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研究论文

毛细管电泳法高压快速分离分析菠菜中的水溶性维生素

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摘要 在毛细管电泳法中,通过双模对接高压电源可以获得0～40 kV甚至40 kV以上的超高电压。本研究在40 kV的超高电压下,以纯电解质水溶液为缓冲液,实现了蔬菜中通常含有的8种水溶性维生素(VB1、VB2、VB6、VC、D-泛酸钙、D-生物素、烟酸和叶酸)的快速分离及菠菜样品的定量分析。通过考察电压、缓冲溶液浓度、pH值等因素对分离的影响,确定了优化的实验条件。结果表明,在40 kV高压下,采用25 mmol/L硼砂-硼酸溶液缓冲液(pH 8.8),菠菜中上述8种水溶性维生素在2.2 min内获得了较好的基线分离。用此方法对菠菜中的水溶性维生素进行定量分析,得到了令人满意的结果。水溶性维生素的线性相关系数范围为0.9981～0.9999,检出限为0.2～0.3 mg/L,在菠菜中的平均加标回收率为88.0%～100.6%,峰面积的相对标准偏差(RSD)为1.15%～4.13%。

关键词 双模 高压 毛细管电泳 水溶性维生素 菠菜

Fast separation and analysis of water-soluble vitamins in spinach by capillary electrophoresis with high voltage

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Abstract

In capillary electrophoresis, 0~40 kV (even higher) voltage can be reached by a connecting double-model high voltage power supply. In the article, water-soluble vitamins, VB1, VB2, VB6, VC, calcium D-pantothenate, D-biotin, nicotinic acid and folic acid in vegetable, were separated by using the high voltage power supply under the condition of electrolyte water solution as running buffer. The separation conditions, such as voltage, the concentration of buffer and pH value etc., were optimized during the experiments. The results showed that eight water-soluble vitamins could be baseline separated in 2.2 min at 40 kV applied voltage, 25 mmol/L sodium tetraborate buffer solution (pH 8.8). The water-soluble vitamins in spinach were quantified and the results were satisfied. The linear correlation coefficients of the water-soluble vitamins ranged from 0.9981 to 0.9999. The detection limits ranged from 0.2 to 0.3 mg/L. The average recoveries ranged from 88.0% to 100.6% with the relative standard deviations (RSD) range of 1.15%~4.13% for the spinach samples.

Key words double-model high voltage capillary electrophoresis （CE） water-soluble vitamins spinach

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