adjusted to pH 3 into an organic phase (1-octanol) immobilized in the pores of the hollow fiber and finally backextracted into 40.0 μ L of the acceptor phase (NaOH) at pH 12.0 located inside the lumen of the hollow fiber. The extractions were carried out under the following optimum conditions: donor solution, 0.05 M H₃PO₄, pH 3.0; organic solvent, 1-octanol; acceptor solution, 40 μ L of 0.1 M NaOH, pH 12.0; agitation rate, 1050 rpm; extraction time, 15 min. Under optimized conditions, the calibration curves for the analytes were linear in the range of 0.05-0.30 mg/L with $r(2) > 0.9900$ and LODs were in the range of 0.01-0.04 mg/L. with RSDs of 1.25-2.32%. Excellent enrichment factors of up to 398-folds were obtained. It was found that the partition coefficient (K-a/d) values were high for 2-nitrophenol, 3-nitrophenol, 4-nitrophenol, 2,4-dinitrophenol and 2,6-dinitrophenol and that the individual partition coefficients (K-org/d and K-a/org) promoted efficient simultaneous extraction from the donor through the organic phase and further into the acceptor phase. The developed method was successfully applied for the analysis of water samples.</p>
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