Capillary electrophoresis connected with inductively coupled plasma mass spectrometry for analysis of oxaliplatin species

Jan Petr[1],*, Daniel Baron[1], Andrea Šebestová[1], Petra Švecová[1], Radka Pechancová[1], Tomáš Pluháček[1]

[1] Department of Analytical Chemistry, Faculty of Science, Palacký University Olomouc, 17. listopadu 12, 77146 Olomouc, Czech Republic; Correspondence: jan.petr@upol.cz

Gold statement
- Learn about our "home-made" CE-ICP-MS interface
- Discover our method for attomolar separation of oxaliplatin enantiomers using CE-ICP-MS
- Uncover our sweeping methodology for preconcentration of oxaliplatin impurities by CE-ICP-MS

Introduction
Capillary electrophoresis (CE) hyphenated to inductively coupled plasma mass spectrometry (ICP-MS) as an element-specific detector represents an interesting and beneficial tool for many applications. Nowadays, CE-ICP-MS is used primarily for speciation analysis, metal-ligand interaction studies including metal-based nanoparticles, as recently reviewed [1]. However, CE-ICP-MS has the potential to touch also other fields by taking account of other advantages of CE, e.g. in chiral separations or in online preconcentration methodologies.

Body
In this communication, we report a development of a simple "in-house" CE-ICP-MS interface using a cross-piece for grounding electrophoresis and a sheath-liquid aspiration. The CE-ICP-MS connection was then used for two applications: (i) separation of oxaliplatin enantiomers at attomolar concentration levels [2], and (ii) determination of B and C oxaliplatin impurities by using sweeping preconcentration CE-ICP-MS [3].
First, the separation of oxaliplatin enantiomers was studied. (R,R)- and (S,S)- oxaliplatin were separated in 40 mM borate buffer pH 9.5 with 60 mg.mL^{-1} sulfated β-cyclodextrin within 10 min with a resolution of 2.0. Calibrations were linear in the range of 0.1–500 µg.mL^{-1} with R^2 of 0.9999; LOD was 64 ng.mL^{-1} determined from the ^{195}Pt isotope signal. In comparison with CE-DAD, LOD was more than 200-times lower [2].
Then, the B and C pharmacopeia oxaliplatin impurities were preconcentrated and separated from oxaliplatin to achieve the lowest possible LODs. Here, BGE consisted of 25 mM phosphate buffer pH 2.15 with 175 mM SDS. With the injection time of 90 s, LODs ranged from 1 (impurity C) to 4 ng.mL^{-1} (impurity B). Calibrations were linear within five orders of magnitude (0.01 – 500 µg.mL^{-1}) with R^2 higher than 0.9993 [3].

Conclusion
We believe that the CE-ICP-MS connection represents interesting avenues for future research as it is able to overcome many problems of CE with commonly used UV detection. The financial support by the Czech Science Foundation (19-23033S) is gratefully acknowledged.

References
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