

scientific library would be complete without it. It is perfectly suited to those of advanced undergraduate level and beyond, although others will find it useful reading.

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**High Performance Liquid Chromatography in Biotechnology.** Edited by William S. Hancock, John Wiley & Sons Ltd, Chichester, 1990. x + 564 pp. Price: £74.35. ISBN 0 471 82584 0.

High performance liquid chromatography is far more important to the field of biotechnology than that of the previous chromatographic methods. It has become so important that it can, and has been, applied to most phases of biotechnological research and development, and is being used increasingly in product analysis.

*High Performance Liquid Chromatography In Biotechnology* gives a broad based overview of the applications of HPLC, covering the major techniques, e.g., reversed phase, ion exchange, affinity and hydrophobic interaction chromatography. There are also more detailed looks at specific examples of separations e.g., polypeptide sample purification of HPLC or antigenic proteins and vaccines. This balance between the theoretical and the in-depth application of HPLC provides an excellent summary of the uses, both actual and potential, which the biotechnology field has for HPLC. The book then describes in detail how HPLC is utilised for these tasks.

Although there are theoretical sections of the book, there is no escaping the fact that Hancock has designed his volume to be practically based. There is a great deal of technical data and information that will make the book far more suited to the scientist who is working with PLC and requires an analytical tool. It would be difficult to recommend this book to the scientist who requires only a theoretical introduction to the uses of HPLC in biotechnology. In fact, there is so much technical information in this book (most pages contain a table or spectra of some type) that many scientists new to the field could be confused or put off. For this reason the book will only have a valid place in the library of an HPLC chromatographer, or a scientist wishing to further improve his HPLC technique. Those wishing for an introduction to the field would

be well advised to look elsewhere. Because of the book's content and style, it will command a place in any large, comprehensive science based library.

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**Multidimensional Chromatography: Techniques and Applications.** Edited by H. J. Cortes, Marcel Dekker Inc., New York, 1990. viii + 378 pp. Price: \$99.75. ISBN 0 8247 9136 8.

Chromatographic techniques have aided the carbohydrate researcher in the characterization of carbohydrates and glycoproteins with regards to structural studies and molecular weight/size determinations. The present knowledge on the action and specificity of carbohydrate hydrolyzing enzymes were also elucidated with these separation cum analytical techniques. Many of these studies involved the collection and concentration of chromatographic fractions and the further fractionation and analysis of these individual functions. Such techniques were laborious, time-consuming and, in some cases, required significant amounts (milligram to gram level) of the samples. As basic investigations become more advanced and analysis becomes more complex, analytical tools are required to have even lower detection limits and greater resolving power.

Multidimensional chromatography is a technique in which fractionation is carried out by continuous serial application of more than one separation mechanism, whilst maintaining the integrity of separation achieved in one stage through to the next stage. This procedure, therefore, reduces analysis time and, at the same time, enhances resolution and sensitivity, in particular, of very complex mixtures.

This book is a timely and comprehensive summary of all the important aspects of multidimensional separations (i.e. theoretical aspects, instrumentation and applications), in the hope to promote the technique, which although extremely powerful and not at all very recent and untried, is still under-utilized.

This book opens with the definition and theoretical information of multiple dimensions in analytical separation. Following chapters deal with the more established multidimensional techniques involving thin-layer, gas and liquid chromatography. Recent developments such as the coupling of liquid chromatography (LC) to gas chromatography (GC),