

4th World Congress on

MASS SPECTROMETRY

June 19-21, 2017 London, UK

Determination of drugs for inflammatory bowel disease treatment in pharmaceuticals by capillary electrophoresis hyphenated with tandem mass spectrometry

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A capillary electrophoresis (CE) method hyphenated with tandem mass spectrometry (triple quadrupole, QqQ MS) was developed for the simultaneous determination of six selected drugs used in Crohn's disease treatment, namely azathioprine, 6-thioguanine, 6-mercaptopurine, mesalazine, prednisone and allopurinol. 10 mM ammonium acetate adjusted at pH 9 with 3% ammonium hydroxide and including 5% methanol addition was used as an optimum background electrolyte (BGE). The optimum BGE provided both the baseline electrophoretic separation of the drugs and highly compatible connection of CE to the electrospray ionization (ESI) interface. The optimized working conditions were favorable for the selective and sensitive QqQ MS detection of the separated compounds according to their mass-to-charge (m/z) ratios. The proposed method was validated in terms of precision (RSDs for the repeatability of migration times and peak areas of the analyzed drugs were less than 1.66% and 6.06%, respectively), linearity (determination coefficient ranged in the interval of 0.9987-0.9995), limits of quantitation (sub $\mu\text{g.mL}^{-1}$ levels) and accuracy (mean recoveries of all the analytes in pharmaceutical matrix ranged in the interval of 98.2-101.2%). The CE-ESI-QqQ MS method is fast, simple, selective, precise, accurate, and was successfully applied to a highly reliable determination of the targeted drugs (for the treatment of inflammatory bowel disease, IBD) in commercial pharmaceuticals (tablet dosage forms).

Biography

Peter Mikuš has completed his PhD at Comenius University, Slovakia. He is a Researcher, Teacher, Associate Professor, and Director of Toxicological and Anti-doping Center at Comenius University in Bratislava (FPCU) as well as Head of Department of Pharmaceutical Analysis and Nuclear Pharmacy FPCU. His research team is focused on the "Development, validation and application of advanced hyphenated analytical methods, based on a combination of 2D-separation and spectral (UV-VIS, MS/MS) techniques for pharmaceutical and biomedical research". He has published more than 70 papers in reputed journals.

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