

特别策划

亲水作用加压毛细管电色谱-激光诱导荧光检测法分析痕量核黄素类物质

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摘要 一种新型的亲水作用毛细管电色谱(HI-CEC)整体柱被应用于加压毛细管电色谱-激光诱导荧光检测(pCEC-LIF)联用法对核黄素类物质的分离分析。采用自组装的pCEC-LIF系统,实现了对痕量核黄素(RF)、黄素单核苷酸(FMN)和黄素腺嘌呤二核苷酸(FAD)的快速分析。在最优的分离检测条件下,3种化合物在8.0 min内完全分离,RF、FMN和FAD的检出限(LOD, S/N=3)分别为 5.0×10^{-11} mol/L、 8.0×10^{-10} mol/L和 2.5×10^{-9} mol/L,测定线性范围可达3个数量级,精密度良好。方法简便、全分析时间短、灵敏度和选择性高,血清样品分析实验结果良好,可望进一步应用于体液及细胞中核黄素类物质的痕量检测

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Rapid analysis of trace levels of riboflavin and its derivatives with hydrophilic interaction monolith by pressurized capillary electrochromatography with laser induced fluorescence detection

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Abstract

A novel hydrophilic interaction capillary electrochromatographic (HI-CEC) monolith with covalently bonded zwitterionic functional groups was applied for the separation of riboflavins (RF) and its derivatives. With a homemade pressurized capillary electrochromatography-laser induced fluorescence detection (pCEC-LIF) system, trace levels of RF and its derivatives, flavin mononucleotide (FMN) and flavin adenine dinucleotide (FAD), can be baseline separated within 8.0 min in isocratic elution mode. The effect of experimental parameters on separation was investigated. Under the optimum conditions, analytes could be determined over nearly three orders of magnitudes with the detection limits (LODs) as low as 5.0×10^{-11} mol/L (RF), 8.0×10^{-10} mol/L (FMN), 2.5×10^{-9} mol/L (FAD), and the relative standard deviations (RSDs) were less than 8.2%. This method is rapid, simple, repeatable and more sensitive than the most of reported methods, and satisfied results has been achieved in serum sample. Furthermore, it can be further applied for trace analysis of RF and its derivatives in biological fluid and cells.

Key words [pressurized capillary electrochromatography \(pCEC\)](#) [hydrophilic interaction \(HI\) monolith](#) [laser induced fluorescence detection \(LIF\)](#) [riboflavin and its derivatives](#) [serum](#)

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