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固相微萃取-气相色谱法测定白洋淀水样中的邻苯二甲酸酯类化合物

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Determination of phthalate esters in Baiyangdian lake by solic and gas chromatography

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摘要 建立了固相微萃取(SPME)-气相色谱法(GC)分析环境水样中痕量邻苯二甲酸酯类化合物(PAEs)的方法。选用100 μm聚二甲基
(PDMS)萃取纤维,在磁力搅拌条件下,对水样中的PAEs萃取富集60 min,然后直接注入GC进样口,在250 ℃温度下解吸4 min后进行
种PAEs能得到充分提取和分离。方法的重现性(以相对标准偏差(RSD)计为0.2%～9.7%,检出限为0.02～0.83 μg/L。将本方法应
水样中PAEs的分析检测发现,样品中邻苯二甲酸二异丁酯(DIBP)、邻苯二甲酸二丁酯(DBP)、邻苯二甲酸二(2-乙基己基)酯(DEHP)
较高。对水样进行两个浓度水平(2.5 μg/L和5.0 μg/L)的加标试验,加标回收率为75.3%～111.0%,RSD为2.1%～8.0%(n=3),
水样中痕量PAEs的测定要求。

关键词： 固相微萃取 气相色谱 邻苯二甲酸酯类化合物 白洋淀

Abstract： A simple method based on solid-phase microextraction (SPME) coupled with gas chromatography-f
ionization detection (GC-FID) was developed for the determination of trace amounts of phthalate esters (PAEs
environment water samples. In this method, polydimethylsilane (PDMS) fiber was chosen to enrich the PAEs. T
were extracted for 60 min using the PDMS fiber under stirring with a magnetic stir bar, after that the fiber was
introduced into the GC injector port and the extract was desorbed at 250 ℃ for 4 min. Under the optimized co
13 PAEs can be extracted completely and separated well. The limits of detection (LOD) were from 0.02 to 0.83
(S/N=3). The water samples collected from Baiyangdian lake were successfully analyzed using the proposed m
phthalic acid, bis-iso-butyl ester (DIBP), phthalic acid, bis-butyl ester (DBP) and phthalic acid, bis-2-ethylhexyl
(DEHP) were detected in all the samples. The spiked (2.5 μg/L and 5.0 μg/L) recoveries were in the range o
~111.0% and the relative standard deviations (RSDs) were between 2.1% and 8.0% (n=3). The results show
this would be a valuable method for PAEs analysis in environmental water samples.

Keywords： solid-phase microextraction (SPME) gas chromatography (GC) phthalate esters (PAEs) Baiyar

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