

**BOOK REVIEW**

René H. Wijffels (ed.): **Immobilized Cells**. (54 figs., 8 tabs., VIII + 261 pp., 660 g, Hardcover, US \$ 82). ISBN 3-540-67070-X; Springer Verlag, Berlin, Heidelberg, New York, 2001.

The book, a *Springer Lab Manual*, goes back to a symposium about immobilized Cells: Basics and Applications" held in 1995. Following the introduction of the editor the goal of the symposium was to relate basic research to application. And another aim was to extract guidelines for characterization of immobilized cells in view of process design and application from the contributions. The editor was able to win some excellent specialists as authors and brought together scientists from various disciplines in academia, industry and research institutes. The Lab Manual was then structured in such a way that guidelines that resulted from the conference were followed and translated into some practical methods, in which general aspects of immobilization were covered as well as description of kinetics and engineering aspects. The manual concludes with some recent, promising and practical cases of immobilized cells as examples of applications with potential. The four sections or parts are divided into a various number of chapters (in total 22), different in size and structure as well as regarding the intended aims. Each chapter has its own references list (in total the book represents about 500 cited references and more than 40 addresses of special suppliers) as shown within the following list of the four sections which offers in detail the titles of chapters, author names and (in brackets) number of references:

1. Introduction (RH Wijffels [3 ])

**Immobilization**

2. Description of the Support Material (EJTM Leenen [26]). 3. Description of the Immobilization Procedures (D Poncelet, C. Dulieu, M Jacquot [15]). 4. Measurement of Density, Particle Size and Shape of Support (E van Zessen, J Tramper, A Rinzema). 5. Mechanical Stability of Support (EJTM Leenen [7]). 6. Diffusion Coefficients of Metabolites (EE Beuling [22]).

**Kinetics**

7. Quantity of Biomass Immobilized, Determination of Biomass Concentration (EA Meijer, RH Wijffels [29] ). 8. Kinetics of the Suspended Cells (RH Wijffels [6] ) 9. Diffusion Limitation (RH Wijffels [17]). 10. Micro-Electrodes (D de Beer [40]). 11. Biomass Gradients (RH Wijffels [30]). 12. NMR and Immobilized Cells (J-N Barbotin, J-C Portais, PM Alves, H Santos [54]).

**Engineering**

13. Immobilization at Large Scale by Dispersion (D Poncelet, S Desobry, U Jahnz, K Vorlop [6]). 14. Immobilization at Large Scale with the Resonance Nozzle Technique (JH Hunik [7]) 15. External Mass Transfer (RH Wijffels [19]). 16. Liquid Fluidization of Gel-Bead Particles (E van Zessen, J Tramper, A Rinzema [9]). 17. Gradients in Liquid, Gas, Solid Fractions (RH Wijffels [12]). 18. Support Material Stability at the Process Conditions Used (EJTM Leenen [15]).

**Cases**

19. Immobilized Cells in Food Technology: Storage Stability and Sensitivity to Contamination (CP Champagne [50]). 20. Immobilized Cells in Bioremediation (BM Hall, AJ Mc Loughlin [39]). 21. Plasmid Stability in Immobilized Cells (J-N Barbotin [61]). 22. Immobilization for High-Throughput Screening (NM Nasby, TC Peterson, CJ Silva [26]).

As indicated in the listed titles, the Manual is thought to be for the research specialist as well as for the responsible biotechnologist in the industrial production. It offers a wealth of methods and practical instructions and standards for development and use of methodology in the broad and increasingly important field of cell immobilization, for the qualitative and quantitative investigation of support material and cell parameters, for finding and answering of scientific questions and for application research. On purpose to avoid unnecessary redundancy the chapters are crosslinked with reference to the corresponding sides. Well understandingly written, the book seems also suitable as instruction of interested students or as their introduction into the world of manipulation of cells with regard to industrial production or variation of e.g. pharmaceuticals and food, or to the bioremediation of pollutant chemicals in the environment. That all is exemplarily and fascinatingly represented in the interesting and very stimulating last section: Cases. The reviewer is convinced that this very instructive and useful Manual will find a broad circulation in appropriate time and hopes that during a new edition some misprints still will be eliminated.

HAINFRIED E.A. SCHENK  
University of Tübingen  
ZMBP, Plant Physiology  
Auf der Morgenstelle 1  
D-72076 Tübingen, FRG