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Ion Suppression; A Critical Review on Causes, Evaluation, Prevention and Applications

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Abstract

The consequences of matrix effects in mass spectrometry analysis are a major issue of concern to analytical chemists. The identification of any ion suppressing (or enhancing) agents caused by sample matrix, solvent or LC-MS system components should be quantified and measures should be taken to eliminate or reduce the problem. Taking account of ion suppression should form part of the optimisation and validation of any quantitative LC-MS method. For example the US Food and Drug Administration has included the evaluation of matrix effects in its "Guidance for Industry on Bioanalytical Method Validation" [1]. If ion suppression is not assessed and corrected in an analytical method, the sensitivity of the LC-MS method can be seriously undermined and it is possible that the target analyte may be undetected even when using very sensitive instrumentation. Sample analysis may be further complicated in cases where there are large sample-to-sample matrix variations (e.g. blood samples from different people can sometimes vary in certain matrix components, shellfish tissue samples sourced from different regions where different phytoplankton food sources are