

研究论文

## 分散液-液微萃取-高效液相色谱法测定环境水样中的多环芳烃

张建华<sup>1,2</sup>, 黄颖<sup>3</sup>, 陈晓秋<sup>2</sup>, 陈金花<sup>2</sup>, 李辉<sup>3</sup>, 陈国南<sup>1\*</sup>

1. Ministry of Education Key Laboratory of Analysis and Detection Technology for Food Safety, Department of Chemistry, Fuzhou University, Fuzhou 350002, China; 2. Fujian Environmental Monitoring Center, Fuzhou 350003, China; 3. College of Chemistry and Materials Science, Fujian Normal University, Fuzhou 350108, China

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**摘要** 建立了简便、快速、有效的分散液-液微萃取-高效液相色谱-荧光检测(DLLME-HPLC-FLD)测定环境水样中15种多环芳烃(PAHs)的方法。重点探讨了萃取剂的种类和用量、分散剂的种类和用量以及萃取时间等对PAHs萃取效率的影响。在优化的条件下,评价了方法的可靠性。15种PAHs在0.01~10 μg/L范围内呈良好的线性关系,相关系数 $r$ 均不小于0.9913,峰面积的相对标准偏差(RSD)在2.3%~4.7%之间( $n=6$ )。在优化条件下,富集因子和萃取回收率良好,分别为674~1032和67.4%~103.2%,15种PAHs的检出限( $S/N=3$ )在0.0003~0.002 μg/L之间。建立的方法应用于敖江水样中PAHs的检测,平均加标回收率在79.5%~92.3%之间,RSD在4.3%~6.7%范围内( $n=5$ )。该方法适用于环境水样中痕量PAHs的分析。

**关键词** [分散液-液微萃取](#) [高效液相色谱](#) [多环芳烃](#) [环境水样](#)

## Dispersive liquid-liquid microextraction coupled with high performance liquid chromatography for the determination of polynuclear aromatic hydrocarbons in environmental water samples

ZHANG Jianhua<sup>1,2</sup>, HUANG Ying<sup>3</sup>, CHEN Xiaoqiu<sup>2</sup>, CHEN Jinhua<sup>2</sup>, LI Hui<sup>3</sup>, CHEN Guonan<sup>1\*</sup>

1. Ministry of Education Key Laboratory of Analysis and Detection Technology for Food Safety, Department of Chemistry, Fuzhou University, Fuzhou 350002, China; 2. Fujian Environmental Monitoring Center, Fuzhou 350003, China; 3. College of Chemistry and Materials Science, Fujian Normal University, Fuzhou 350108, China

### Abstract

A simple, rapid and effective method, the dispersive liquid-liquid microextraction coupled with high performance liquid chromatography-fluorescence detection (DLLME-HPLC-FLD), has been developed for the extraction and determination of polynuclear aromatic hydrocarbons (PAHs) in environmental water samples. The factors relevant to the microextraction efficiency, such as type and volume of dispersion agent and extraction solvents and the extraction time were investigated and optimized. Under the optimized extraction conditions, the reliability of the proposed method was evaluated. The linear response of this method was in the range of 0.01~10 μg/L ( $r \geq 0.9913$ ), the relative standard deviations (RSDs) of peak area for 0.05 μg/L PAHs were in the range of 2.3%~4.7% ( $n=6$ ). At room temperature, the method exhibited excellent enrichment factors and good recoveries, 674~1032 and 67.4%~103.2% respectively. The detection limits ( $S/N=3$ ) were in the range of 0.0003~0.002 μg/L. The developed method was applied to the determination of 15 PAHs in the water from Aojiang river, the average recoveries were 79.5%~92.3% with RSD of 4.3%~6.7% ( $n=5$ ). The developed method is suitable for the analysis of trace PAHs in environmental water samples.

**Key words** [dispersive liquid-liquid microextraction](#) [high performance liquid chromatography \(HPLC\)](#) [polynuclear aromatic hydrocarbons](#) [environmental water samples](#)

DOI:

通讯作者 陈国南 [gnchen@fzu.edu.cn](mailto:gnchen@fzu.edu.cn)

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