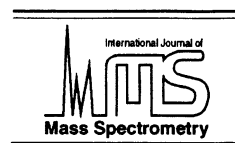




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Book Review

***Current Practice of Liquid Chromatography–Mass Spectrometry*, W.M.A. Niessen, R.D. Voyksner (Eds.), Elsevier Science, New York, 1998, 438 pp. ISBN: 0-444-82938-5**

This is a special volume reprinted from *J. Chromatogr. A* 794 (1998) and comprises 23 articles and 8 reviews. These cover the general areas of: (1) pharmaceutical and biomedical applications of liquid chromatography–mass spectrometry (LCMS), (2) environmental applications of LCMS, (3) LCMS in the analysis of natural products, (4) electromigration techniques, and (5) fundamentals and instrumentation. Although there is still use of off-line LC followed by mass spectrometry or tandem mass spectrometry, the past decade has seen the development of new interfaces for use with atmospheric pressure ion sources and improved mass analysers. These have largely replaced the unsatisfactory interfaces of the 1970s and 1980s so that LCMS, previously a rather specialised technique, is now, widely used and many of the more important applications are described in this volume.

In the first section, the first of three reviews describes the quantitative analysis of enkephalin and β -endorphin in the pituitary by means of off-line LC followed by fast atom bombardment/mass spectrometry/mass spectrometry (FAB/MS/MS) analysis of the peptides. Working with off-line LC allows one to use several other techniques that aid the quantitative determination of the peptides. In two further reviews, the analysis of DNA adducts, important as biomarkers, and nucleosides and nucleotides by means of several ionisation techniques is discussed together with the current status of capillary LCMS/MS and capillary electrophoresis (CE/MS). The remaining eight papers in this section cover specific applications

ranging from an automated analytical/preparative LCMS system, immunoaffinity chromatography of corticosteroids and the detection of constituents in milk, tea, human plasma, and urine.

In the second, the analysis of complex mixtures of isomers, oligomers, homologues, and biodegradation products of surfactants by LCMS and LCMS/MS is reviewed, particular attention being paid to methods that make use of thermospray and electrospray interfaces. Of the remaining seven articles, two deal with the use of LC inductively coupled plasma mass spectrometry in the analysis of organo-tin and tellurium compounds and a further two describe the detection of pesticides in water and food samples by means of electrospray, particle beam, and atmospheric pressure chemical ionisation (APCI) and LCMS. Detection of microcontaminants such as herbicides are described in two further papers; in one, an LCAPCI ion trap MS/MS is employed, whereas the other describes the use of solid-phase extraction followed by LC/electrospray ionisation (ESI)/MS/MS. This section is completed by an account of the qualitative analysis of organophosphorus chemical warfare agents by means of LC/APCI/ESI/MS/MS.

The major part of section three is a comprehensive review of applications of different LCMS techniques in the analysis of substances such as lipids, oligosaccharides, vitamins, flavonoids, glucosinolates, etc. in food. For this, LC/APCI/MS/MS has proved to be particularly useful since the ionisation process is “soft” and very efficient, providing a sensitivity of 5–10 fmol in favourable cases. The review concludes with an extensive bibliography that will doubtless prove valuable to those new to the field. An article in this section describes the use of LCMS and the recently introduced LC–nuclear magnetic resonance

(NMR) technique in the screening of plant constituents; these provide a rapid method of isolating targeted compounds. The remaining two papers describe the use of LCMS in the analysis of cholesterol oxides, and retinol and retinyl palmitate in human serum.

Preliminary results obtained by means of on-line micellar electrokinetic chromatography–MS with a high molecular mass surfactant are presented and indicate that this could be a useful technique if further developed. The characterisation of protein glycoforms by capillary zone electrophoresis–nanospray tandem mass spectrometry was shown to allow the characterisation of both the carbohydrate and peptide structures from low picomole samples.

The final section begins with a review of mechanistic aspects of electrospray ionisation and discusses the problem of nonlinearity due to ion saturation at high sample concentrations. A second article reviews the many types of LCMS interfaces currently commercially available for ESI sources and a range of different types of mass analysers. The author warns that despite all the automated, easy-to-operate instruments now being introduced, interpretation of the data, much of which is currently unused, will continue to be challenging. A more specialised review describes the performance of various types of on-line capillary separations interfaced to an ion trap storage—reflectron time of flight mass spectrometer; these give low fmol sensitivity in some cases for

characterisation of peptides and proteins. Two papers describe novel instrumental developments. In one, several different API sources were interfaced to instruments in which a variety of ionisation techniques could be used, the choice depending on the type of sample under investigation; preliminary results look promising. The second paper describes the development of LCMS by means of continuous flow matrix assisted laser desorption ionisation–time of flight mass spectrometry; this ionisation method has been shown to be viable but at present, relatively poor high mass resolving power causes problems. In a further paper, a description is given of postcolumn cationisation of the mobile phase in microcolumn LCMS to assist in the elucidation of structures of compounds such as cyclodextrins and oligosaccharides.

Overall, I found this to be a fascinating volume covering, as it does, many aspects of LCMS techniques and instrumentation and giving a good cross section of current applications. The articles are, in general, well referenced, which adds to their value. Anyone new to the field will find the volume invaluable and those already familiar with the technique will undoubtedly find much in it to interest them.

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