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Recent advances in the applications of chromatography - mass spectrometry to environmental matrix analysis

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Abstract

The applications of Chromatography in conjunction with Mass Spectrometry are extremely wide ranging, not least in the analysis of environmental matrices, including water, soil, flora and fauna. A recent monograph on this subject emphasises the diversity of application of these coupled instrumental techniques. Depending on the purpose of mass spectrometric analysis, sample preparation may be critically important, unnecessary or inappropriate.

This paper is intended to communicate recent developments in methodologies employed to analyse complex matrices containing substances with a wide range of physico-chemical properties, including enhancements to chromatographic technique, mass analyser technologies and data interpretation tools.

Recent advances in mass analyser capability, including the advent of the orbitrap, will be discussed. The range of commercially available mass analysers continues to increase and high resolution spectral data acquisition is now possible using magnetic sector instruments, TOF, orbitrap analysers and ICR-MS, though applications of the latter technique remain limited in number. The expansion of hyphenated chromatography-mass spectrometry techniques to achieve greater selectivity and sensitivity remains a topic of active discussion, including applications of ion mobility mass spectrometry beyond the domain of proteomics and protein structure analysis.

The necessity for increasingly high rates of data acquisition, processing and interpretation presents technical challenges, notably in the areas of peak deconvolution, spectral matching/identification and statistical evaluation of results (viz. evaluation using informatics & mass spectral data bases).

Biography

Peter J Baugh, Ph.D. (University of Wales, 1964), NSF Postdoctoral Fellow, USDA, SRRL, New Orleans, LA, USA (1964-66), University of Salford, England, UK (1967-2000), Liverpool John Moores University (2002) ; current responsibility as the coordinator for the EMSSIG (The BMSS, 1997- to date). More than 70 research papers and book publications. Research interests include: Applications of Chromatography-Mass Spectrometry to Environmental Matrix Analysis including pesticide residue analysis in water courses, soil, flora and fauna ; correlation studies of GC/MS and Elisas for pesticides.