

8th World Congress on Chromatography

4th International Conference on

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Polymer Science and Technology

September 13-14, 2018 | Prague, Czech Republic

The Use of Isotopically Labeled Internal Standards in Quantitative LC/MS – The Way of The Full Compensation of Negative Impact of “Matrix Effect”



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The source of the “Matrix effect” as a consequence of analyte ions suppression or ions enhancement must be sought in the presence of unknown impurities from matrix. They are participating in the complex ionization process in parallel or competing ion-molecular reactions. Not only impurities from extracts but impurities adsorbed in the ion source and/or in the analytical system may play an important role. These adsorbed substances cannot be fully removed from the system by any cleaning procedure.

To fully compensate for the negative impact of the “Matrix effect”, use of isotopically labeled internal standards (isotope dilution technique) proved to be the only effective technique. This applies especially to LC/MS/MS determination of drugs and their metabolites in complex extracts of biological matrices. The isotope dilution technique is successful regardless of the method of purification, the ionization technique (APCI or ESI) and the type of the equipment used. The isotope dilution technique proved to be 100% effective for the compensation of matrix effect influences in 181 analytical methods developed and validated. The strict requirements of EMA guidelines to investigate different plasma sources for the assessment of the matrix effect in the analytical method validation are discussed.

Biography

Miroslav Ryska (1938) holds an undergraduate degree from Charles University, along with an M.S. in Physical Chemistry from Moscow State University and a PhD. from the Institute of Macromolecular Chemistry of Czechoslovak Academy of Sciences. From 1961 to 1978 he worked at the Institute of Macromolecular Chemistry of the Czechoslovak Academy of Sciences. In 1978 - 1997 he worked as a researcher in the field of MS and its application in research of metabolism and pharmacokinetics of drugs at the Research Institute for Pharmacy and Biochemistry in Prague. He has written more than 100 publications mainly on the topic of mass spectrometry, trace analyses, analyses of drugs, metabolites and quantitative analysis. In the 1990's Mr. Ryska acted as an Editor of two international journals, The Journal of Mass Spectrometry and Rapid Communication in Mass Spectrometry. He founded Quinta-Analytica s.r.o. in 1997.

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