

研究论文

## 三相中空纤维式液相微萃取用于快速富集血浆中的尼古丁

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**摘要** 建立了一种以三相中空纤维式液相微萃取(TP-HF-LPME)进行样品前处理,采用高效液相色谱快速、准确测定血浆中尼古丁含量的方法。研究表明该方法集萃取、富集、净化为一步,极大地简化了传统血浆成分测定的前处理过程,是一种快速、有效、绿色的前处理方法。方法的线性范围为0.1~50 mg/L,相关系数( $r^2$ )为0.9996,检测限为0.05 mg/L(信噪比为3),相对标准偏差小于5%。

**关键词** [液相微萃取](#) [样品前处理](#) [高效液相色谱](#) [尼古丁](#) [血浆](#)

分类号

## Enrichment of Nicotine in Plasma with Three-Phase Hollow Fiber Based Liquid Phase Microextraction

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### Abstract

A novel method for fast determination of nicotine in plasma was established by using high performance liquid chromatography (HPLC) coupled with a three-phase hollow fiber based liquid phase microextraction (TP-HF-LPME) technique for sample preparation. The microextraction was mediated by the pH difference between the environment inside and outside of an organic phase immobilized in the pores formed in the wall of a polypropylene hollow fiber. The pH value of the medium outside the organic phase was adjusted by adding a dilute KOH solution to form a basic donor phase while the pH value of the inner media was set to pH 3 to form an acceptor phase using a 10 mmol/L KH<sub>2</sub>PO<sub>4</sub> solution. On working conditions, neutral nicotine molecules were firstly extracted from the original sample solution to the organic phase, and then the analyte was extracted from the organic phase to the acceptor phase. After described extraction time, 4  $\mu$ L of acceptor phase was withdrawn and directly injected into HPLC system for analysis. Parameters related to TP-HF-LPME (organic solvent, pH of acceptor and donor phase, stirring rate, salt effect, methanol content in acceptor phase and extraction time) were also optimized experimentally. The proposed method integrates extraction, enrichment and clean-up into a single step, dramatically simplifying the traditional procedure to prepare a liquid sample with complex matrices such as plasma. It has been demonstrated to be a very fast, effective and virtually "green" sample preparation technique, which provided a good linear range (0.1-50 mg/L) with  $r^2$  of 0.9996, a low detection limit (0.05 mg/L, S/N= 3) and a satisfactory relative standard deviation (<5%).

**Key words** [liquid phase microextraction](#) [sample preparation](#) [high performance liquid chromatography \(HPLC\)](#) [nicotine](#) [plasma](#)

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