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特别策划

基于一种新型有机聚合物整体柱的毛细管电色谱技术用于利尿剂的分离与检测

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摘要 采用自制的新型有机聚1-十六碳烯-三羟甲基丙烷三甲基丙烯酸酯［poly(1-hexadecene-co-TMPTMA)］整体柱,建立了一种同时分离检测6种利尿剂(氯噻酮、氢氯噻嗪、美托拉宗、吲哒帕胺、坎利酮和螺内酯)的毛细管电色谱(CEC)新方法,并成功应用于志愿者实际尿样的分析测定。在最佳实验条件下,6种利尿剂包含2种中性物质(坎利酮和螺内酯)和2种同分异构体(美托拉宗和吲哒帕胺)在11.0 min内得到基线分离,柱效分别达到218000、176000、143000、121000、108000、103000 塔板/m。6种利尿剂在1.15～86.0 μg/mL范围内呈良好的线性关系,相关系数R2 ≥0.990 8,检出限(LOD)在0.35～0.65 μg/mL范围内,回收率为81.9%~105%,相对标准偏差(RSD)小于4.7%。结果表明,实验所建立的基于poly(1-hexadecene-co-TMPTMA)整体柱的CEC方法,具有良好的重复性和稳定性,能够实现对多种利尿剂的同时分离检测。该方法已成功应用于来自志愿者实际尿样的分析,该方法可以用于利尿剂类药物的初筛。

关键词 毛细管电色谱 整体柱 制备 色谱分离 利尿剂

Analysis of diuretics by capillary electrochromatography using poly(1-hexadecene-co-TMPTMA) monolithic column

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Abstract

A new method for analyzing diuretics by capillary electrochromatography using poly(1-hexadecene-co-TMPTMA) monolithic column was established. Experimental conditions including the mobile phase, separation voltage, and injection condition were optimized for the analysis. Under optimized experimental conditions, six diuretics were separated within 11.0 min with the limits of detection （LODs） (S/N=3) in the range of 0.35－0.65 μg/mL. The method showed good linearity (R2≥0.9908) in the range 1.15 and 86.0 μg/mL. The recoveries obtained from the analysis of spiked urine sample were between 81.9% and 105% with the relative standard deviations (RSDs) lower than 4.7%. It can be concluded that this new method possessed good repeatability and stability in analyzing diuretics, and was successfully applied to the analysis of real urine samples from volunteers. Therefore, this method could be applied to scanning diuretics in human urine samples.

Key words capillary electrochromatography (CEC) monolithic column preparation chromatographic separation diuretics

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