

Biochromatography: Theory and Practice. M. A. Vijayalakshmi (ed.). Taylor and Francis Books Ltd., 11 New Fetter Lane, London EC4P 4EE. 2002. 526 pp. Price: £ 110.

Living in an era of proteomics, high throughput screening and computer graphics, biochemists can be excused for sometime forgetting that for real applications, it is necessary to isolate and purify proteins. In fact, within this country, there is little research activity in the area of bioseparation. Elsewhere, increasing availability of upstream processes like cloning, tissue culture, engineering of protein and directed evolution of biological activities have resulted in renewed efforts in developing more efficient strategies for downstream processing of proteins. There has been a phase wherein research workers thought that expensive chromatographic techniques would ultimately be replaced by more easily scalable and cheaper non-chromatographic approaches. By now, it is (to paraphrase Jane Austen's immortal sentence) universally acknowledged that a biochemist in search of a pure protein has to employ chromatography at some point or the other. This is because no other technique has given high resolution of the level provided by chromatography via multiple theoretical plates. (Counter current distribution gives higher resolution but it is not so practical.) Biochromatography, thus is a very relevant and necessary tool of our times. The book under review, edited by Viji (as she is known among her friends and collaborators), provides a comprehensive treatment to this important technique.

The editor explains in the first chapter that 'biochromatography' is the chromatography of biological molecules. However, much of the information and examples in the book pertain to peptides and proteins. The two exceptions are chapter 14 (on capillary electrokinetic chromatography) and chapter 15 (on imprinted polymers), wherein some applications of the technique to aromatic compounds, steroids and herbicides can be found. This disproportionate emphasis on proteins is understandable as much that is novel in the area of chromatography in the last two decades has been in the area of protein bioseparation.

Introduction of Sephadex range of materials by Pharmacia (now known as Amersham Pharmacia Biotech) for gel filtration (chapter 2) was an early milestone in peptide/protein chromatography. Over the years, Pharmacia as well as others have introduced many other gel filtration media. We personally would have preferred a little more help in choosing the right gel filtration media for specific needs, from the bewildering choice available today.

The third chapter on ion exchange chromatography along with the seventeenth chapter (on engineering aspects of industrial biochromatography) constitute a good introduction to chromatography of proteins in general and can be used profitably as a course material on the subject. Chapters 4–12 are devoted to affinity chromatography (puritans may object to our including chapter 4 on 'hydrophobic interaction chromatography' in this). Affinity chromatography started with the idea of using biologically relevant molecular recognition pairs like enzyme/substrate and enzyme/coenzymes for enhancing the selectivity of the chromatographic process. Over the years, ligands like dyes, metal coordination compounds and peptide libraries have become equally common as affinity ligands. Thus, molecular recognition now being exploited in affinity chromatography need not have any biological significance. These chapters contain the usual information found in similar chapters elsewhere. The authors besides being the same, are saying more or less the same thing. The advantage is that you get it in one single book. One sorely misses any discussion on combinatorial chemistry for generating affinity ligands.

Chapter 13 is a good overview of structural aspects of glycoconjugates and their biochemical importance. Lectins, with their capacity to identify glycoconjugates, have both *in vivo* and *in vitro* significance. The chapter focuses rather narrowly on separation of glycopeptides on lectin columns. Capillary electrophoresis can be operated in various ways. One such version of this technique, micellar electrokinetic chromatography (MEKC), is discussed in chapter 14.

Chapter 15 is a brief summary of fairly extensive work on imprinted polymers. As pointed out by the authors, this term has also been used for describing an

altogether different phenomenon related to nonaqueous enzymology. Molecular imprinting is an important innovative technique of our times.

Chapter 16 (by Voute) and chapter 17 (by Cabral's group) touch upon the quantitative and engineering aspects of chromatography. The former, surprisingly, does not touch upon weak interaction chromatography. Process validation is referred to in chapter 17, and is discussed in slightly greater detail by Lutsch in chapter 18. Curiously, this chapter on validation departs from the format used in the rest of the book for providing references.

The last chapter (chapter 19) deals with the use of chromatography in designing blood purification systems and also appropriately discusses the issue of biocompatibility with respect to these extracorporeal shunts. Thus, 19 chapters are covered in 526 pages. There are some avoidable typographic errors like 'HO' instead of 'Ho' for the author's name in the legend to figure 1.2.

The book title raises the hope that it will cover both theory and practice. However, this one does not belong to the 'cook book' genre.

Lastly, the chromatographic technique as applied to biological crude broths has undergone some definite paradigm shifts by the introduction of stable, fluidized beds and perfusion media. The book fails to alert or educate readers regarding this aspect. Also, a comparison with non-chromatographic techniques for the purpose of emphasizing USP of chromatographic approach (if for nothing else) would have been welcome.

None of this, of course, seriously detracts from the usefulness of this valuable addition to the important reference material on bioseparation. The contributing authors constitute a good list of 'who's who' in chromatography; so readers get to hear straight from the 'horse's mouth'.

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