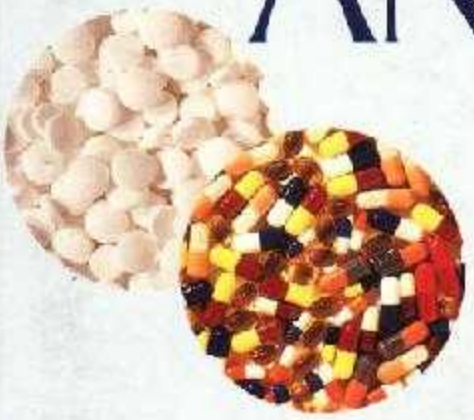
Pharmaceutical ANALYSIS



A Textbook for Pharmacy Students and Pharmaceutical Chemists

David G. Watson

CHURCHILL LIVINGSTONE

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Note
Medical knowledge is constantly changing. As new information becomes available, changes in treatment, procedures, equipment and the use of drugs become necessary. The author and the publishers have, as far as it is possible, taken care to ensure that the information given in this text is accurate and up-to-date. However, readers are strongly advised to confirm that the information, especially with regard to drug usage, complies with the latest legislation and standards of practice.

Preface

I have aimed this book at an undergraduate audience of pharmaceutical science and chemistry students and the book gives an introduction to all the major techniques used in the analysis of pharmaceuticals

Rapid advances have been made in many analytical techniques over the last 10 years. To a larger extent than in many industries the quality control of pharmaceuticals has become very important and has driven the development of analytical techniques, particularly chromatographic techniques. Most of the existing books on pharmaceutical analysis tend to try to cover every aspect of a technique including elements in the technique which may be very seldom used and thus comprehensive books on this topic are long. I have covered a wide range of techniques in a relatively small amount of space by selecting what I consider to be the most important points involved in each technique, working on the theory that it is better to have grasped a few keypoints rather than a large number of facts which are best consulted when a particular problem with a technique arises. Thus for in-depth coverage of the more esoteric aspects of a technique, it would be better to consult a specialist textbook on that particular technique.

I have included self-assessment exercises to bring out the keypoints in most of the chapters and there is particular emphasis on simple arithmetical calculation of results from analytical data because, although this is easy after practice, the decline in arithmetical skills at undergraduate level requires some remedial attention.

One aspect of drugs that is not examined by other books on pharmaceutical analysis is the importance of the concept of a p*K*a value, which has a bearing on a number of areas of analysis: this topic is not covered with any emphasis in most chemistry courses and I have tried to give it a particular emphasis in this book. Stereochemistry is also sometimes a source of confusion and its relation to drugs is discussed alongside some useful examples of this concept. As well as the instrumental techniques, I have also considered titrimetric methods which are still extensively used, particularly by pharmacopoeial monographs. I have had hands-on use of most of the instrumental techniques covered in the book (apart from capillary electrophoresis), where I have had to rely on the vicarious experience of seeing PhD students use this increasingly important technique, and near infrared and Raman spectroscopy, to which I do not have access.

The longest chapter deals with high-pressure liquid chromatography, which is the most widely used technique for the quality control of pharmaceuticals and which could fill several books until one realises that many analyses are based on a few

simple methods. Since my primary research interest has been in chromatography in conjunction with mass spectrometry I have resisted the temptation to describe this technique in too much depth since it is not central to pharmaceutical analysis, except perhaps in the burgeoning area of biotechnologically produced drugs. Mass spectrometry and nuclear magnetic resonance spectroscopy are usually placed among the more complex spectrochemical techniques and I have tried to reduce their complexity by showing their relevance to the analysis of drugs, which are often rather simple molecules compared to complex natural products where such techniques are relied on heavily to provide a solution to an unknown chemical structure. I have treated statistics fairly superficially since much of the time simple statistics are sufficient to determine whether or not an analysis is reliable.

I would like to thank my colleagues in the Department of Pharmaceutical Sciences for being such an entertaining bunch of people with which to share the frustrations of academic life in the late 20th century. Finally, I should also like to thank my wife and daughter for their patience with the late hours required to write this book in the face of a busy lecturing and research schedule.

D. G. Watson 1999

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