

Book reviews

Liquid and Surface-Borne Particle Measurement Handbook

J.Z. Knapp, T.A. Barber, A. Lieberman (Editors)
Marcel Dekker, New York; 1996, 870 pp.; \$195; ISBN:
0-82479486-2

In 21 chapters and 870 pages the authors try to give a survey on particle measurement. In the introductory chapter Lieberman describes all the areas where particle measurement is of importance. There is a focus on pharmaceutical liquids. He then gives a short survey on the methods used for particle characterisation, starting with sieves and ending with optical single particle counting systems. In the second chapter Dely describes the correct use of polarised-light microscopes in particle identification. He gives a list of 18 important characteristics which can be used for particle identification. Barber gives an introduction into automated image analysis. After an elementary description of the various elements of a video system, he gives a short survey on the different diameters and areas which are used in particle measurement and their application in automated particle sizing and shape analysis. Lines outlines the principles of electrical sensing zone methods which are applied, e.g. in the Coulter Counters. He discusses the most important problems which may arise when applying such a technique. Weiner gives a survey on the various ensemble averaging techniques used in particle sizing, e.g. sedimentation, dynamic light scattering and Fraunhofer diffraction. In his second contribution Lieberman discusses aspects which have to be considered when performing particle measurement in situ. These techniques are mainly used for in-process-control not only in pharmaceutical production but also in the operation of power plants or hydraulic systems. Thompson gives an excellent introduction to particle sizing by means of holographic methods. These techniques allow not only for the particle size and shape analysis but also for the determination of particle velocity. As all information on a given system is stored in a hologram it can be evaluated repeatedly under various aspects. In his second contribution Baxter gives some good hints on preparing samples for particle analysis.

The discussion of methods like electron microscopy, X-ray spectroscopy, infrared microspectrophotometry, mass spectrometry, X-ray and electron diffraction is too detailed with respect to constructional issues of the equipment, but not detailed enough to allow for a full understanding of the various methods. In Chapters 9 and 10 Knapp and Abramson present methods to validate particle inspection methods and systems as well as counting accuracy. These methods are based on a statistical analysis of sample rejection by inspectors as well as by automatic inspection systems. A special aspect is the selection of appropriate inspectors by means of these statistical procedures. Chapter 9 gives a good survey of the state-of-the-art in particle inspection. Chapter 10 gives a lot of information which may help to avoid mistakes in applying particle counting methods. Both chapters are very helpful. In Chapters 11 and 12 particle inspection applications in semiconductor manufacturing process liquids and in petroleum oils are described. It is interesting to learn how the semiconductor industry meets the particle purity requirements which are more stringent than in pharmaceutical manufacturing. In his third contribution Barber discusses various sources of particulate matter in pharmaceutical production. Pesko outlines the physiological consequences of injected particles. This information is interesting but I would not have expected it in a handbook on particle measurement. The same holds for Chapter 15 which deals with the diagnostic application of microspheres. Xu contributes two chapters, one dealing with reference materials in particle measurements, the other with distribution analysis using light scattering. Both chapters provide excellent information. The second chapter describes in a brilliant way the operation principles of modern light scattering instruments as well as the physics and mathematics underlying these light scattering techniques. Knapp describes methods for selective particle capture with transparent sieves in the evaluation of contamination in parenteral solutions. The use of transparent sieves allows for an improvement in particle detection; their cost however is limiting a wider use. The chapter contributed by Syverson gives a survey of industry's role in the development of standards and controls for particulate matter in small vol-

ume injectables. It is a historical review of limited help in a handbook on particle measurement. In Chapter 20 Barber describes pharmaceutical clean laboratory operations. A reader interested in particle measurement would not expect such information in a handbook on particle measurement. In the last chapter Lieberman presents a specialised bibliography on particles in fluids and on surfaces. The articles cited deal with 'adhesion of particles on substrates', 'filter evaluation', 'filtration of liquids', 'light and electron microscopy', 'liquid borne particle measurements', 'particle shape considerations and measurement', 'slurry and colloid physics' or with 'suspension and multiphase flow'. This list is not complete. The selection was made to demonstrate the wide range covered by this bibliography.

The book gives a broad overview of problems related with particle measurement. With the exception of the excellent chapters contributed by Lines, Knapp/Abramson, Thompson and Xu, the information is not presented in sufficient detail to enable a beginner in particle sizing to apply one of the methods. On the other hand it is too basic for an expert. The four chapters mentioned above may justify the acquisition of the book by libraries or special labs.

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Oral Mucosal Drug Delivery

Michael J. Rathbone (Edited by) *Drugs and the Pharmaceutical Sciences*, Marcel Dekker, New York; Vol. 74, 1996; 440 pp.; \$175.00; ISBN: 0-8247-9744-2

There are still a number of notable gaps in the Marcel Dekker series, *Drugs and the Pharmaceutical Sciences*. This volume fills one of the more obvious ones in covering the delivery of drugs via the oral mucosal. Although the pharmaceutical and dental literature contains numerous publications on this topic, this work appears to be one of the first to present the whole subject methodically in a single book.

The first chapters review the unique aspects of the oral cavity that make it a distinctive site for drug delivery, viz. its anatomy and physiology, the structure and organisation of the oral mucosal, routes of drug transport through the oral mucosal, salivary mucins, and saliva kinetics. To assess the suitability of a drug for delivery through the oral mucosal its permeability must be determined. The relevant *in vitro* and *in vivo* methods for measuring permeability are discussed in some detail over three chapters that include *in vitro* methods, cell cultures and *in vivo* techniques. There follows a chapter dealing with one of the major problems encountered in oral mucosal drug delivery, the saliva. The location of the sites of secretion are discussed, as well as flow patterns of saliva in the oral cavity. The implications of these flow patterns for oral mucosal drug delivery are discussed in this excellent contribution. Salivary mucins are then comprehensively described, followed by a discussion of the use of mucoadhesive hydrogels for buccal delivery.

The remaining chapters of this book describe delivery systems used in the oral cavity. A review of systemic drug delivery is presented, followed by a chapter devoted to the use of patches. Chewing gum as an oral mucosal drug delivery system also finds its place here. Concluding the book we find two chapters describing local delivery of specialist areas of the mouth: the periodontal pocket and the teeth.

This book achieves its goal splendidly, i.e. to present a comprehensive summary of the current state of research into oral mucosal drug delivery. I particularly found the extensive citations out of the dental literature very interesting, for they prove to be of great relevance to pharmaceuticals. This book is an ideal introductory text for a scientist or graduate student new to the field of oral mucosal drug delivery.

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