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Andrea Beutner, Beate Scherer, Frank-Michael Matysik



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# ***Dual detection for non-aqueous capillary electrophoresis combining contactless conductivity detection and mass spectrometry***

Andrea Beutner<sup>1</sup>, Beate Scherer<sup>1</sup>, Frank-Michael Matysik<sup>1,\*</sup>

<sup>1</sup>Institute of Analytical Chemistry, Chemo- and Biosensors, University of Regensburg, Universitaetsstrasse 31, 93053 Regensburg

\*Frank-michael.matysik@ur.de

## ***Abstract***

Coupling of two detectors is a powerful tool to enhance the overall analytical performance generating complementary information and overcoming the limitations of the single detectors. In this work, capacitively coupled contactless conductivity detection (C<sup>4</sup>D) and electrospray ionization mass spectrometry (ESI-MS) were coupled in conjunction with non-aqueous capillary electrophoresis (NACE). Non-aqueous electrolytes are highly compatible with ESI due to their volatility. Moreover, they exhibit low background conductivity, which is essential for the detection with C<sup>4</sup>D. A NACE-C<sup>4</sup>D-MS method was developed using an acetonitrile buffer containing 2 M HAc and 4 mM NH<sub>4</sub>Ac as background electrolyte. The influence of the inner diameter of the separation capillary on the C<sup>4</sup>D was studied and taken into account. A capillary with 50 µm inner diameter was found to be best suited.

The complementarity of the two detectors was shown by determining a sample mixture containing choline, thiamine, nitrate, and chloride as well as bromide and acetylcholine as internal standards. The C<sup>4</sup>D was the detector of choice for the inorganic ions which were not detectable with the MS whereas the MS had much lower limits of detections for the organic biomolecules. The method was applied on an extract of a food supplement containing the model analytes.

**Keywords:** Contactless conductivity detection, electrospray ionization, mass spectrometry, dual detection, non-aqueous capillary electrophoresis

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