

## BOOK REVIEW

Barry K. Logan,<sup>1</sup> Ph.D., DABFT

### Review of: *Advances in Forensic Applications of Mass Spectrometry*

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**REFERENCE:** Yinon J, editor. *Advances in forensic applications of mass spectrometry*. CRC Press, Boca Raton, FL, 2004, 279 pp., \$139.95.

This book updates developments in the field of forensic mass spectrometry, since the author's 1994 publication of *Forensic Applications of Mass Spectrometry* (CRC Press, FL, 1994).

The book consists of six chapters dealing with drug screening by GC/MS, LCMS in forensic toxicology, drug testing in hair by tandem mass spectrometry, forensic applications of isotope ratio mass spectrometry, fire debris analysis by tandem mass spectrometry, and analysis of explosives by LCMS. The contributors are all well recognized and respected within the forensic community. The chapters were generally well written and easy to follow.

The field of forensic mass spectrometry has developed significantly with growing accessibility of more complex mass spectrometry techniques such as robust LCMS and chemical ionization interfaces, and MS to the nth techniques. The book is directed at the more sophisticated user, and at analysts with some practical experience in forensic mass spectrometry. It is not a basic text. The more advanced capabilities of laboratory instrumentation are often underutilized and this book may give forensic scientists some insight into what is possible.

Chapter 1 by Hans Maurer examines in depth analytical approaches for the major classes of drugs that are the targets of systematic toxicological analysis. The chapter is well organized with introductory comments on isolation techniques and choice of matrices, followed by practical instrumental considerations. This is followed by sections on major target classes of systematic toxicological analysis. The author also discusses the issue of hydrolysis and gives multiple options of derivatization. The chapter is thoroughly referenced with 331 citations.

Bogusz's chapter on LCMS is a timely update on this rapidly growing analytical area. It has a good introductory section on practical aspects of LCMS such as ion suppression, and selection of ionization method (some of this is repeated in chapter 6). This is followed by sections on specific analytes referencing the original publications and highlighting analytes which are not suitable for analysis by other methods such as insulin, anti-diabetic drugs, some anti-psychotics, and natural products. In many cases these could

not be described as routine techniques in the forensic laboratory, involving tandem MS, time of flight (TOF), and matrix-assisted laser desorption/ionization (MALDI) methods. This is however a good introduction to that more advanced literature.

Chapter 3 deals with the application of GC techniques to the detection of drugs in hair as a method for detecting doping in sport. The chapter reproduces some of the author's original data for the detection of anabolic, corticosteroids, and beta-adrenergic stimulants. Hair testing is still a relatively young field especially for this application, and this is reflected by the limited but comprehensive citation list.

Isotope ratio mass spectrometry is covered in the fourth chapter, but addresses issues which could not be considered routine forensic analyses, such as determination of geographic origin of drugs, and detection of adulteration in food products, and individualizing trace evidence beyond class characteristics. The technique also requires technology not currently available in many forensic laboratories. The chapter may have some value in introducing the concept of isotope ratio mass spectrometry to forensic chemists, but would be considered too time consuming and complex for routine use at present.

Chapters 5 and 6 describe the benefits and utility of GC/MS/MS and LC/MS for fire debris and explosives analyses. Both chapters briefly describe the theory, and give plentiful detail on the apparent benefits of advanced mass spectrometric techniques over traditional methods. Both are well referenced. Yinon's own chapter, chapter 6, describes applications in explosives analysis giving some useful background on different LC ionization sources, in particular Electrospray Ionization (ESI) and Atmospheric Pressure Chemical Ionization (APCI), and detailed experimental procedures and analytical data.

The forensic science community often lags in adopting new technology due to workload, limited funding but also due to the fact that in many instances existing techniques are "good enough." Texts such as this have an important role in that they make us think about the way we approach problems, keep us abreast of what's happening in the academic and research communities, and describe the routine techniques of tomorrow.

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<sup>1</sup> Forensic Lab Services Bureau, Washington State Patrol, 2203 Airport Way, South, #360, Seattle, WA 98134-2027.