

Biotechnology: Principles & Applications

Edited by I.J. Higgins, D.J. Best and J. Jones

Blackwell Scientific Publications; London, 1985

422 pages. Paperback £16.50, Hardback £32.50

This is a compendium volume with seventeen contributions from both academia and industry producing ten chapters. These cover a general introduction 'What is Biotechnology', 'Energy and Biotechnology', 'Food, Drink and Biotechnology', 'Chemistry and Biotechnology', 'Materials and Biotechnology', 'The Environment and Biotechnology', 'Genetics and Biotechnology', 'Medicine and Biotechnology', 'Applications and Biotechnology' and 'Chemical Engineering and Biotechnology'.

This book gives a fair coverage of the facts but is somewhat historical in its treatment. Professor Higgins gives an excellent introduction but rather sticks his neck out prophesising that fermentation using animal, plant or microbial cells will slowly replace agriculture for bulk food production. I think this is highly unlikely in view of the costs and the enormous tonnages of foodstuffs needed, and this belief has already led a couple of British companies down a very expensive R & D route with little hope of recouping the costs.

This book contains virtually no illustrations of fermenters, downstream processing plants, etc. that would give students and neophytes some idea of the frequent complexity of the game. Economics only surface in the excellent chapter on Chemical Engineering, the introduction to which should be enlarged and put up on the walls of laboratories specialising in biotechnology, including industrial ones. Unfortunately most of the chapter is devoted to the central reactor; a similar treatment for downstream processing which often controls overall economics would have been very useful.

The chapter on Medical Biotechnology is somewhat breathless but gives good coverage on the whole. However, it does not bring out the advantage of large-scale animal cell culture for those

therapeutic proteins whose maximal activity is dependent on glycosylation. Indeed large-scale animal cell culture is at present a largely British expertise and the lead company (Wellcome) has recently built and commissioned a large-scale production plant in Japan for a Japanese company.

The chapter on Energy and Biotechnology is the best review of the area I have yet seen. It is well balanced, comprehensive and makes no bones about practical difficulties. More could have been made of the application of modern crop improvement biotechnology for forest crops where improvement is in its infancy and great advances could be made if attention on the right scale was paid to this area.

Agriculture and Biotechnology is given a rather uneven treatment in that excessive attention is devoted to nutrient film techniques for plant production and too little to plant cloning by tissue culture, somatogenic modification in culture and to modern developments in direct genetic modification. The commercial plant cloning companies in the UK and elsewhere could have provided useful data and pictures showing the present scale of operation and advantages to breeders and third world countries (dates, oil palm, coconut palm). No mention is made of the urgent need for new crops for European agriculture as a feasible route of getting away from the absurdities of EEC policies (e.g. temperate oil seeds, high protein seeds, etc.).

The other chapters are reasonably comprehensive but not totally up to date. In general this book will serve as introduction to the vast field of Biotechnology for those new to it; for those already involved it is of more limited use.

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