A polyaniline/pencil lead solid phase microextractor for trace phthalate esters
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Abstract: A solid-phase microextraction (SPME) fiber was fabricated by electrodeposition of silver-incorporated polyaniline film on a pencil lead fiber core. This fiber was used to extract trace phthalate esters and later thermally desorbed at an injection port of a gas chromatograph coupled with an electron capture detector (GC-ECD). Under the optimum conditions, linearity of two phthalate esters, benzyl butyl phthalate (BBP) and bis(2-ethylhexyl) phthalate (DEHP) were in the range of 0.05-5.00 mg L$^{-1}$ and 0.25-5.00 mg L$^{-1}$ with a coefficient of determination ($R^2$) greater than 0.99. Limits of detection of 0.030 and 0.24 mg L$^{-1}$ and limits of quantification of 0.10 and 0.79 mg L$^{-1}$ were obtained for BBP and DEHP. The developed method was utilized for the simultaneous extraction of spiked BBP and DEHP in deionized water (1.0 mg L$^{-1}$). A high preconcentration factor and satisfactory recoveries were achieved. This study indicated that the developed polyaniline/pencil lead SPME fiber can be used to extract BBP and DEHP. Further optimization of the extraction and thermal desorption conditions would make this sorbent applicable for the determination of phthalate esters contaminated in food and environmental samples.

Keywords: Sample preparation; Plasticizer; Pencil lead fiber; Electrodeposition; Thermal desorption