BOOK REVIEW

Advances in Biochemical Engineering

Vol. 13.

Mass Transfer and Process Control

Edited by T. K. GHOSE, A. FIECHTER, N. BLAKEBROUGH, Springer Verlag, Berlin, Heidelberg, New York 1979. (214 pages, 134 figures, 311 references)

The recent volume of this series of international renown is mainly devoted to problems of Mass Transfer and Process Control.

The first article in the volume "Application of Microcomputers in the Study of Microbial Processes" by W. Hampel deals with laboratory-scale application of these processes. The inexpensive microcomputers can be used for on-line data acquisition and analysis as well as for process control. The paper also discusses soft-ware and hard-ware problems of fermentor-microcomputer systems and describes in detail the experiences obtained with the system developed by the Technical University of Vienna (Figure 9, References 97).

The second contribution deals with the problem of Dissolved Oxygen Electrodes, a topic of high priority both in research and industry (Y. H. LEE and G. T. TSAO). Recent advances in theory, construction, operation and application of dissolved oxygen (DO) electrodes are reviewed to assist those who use them in biochemical engineering, microbiology and environmental engineering. Basic operating principles of membrane-covered DO electrodes and oxygen microelectrodes are presented together with methods of construction, electrode component selection and general design consideration (20 figures, 150 references).

The aim of H. BRAUER's contribution (Power Consumption in Aerated Stirred Tank Reactor Systems) is to give all biochemists and biochemical engineers working in the field of biotechnology, an insight into the energy transfer in mixing equipment under various operational conditions (31 figures, 16 references).

The last chapter by H. BLENKE: Loop Reactor, gives a thorough theoretical and practical description of the loop reactor, a system operating on new principles and bearing of fundamental importance in the production of SCP. Simple construction and operation, as well as well controlled flow of the system involve low investment and operational costs. In consequence, they can be considered as appropriate bioreactors for multiphase, highly viscous biosystems. Optimal design and operation for large scale production still requires considerable research and development and close cooperation of chemical engineers, microbiologists and bichemists. This paper offers a survey from the aspect of engineering (74 figures, 48 references).

L. NYESTE

Advances in Biochemical Engineering

Vol. 10.

Immobilized Enzymes I.

Edited by: GHOSE, T. K., FIECHTER, A., BLAKEBROUGH, N. Springer Verlag, Berlin, 1978

In volume 10 of the series, 3 studies deal with fundamental information in the field of immobilized enzymes.

Contents/Information:

PITCHER, W. H.: Design and Operation of Immobilized Enzyme Reactors (120 ref.).

The first review deals with the problems of industrial application of immobilized enzymes. Different types of reactors and reactor kinetics are described. Main operation parameters of enzyme reactors (mass transfer, internal and external diffusion, backmixing, heat transfer, activity loss, etc.) are shown in industrial examples, as e.g., glucose isomerase, glucamylase, lactase. The area reviewed includes operation strategy, general design, and economic considerations.

BARKER, S. A., SOMERS, P. J.: Biotechnology of Immobilized Multienzyme Systems (64 ref.)

New possibilities of application for immobilized enzymes, the biotechnology of multienzyme systems bound to synthetic membranes and some immobilized whole cells are discus-

sed. Authors present some possibilities of immobilizing specific sequential enzyme systems and give initial results achieved in this field. Some of these systems, e.g., starch degrading enzyme systems, glucose oxidase-catalase, tryptophanase-lactate dehydrogenase, etc., might be of industrial and analytical importance.

MESSING, R. A.: Carriers for Immobilized Biologically Active Systems (43 ref.)

The review deals with one of the most important problems of immobilized enzymes, the choice of a suitable carrier.

BRODELIUS, P.: Industrial Applications of Immobilized Biocatalysts (206 ref.)

Industrial realization, the most debated area of immobilized enzymes, is discussed in this review. The author describes in detail enzyme engineering aspects of industrial application as well as some currently applied industrial processes: isomerization of glucose to fructose, the production of amino acids and hydrolysis of pennicillins to 6-amino-penicillianic acid.

Furthermore, an overall review is given on the application of immobilized biocatalysts in food and pharmaceutical industries based on the results of pilot plant and laboratory scale experiments.

SOLOMON, B.: Starch Hydrolysis by Immobilized Enzymes (211 ref.)

In the last study, the possibilities of enzymatic hydrolysis of starch, the most widely used natural polysaccharide, are discussed.

Recent results of starch hydrolysis by immobilized enzymes are summarized and its efficiency with that of soluble enzymes is compared.

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