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论文

微流控芯片分析系统中硅胶整体柱和膜滤复合预处理单元的构建

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摘要:

以改性C₁₈反相硅胶整体柱为微流控芯片分析系统中固相萃取介质材料, 构建不同功能单元的样品预处理微分析系统, 实现了血清样品中痕量盐酸多巴酚丁胺的富集。初步构建了单一改性硅胶微柱固相萃取预处理单元, 测试得到了改性硅胶整体柱对血清中痕量盐酸多巴酚丁胺的平均富集倍数为77.2, RSD为12.35%。为了提高测试的精密度, 进而设计含膜复合式预处理芯片, 探讨了不同预处理单元对血清样品中痕量盐酸多巴酚丁胺富集效率的影响, 优化设计了外接式硅胶整体柱-亲和膜微芯片固相萃取预处理单元, 复合式的反相硅胶整体柱对血清中微量盐酸多巴酚丁胺的平均富集倍数提高到89.4, RSD为4.37%。结果显示了该预处理单元在血清中痕量药物富集的可行性和有效性。

关键词: 微流控芯片分析系统 固相萃取预处理单元 硅胶整体柱 亲和膜

Construction of Pretreatment Units with Esterified Silica Monolithic Column and Affinity Membrane on Micro-fluidic Chip

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Abstract:

C₁₈ esterified silica monolithic column emerging from chromatogram realm was made by use of solid-phase extraction medium material in μ-TAS. Several simple solid-phase extraction pretreatment units were set up to preconcentrate dobutamine hydrochloride which was detected by dobutamine hydrochloride-KMnO₄-Luminol chemiluminescence system. Trace dobutamine hydrochloride in serum was enriched by C₁₈ esterified silica monolithic column, the average enrichment was 77.2 times, RSD was 12.35%. In order to overcome the shortage of conformable precision, polyamide affinity membrane modified by cibacron blue F3GA was introduced into the pretreatment unit to get rid of interferer from large molecule such as albumin in serum. The affinity membrane was combined with micro-fluidic chip by embedded and external methods and using external-combination pretreatment unit, average enrichment was 89.36 times, RSD was 4.37%. The result indicate the feasibility and validity of the pretreatment unit for trace medicine enrich in serum.

Keywords: Analytical system with micro-fluidic chip Solid-phase extraction pretreatment unit Silica monolithic column Affinity membrane

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