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研究论文

采用隔离池的毛细管电泳-间接紫外吸收法测定茶叶中的氨基酸

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摘要 改进的毛细管电泳-间接紫外吸收法采用了自制隔离池,以对氨基苯甲酸(PAB)为背景电解质,对茶叶中的氨基酸进行了测定。PAB能够提高分离效率,降低检出限。隔离池的使用避免了PAB的电极反应,降低了基线噪声,维持了两缓冲液池间的电流导通。研究了背景电解质的浓度、pH值以及电渗流改性剂的种类和浓度对氨基酸分离的影响。在优化的实验条件下,16种氨基酸在14 min内达到了基线分离,峰面积的相对标准偏差小于5%(n=5),检出限为1.7~4.5 μmol/L,回收率为83.0%~106%。该法快速、便捷和灵敏,已成功应用于茶叶中11种游离氨基酸的检测。

关键词 毛细管电泳 间接紫外吸收检测 隔离池 氨基酸 茶叶

分类号

Determination of Amino Acids in Tea Samples by Capillary Electrophoresis with Partition Cell and Indirect Ultraviolet Detection

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Abstract

An improved capillary electrophoretic (CE) separation and indirect ultraviolet (in-UV) detection system was proposed for the amino acid analysis in tea samples with a homemade partition cell and a background electrolyte (BGE) of p-aminobenzoic acid (PAB). PAB improved the separation efficiency and detection limits of the amino acids. The partition cell prevented PAB from chemical reaction at the electrode, reduced baseline noise and kept electric current inside the cell. The separation parameters of the amino acids, such as different BGEs, BGE concentration, buffer pH and electroosmotic flow (EOF) modifiers, were investigated. The CE separation was carried out with the running buffer solution of pH 11.2, 10 mmol/L PAB containing 0.014 mmol/L cetyltrimethylamonium bromide (CTAB), an applied voltage of -15 kV and a detection wavelength of 254 nm. Sixteen amino acids were separated within 14 min under the selected conditions. The linear ranges of the amino acids were 0.02-0.60 mmol/L except for theanine (0.02-3.80 mmol/L) and γ-aminobutyric acid (0.02-2.00 mmol/L). The recoveries were in the range from 83.0% to 106%. The relative standard deviations of peak area were less than 5% (n=5) and the detection limits were in the range of 1.7-4.5 μmol/L. The method is fast, convenient and sensitive, and has been applied to the determination of 11 amino acids in tea samples satisfactorily.

Key words capillary electrophoresis (CE) indirect ultraviolet detection partition cell amino acids tea

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