

عنوان مقاله:

Combining magnetic solid-phase extraction and dispersive liquid-liquid microextraction methods for preconcentration environmental pollutants

محل انتشار:

بیستمین کنگره شیمی ایران (سال: 1397)

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خلاصه مقاله:

In this study, the combination of two methods of magnetic solid-phase extraction (MSPE) and dispersive liquid-liquid microextraction (DLLME) was used to preconcentration of polycyclic aromatic hydrocarbons (PAHs) in aqueous samples. To perform of MSPE procedure, a magnetic graphene modified with polyaniline (Fe₃O₄@GO/PANI) was synthesized and characterized by scanning electron microscopy, Fourier-transform infrared spectroscopy and vibrating sample magnetometer. The PAH compounds were initially extracted by MSPE and the desorption solvent was used as a dispersing solvent in the DLLME method. Finally, the extraction solvent was injected into the gas chromatography for the determination of polycyclic aromatic hydrocarbons. The factors affecting the efficiency of both extraction methods include adsorbent amount, desorption conditions, extraction time, salt concentration, sample pH, extraction solvent and volume, which were investigated and optimized [1,2]. The method showed good linearity in the range 0.03–100 ng mL⁻¹ for all analytes, with correlation coefficients ranging from 0.9920 to 0.9948. The method detection limits (S/N=3) were in the range of 0.01–0.05 ng mL⁻¹ and the limits of quantification (S/N=10) between 0.03–0.1 ng mL⁻¹. Repeatability of the method was assessed through five consecutive extractions of independently prepared solutions at concentrations of 0.1, 10 and 100 ng mL⁻¹ of the compounds. The repeatability was obtained in the range of 3.1–8.2%. The proposed method was successfully applied in the analysis of PAHs in environmental samples (tap, well and wastewater samples). The recoveries of the method ranged between 89.6–98.1%. The procedure proved to be efficient, environmentally friendly and fast.

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