

BOOK REVIEW

High-Throughput Bioanalytical Sample Preparation: Methods and Automation Strategies

by David Wells



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The sheer number of methods available for the preparation of samples from biological matrices can make this subject seem bewildering for the uninitiated; even for the experienced analyst it is near impossible to maintain a comprehensive overview of new developments in the field. For this reason there is an obvious need for an authoritative reference guide on the subject, and this is underlined by the fact that "High Throughput Bioanalytical Sample Preparation: Methods and Automation Strategies" was almost sold out on the website of a well known on-line bookseller at the time the book was received for review.

As the title implies, the main focus of the book is on high-throughput methodologies; however, the subject is covered in much greater detail. Wells begins by putting bioanalysis in the wider context of drug discovery, discussing the different stages of the process in some detail, as well as the particular bioanalytical challenges encountered at every stage.

Although titled "Fundamental Strategies for Bioanalytical Sample Preparation," a good part of the next chapter follows on to discuss the influence that physicochemical properties of the compounds to be investigated (and changes thereof) have on the successful implementation of a sample preparation procedure. As a previous author noted, the importance of, for instance, the concept of pK_a is not examined by most books on pharmaceutical analysis,¹ although this parameter is obviously vital for the development of a successful sample extraction method. Recognizing this need, Wells thankfully tries to cover these essential concepts.

Several chapters are then devoted to the detailed discussion of accessory devices, such as the various formats and types of microplates available, and of automation devices. The following chapters address the core subject of the book in a very helpful format: first, the fundamental principles of a technique (protein precipitation, liquid-liquid extraction, solid-phase extraction and on-line sample preparation) are outlined in great detail to aid the general understanding of a given method; the use of the methods is further clarified by references to published literature. This is then followed in most

instances by a chapter on strategies for method development and optimization; the final chapter the emphasis is on automation strategies.

Wells uses his experience as an educator in the field to great effect: the introductory chapter on solid-phase extraction is one of the most useful overall introductions to this technique available to date, discussing in detail its advantages and disadvantages, sorbent

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chemistries and attraction mechanisms as well as the different modes in which the technique can be applied. Example protocols are provided, which further clarify the basics and aid in the understanding of the technique and its application in a high-throughput setting.

Only minor points of criticism can be made. For instance, it is somewhat puzzling to find equilibrium dialysis and ultrafiltration being discussed in the chapter of protein precipitation techniques. The section on physicochemical parameters could have benefited greatly by it being followed directly and referred to by the chapter on solid-phase extraction, where the application of the basic concepts could have been elaborated on in a practical context.

However, for a book on a topic as complex as this one, "High Throughput Bioanalytical Sample Preparation: Methods and Automation Strategies" is surprisingly enjoyable to read. This is both thanks to the very well thought out structure of the text and to the knowledge Wells brings to the subject (e.g., if ever you wanted to know which major pharmaceutical company holds the patent for 96-well format SPE plates — this is the book to find out). Most importantly, this book represents a valuable point of reference, both for types of hardware and accessories available and their vendors, and for further literature on the subject, which is suggested for each chapter in extensive and thorough reviews of the current literature.

1. D.G Watson, *Pharmaceutical Analysis* (Churchill Livingstone, Edinburgh, 1999), 17.