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Book review

Applications of LC–MS in Environmental Chemistry
Edited by D. Barceló, Elsevier Science B.V., Amsterdam, Netherlands, 1996, 1st edn., xii +543 pp., price Dfl. 450.00; ISBN 0-444-82067-1 (hardbound).

Written by experienced practitioners in the field of both LC–MS and environmental chemistry, this clearly written book gives an overview of how liquid chromatography (LC) coupled to mass spectrometry (MS) can be used for the identification, confirmation and quantification of relevant offending target compounds in various environmental matrices.

The book is divided in three parts: fundamental aspects and instrumentation, environmental applications, and complementary techniques. The solid opening chapter provides an overview of many of the typical LC–MS interfaces which have been used in this field and their associated MS ionization modes. This makes the text particularly interesting for the LC–MS novice. Two other chapters deal in more depth with the ionization modes of thermospray (TSP), atmospheric pressure chemical ionization (APCI), electrospray (ESP) and continuous flow fast atom bombardment (cf FAB), and instrumental aspects of tandem MS. However, after this highly adequate introductory section, there should have been less repetition of theoretical aspects throughout the rest of the book.

The second part of the book deals with specific environmental applications. Each chapter is particularly well researched and provides interesting background information. The ionization modes predominantly discussed are TSP, particle beam (PB) and atmospheric pressure ionization (API) techniques. A chapter on the determination of a wide range of non-ionic, cationic, anionic, amphoteric surfactants and their degradation products by LC–MS and tandem MS using TSP ionization provides valuable insight on how to solve the difficult problem of detection, identification and quantification of these compounds in waste, surface and drinking waters (H.P. Schröder). The undoubted advantages of API over TSP and PB techniques is clearly demonstrated for the trace-level determination of thermally labile and/or polar pesticides (D. Barceló et al.). The authors comment upon the growing importance of API techniques in LC–MS and emphasize the need for more interlaboratory studies to establish analytical protocols for the entire analytical process including on-line sample extraction (solid-phase extraction) combined with LC–MS. Other chapters in this section discuss the use of PB for the analysis of aqueous and hazardous waste leachates (J. Hsu) and agrochemicals (M.J.I. Mattina), the analysis of dyes using PB and ESP (J. Yinon et al.), the analysis of organotin compounds using ESP and TSP (L.D. Betowski and T.L. Jones) and the analysis of seafood toxins using high-flow pneumatically-assisted ESP (M.A. Quilliam). The present referee would have appreciated additional chapters on the determination of pesticides in food, and on validation of LC–MS procedures for quantitative analysis. However, as regards the latter case, it may well be that there is an insufficient number of research papers devoted to this topic.

In the section on complementary techniques an interesting chapter (R.J. Vreeken) highlights how to address the notorious LC–MS problem of dealing with non-volatiles in LC eluents via on-line post-column liquid–solid or liquid–liquid extraction. The chapter on capillary electrophoresis (CE)–MS (W.C.

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Brumley and W. Winnik) is particularly interesting. It provides a detailed account of the various electrophoretic approaches and highlights their undeniable respective advantages. However, the authors have been realistic in emphasizing some of the existing problems associated with CE–MS such as sample preparation, quantification and the need for new interfaces. The advances in nano-flow electrospray and electrokinetic chromatography will no doubt help to solve some of these issues. The present book undoubtedly is a useful (but unfortunately, highly expensive) text for those interested in or applying LC–MS in environmental chemistry.

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