

Book review

Industrielle Mikrobiologie: Second (completely revised) edition (in German), by HANS-JÜRGEN REHM, Springer-Verlag, Berlin, Heidelberg, and New York, 1980, xx + 718 pages, DM 198.00, ~\$117.00.

In addition to the time-honored ways of brewing beer and making bread, cheese, spirits, vinegar, wine, or yeasts, large-scale fermentations generate products that are indispensable for human health, chemical syntheses, and agriculture: alkaloids, amino and other organic acids, antibiotics, insecticides, plant-growth hormones, solvents, vitamins, and others. During the past 27 years, microbiological and biotechnological aspects of these processes have been described in several books [*Industrial Fermentations*, by L. A. Underkofler and R. J. Hickey (1954); *Industrial Microbiology*, by S. C. Prescott and C. G. Dunn (1959), by A. H. Rose (1961), by L. E. Casida, Jr. (1968), and by B. M. Miller and W. Litsky (1976); a multi-volume series on *Economic Microbiology*, by A. H. Rose (1977–); *Microbial Technology*, by H. J. Peppler and D. Perlman (1979); and *Biochemical Engineering*, by R. Steel (1958), and by S. Aiba, A. E. Humphrey, and N. R. Millis, (1973)].

In addition, a textbook of similarly high quality, written in German by H.-J. Rehm, and published in 1967, was based on lectures given by him in Berlin and Munich, and represented the state of fermentation technology at that time. For the second edition of the book, reviewed here, the text was thoroughly revised to reflect the advances that have since occurred in this field. It gives a comprehensive and well-balanced picture of industrially important fermentations and related microbial activities.

The author, who is now associated with the University at Münster, arranged the material into 43 chapters. They cover essentially all of the areas of industrial interest: a brief description of technologically important micro-organisms and their growth requirements, principles of primary and secondary metabolism and metabolic regulation, mutation, selection and recombination, preservation of high-producing strains, and gene technology. The text describes growth kinetics, batch and continuous cultures, immobilized cells, and immobilized enzymes. It also mentions the techniques of animal and plant tissue-cultivation. It reviews the cultivation of edible mushrooms, production of the biomass, and of alcohols, alkaloids, amino and other organic acids, antibiotics, coenzymes, enzymes, gibberellins, lipids, nucleic acids and their constituents, polyols, polysaccharides, and vitamins. Other chapters deal with bio-transformations of steroid and nonsteroid substances, with the production of beer, wine, and fermented foods, with the use of micro-organisms in the treatment of coffee beans and tobacco, with the retting of flax, and with nitrogen fixation. They also describe composting, utilization of agricultural and municipal wastes, methane

production, leaching of metals, oil recovery, and the deterioration and degradation of wood, paints, and other materials.

The clarity of the text is enhanced by the inclusion of 215 drawings of catabolic and biosynthetic pathways, flowsheets, charts, and graphs, of 89 Tables, and of numerous chemical structures and reactions. Each chapter is supplemented with a list of carefully selected, key literature-references, to provide more-detailed information on individual subjects of interest to the reader. Throughout the text, which is remarkably free from errors, the names of the microbial species are cited as they appeared in the original literature, although some of them have since been changed. The book should be valuable as a lucid, accurate, and concise text for instruction on industrial fermentations and applied microbiology. However, its wider acceptance may be seriously limited by two factors: the book is written in German, and its price for the personal library is unusually high.

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