



Enzyme Technology. S. Shanmugam and T. Sathishkumar. I. K. International Publishing House Pvt Ltd., S-25, Green Park Extension, Uphaar Cinema Market, New Delhi 110 016, India. 2009. 213 pp. Price: Rs 145.

We live in an era wherein it is a normal practice to find out the primary sequence of a protein by sequencing its gene. Today, if you advertise for a post in a research project, all applicants are bound to be familiar with PCR, cloning and bioinformatics. We have made progress in this country as far as teaching of modern biology is concerned. If you happen to seek a candidate who knows how an enzyme is assayed, purified (other than through some kit!), you are bound to be disappointed. People who work with proteins/enzymes especially their applied aspects are an endangered species. The area is no longer fashionable so there are very few schools left which can train people in the basic or applied aspects of enzymology. Some of the protein chemistry and enzymology is being rediscovered by people who work with proteomics. Hence, it is with mixed feelings of surprise, nostalgia and pleasure that I received a copy of this book called *Enzyme Technology*.

What is this area called enzyme technology? You do not find it on the pages of *J. Biol. Chem.* or similar journals. If you are not obsessed by impact factors, you may come across journals like *Biotechnology & Bioengineering*, *Process Biochemistry*, *Biocatalysis & Biotransformations* and few others. Therein, you will see the work which forms the basis of industrial R&D in life sciences which has now become a respectable word – Biotechnology.

Biotechnology, mostly, is either about producing enzymes or using them. These are the sort of aspects which this small book aims to cover. I use this adjective small as there are bigger volumes on this subject.

Enzyme Technology is an old fashioned word; applied enzymology or applied biocatalysis are the terms which have also been used. These days, we have white biotechnology (which puts industrial enzymology in the context of sustainable technology), red biotechnology (dealing with high value products such as pharmaceuticals) and green biotechnology (plant biotechnology). Nevertheless, the *Enzyme Technology* adequately describes what is covered in the present book. In this area, a book has to essentially cover: What are enzymes? How do they behave? How are they obtained? What are their uses? This book manages to cover all this.

After a short history (chapter 1), it outlines the IUBMB way of classifying and giving name and a number each to the enzymes (chapter 2). The next two chapters deal with isolation and purification. These are followed by chapters on enzyme kinetics, immobilization and various applications. One application, i.e. biosensors forms a separate and last chapter (chapter 8) of the book. At the end, tables for preparing buffers which are used in enzymology are given and that is not a bad idea.

Photographs (not very flattering versions in most of the cases!) of various scientists are given at various places in the book. I like the intention although I doubt that current generation cares much for the sense of history and people who created history.

The best is the chapter 5 on enzyme kinetics. It covers all essentials. Many of even bigger books do not mention uncompetitive inhibitor whereas this one does (page 91). However, do not expect a rigorous treatment. Chapter 7 gives a good idea about industrial enzymology. Therapeutic enzymes are covered in half a page. Even if the title of the book is enzyme technology, it would have been more than appropriate to mention therapeutic proteins. 'In 2006, recombinant biopharmaceuticals alone had global sales of nearly \$65 billion. That figure represents between 10 to 15% of the world's pharmaceutical market' (*Genet. Engg. & Biotechnol. News*, 2009, Jan. 1, p. 18). The chapter of little value is the

one possibly on purification (chapter 4). It is difficult to understand why TLC has been talked about! It also mentions FPLC but fails to explain how it is different from HPLC. The chapter also gives the impression that CNBr activation method is the only way to create an affinity media. It also does not say much about affinity ligands.

One of the major missing aspects is the use of enzymes in synthesis and kinetic resolution. Enzyme function in low water media such as organic solvents, reverse micelles or ionic liquids is completely missing. The justification perhaps is that such topics are not yet part of syllabi of various universities. However, that area is fast emerging and is already a very important component of 'enzyme technology'.

Equally disturbing is the omission of all recombinant DNA based technologies. Cloning, expression systems, protein refolding, protein engineering and directed evolution are not discussed. As far as sourcing enzymes is concerned, recombinant organisms; transgenic plants and animals and metagenomics should be mentioned.

This book can substitute for class notes. For Rs 145, it is a steal. It does not aim to inspire (except by those photographs) or motivate. It does not even provide any references for further reading.

Finally, we must realize that lot of efforts go in writing any book. The authors are to be congratulated in packing so much information in so few pages which is not a mean achievement. It is a book worth having on the shelf. You may like to checkup on something real fast and chances are that you would find that mentioned here. I think most of the young workers in R&D of biotechnological industries would find it useful for a quick introduction. I also hope that after having got whatever they quickly wanted, the students would also refer to some other books as well for a more comprehensive and rigorous understanding.

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