

Abstract

Capillary zone electrophoresis is frequently used in various analyses. In this diploma thesis a hydrodynamic sample introduction method controlled by pressure pulse has been proposed for short-capillary electrophoresis. The base electrolyte flushes sample from the loop of a six-way sampling valve and is carried to the injection end of the capillary. At the time when the sample zone reached the capillary, a short pressure impulse is generated in the electrolyte stream, which provides injection of the sample into the capillary. Then the electrolyte flow is stopped and the separation voltage is turned on. The amount of sample introduced to the capillary is controlled by the duration of the pressure pulse.

This new sample introduction method was tested in the determination of ammonia, histidine, creatinine, uric acid and hippuric acid in human urine and for rapid screening of the contents of the inorganic ions in cerebrospinal fluid and blood plasma. The determination was performed in a capillary with an overall length of 10,5 cm and two base electrolytes was tested – 50 mM MES + 5 mM NaOH (pH 5,10) and 1 M acetic acid + 1,5 mM crown ether 18-crown-6 (pH 2,40). Using dual detection techniques contactless conductivity and UV spectrometric detection, anorganic and organic substances in the sample could be detected simultaneously.

Key words

Capillary electrophoresis, Short capillary, Hydrodynamic injection, Dual detection, Ammonia ions, Histidine, Creatinine, Uric acid, Hippuric acid, Urine, Cerebrospinal fluid, Blood plasma