

研究论文

## 弱阳离子交换整体柱的制备及其对人血浆中硝苯地平的在线分析

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**摘要** 以甲基丙烯酸(MAA)为功能单体, 乙二醇二甲丙烯酸酯(EDMA)为交联剂, 以色谱柱管为模具, 通过原位聚合法制备了弱阳离子交换整体柱。该柱能去除血浆中的内源性物质, 对生物样品中的药物有富集作用。将其作为固相萃取柱与C18色谱柱联用, 在线分析了人血浆中的硝苯地平。流动相为甲醇-水(体积比为70:30), 流速1.0 mL/min, 检测波长235 nm。结果表明, 硝苯地平在5.0~75.0 μg/L范围内线性关系良好( $r=0.9993$ ), 方法的回收率为90.0%~99.0%, 日内、日间相对标准偏差均小于5.0%。该方法精密度高, 重现性良好, 避免了繁琐的样品预处理过程, 且弱离子整体柱可多次重复使用, 为检测血浆中的痕量药物提供了一种快速、经济、有效的新方法。

**关键词** [离子交换整体柱](#) [在线分析](#) [硝苯地平](#) [血浆](#)

## Preparation of weak cation exchange monolithic column and its applications for on-line determination of nifedipine in human plasma

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### Abstract

A cation exchange monolithic column was prepared with methylacrylic acid (MAA) as the functional monomer and ethylene dimethacrylate (EDMA) as the cross linker. This column was applied to remove the matrix compounds and enrich the ionic medicines in human plasma with water as the mobile phase. As a result, the human plasma samples can be directly injected into chromatographic system. The relationship between the mobile phase flow rate and back pressure was studied. The results showed that the monolithic column had good performances in lower pressure and higher permeability. In addition, the maximum adsorption of nifedipine on this monolithic column was investigated. The on-line clean-up and enrichment of samples were carried out using this column as the solid-phase extraction material and the C18 column as the analytical column. The chromatography was performed on a C18 reversed-phase high performance liquid chromatographic column with ultraviolet detection at 235 nm. The mobile phase was a mixture of methanol-water (70:30, v/v), and the flow rate was 1.0 mL/min. The linear range of nifedipine in human plasma was 5.0-75.0 μg/L. The intra- and inter-day relative standard deviations (RSDs) were both less than 5.0%. The limit of detection (LOD) was 1 μg/L and the limit of quantification (LOQ) was 4 μg/L. In this method tedious pretreatment procedure is not necessary. It is a fast, economical, reproducible and efficient method for assaying trace nifedipine in human plasma.

**Key words** [ion exchange monolithic column](#) [on-line analysis](#) [nifedipine](#) [human plasma](#)

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