

研究论文

毛细管电泳-电化学检测法测定黄芪及其制剂中的活性成分

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摘要 采用毛细管电泳-电化学检测法(CE-ED)对中药黄芪的主要活性成分芦丁、阿魏酸、香草酸、绿原酸、槲皮素和咖啡酸进行了分离和测定。分别考察了工作电极电位、运行缓冲液的pH值和浓度、分离电压和进样时间等实验参数对实验结果的影响。在优化的实验条件下,以直径300 μm 的碳圆盘电极为工作电极,检测电位为+0.95 V(相对于饱和甘汞电极),在10 mmol/L硼酸盐(pH 8.2)的运行缓冲溶液中,上述6种活性成分能在17 min内实现很好的基线分离,被测物浓度与峰电流在3个数量级范围呈良好的线性关系,检出限(S/N=3)范围为78~110 $\mu\text{g/L}$ 。在不同的加标水平下,6种活性成分的平均回收率为96.0%~103.0%,相对标准偏差为1.9%~3.6%(n=3)。该方法样品处理简单,无需预富集,已应用于实际样品的分析,并获得了令人满意的结果。

关键词 [毛细管电泳](#) [电化学检测](#) [活性成分](#) [黄芪](#) [中药](#)

Determination of active components in Radix Astragali and its medicinal preparations by capillary electrophoresis with electrochemical detection

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Abstract

A simple, fast, and reliable method based on capillary electrophoresis with electrochemical detection (CE-ED) was developed for the separation and determination of rutin, ferulic acid, vanillic acid, chlorogenic acid, quercetin and caffeic acid in Radix Astragali and its medicinal preparations. The effects of several important factors, such as detection potential, pH, running buffer concentration, separation voltage and injection time, were investigated to acquire the optimum conditions. Under the optimum conditions, the analytes could be separated within 17 min in a 75 cm length capillary at a separation voltage of 18 kV in a 10 mmol/L borate buffer (pH 8.2). A 300 μm diameter carbon disk electrode generated a good response at +0.95 V (vs. saturated calomel electrode (SCE)) for all analytes. The relationship between peak currents and analyte concentrations was linear over about three orders of magnitude with detection limits (S/N=3) ranging from 78 $\mu\text{g/L}$ to 110 $\mu\text{g/L}$ for all analytes. The average recoveries were 96.0%-103.0% with the relative standard deviations of 1.9%-3.6%(n=3). This method has been successful used for the determination of these analytes in real samples, and the assay results were satisfactory.

Key words [capillary electrophoresis \(CE\)](#) [electrochemical detection](#) [active components](#) [Radix Astragali](#) [traditional Chinese medicine \(TCM\)](#)

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