

Capillary electrophoresis as a tool for diagnosis of methanol and ethylene glycol poisoning from blood samples

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Analysis of blood samples is of particular importance, especially in medical diagnosis. During alcohol poisoning, various toxic metabolites are formed in the circulating blood that need to be detected early to decrease the risk for serious health consequences. A simple and rapid capillary electrophoretic (CE) method, using contactless conductivity detection (C4D), for simultaneous analysis of methanol (formate) and ethylene glycol (oxalate and glycolate) metabolites from a drop of blood was developed. The separation was performed in a background electrolyte consisting of 50 mM 2-(N-morpholino)ethanesulfonic acid and 50 mM L-histidine (pH = 5.9) in bare fused silica capillary (50 µm ID) in less than 5 minutes. We present here a new, simple device that can be used to separate the blood plasma from as little as 5 µL of whole blood in less than a minute, using no electric power. This may be important especially in the point-of-care analysis. The parameters of the developed system, such as analyte recovery, plasma separation speed and capillary electrophoresis electrolyte optimization was performed and will be described in detail.

Acknowledgment

The authors acknowledge the financial support from the Grant Agency of the Czech Republic (Grant No. P206/13/21919S). This research was carried out under the project CEITEC 2020 (LQ1601) with financial support from the Ministry of Education, Youth and Sports of the Czech Republic under the National Sustainability Programme II.