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**Trace determination of volatile polycyclic aromatic hydrocarbons in natural waters by magnetic ionic liquid-based stir bar dispersive liquid microextraction****Juan L. Benedé<sup>a</sup>, Jared L. Anderson<sup>b,\*</sup>, Alberto Chisvert<sup>a,\*</sup>**<sup>a</sup>Department of Analytical Chemistry, University of Valencia, 46100 Burjassot, Valencia, Spain<sup>b</sup>Department of Chemistry, Iowa State University, Ames, IA, 50011, USA

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**Abstract**

In this work, a novel hybrid approach called stir bar dispersive liquid microextraction (SBDLME) that combines the advantages of stir bar sorptive extraction (SBSE) and dispersive liquid-liquid microextraction (DLLME) has been employed for the accurate and sensitive determination of ten polycyclic aromatic hydrocarbons (PAHs) in natural water samples. The extraction is carried out using a neodymium stir bar magnetically coated with a magnetic ionic liquid (MIL) as extraction device, in such a way that the MIL is dispersed into the solution at high stirring rates. Once the stirring is ceased, the MIL is magnetically retrieved onto the stir bar, and subsequently subjected to thermal desorption (TD) coupled to a gas chromatography-mass spectrometry (GC-MS) system. The main parameters involved in TD, as well as in the extraction step affecting the extraction efficiency (i.e., MIL amount, extraction time and ionic strength) were evaluated. Under the optimized conditions, the method was successfully validated showing good linearity, limits of detection and quantification in the low ng L<sup>-1</sup> level, good intra- and inter-day repeatability (RSD < 13 %) and good enrichment factors (18 – 717). This sensitive analytical method was applied to the determination of trace amounts of PAHs in three natural water samples (river, tap and rainwater) with satisfactory relative recovery values (84 – 115 %), highlighting that the matrices under consideration do not affect the extraction process.

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