



Biocatalysts and Enzyme Technology

By Klaus Buchholz, Volker Kasche, Uwe Theo Bornscheuer

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An instructive and comprehensive overview of our current knowledge of biocatalysis and enzyme technology. Following an introduction to the history of enzyme applications and the motivations for using these highly selective and environmentally friendly methods, the book goes on to cover enzyme mechanisms and kinetics, production, recovery, characterization and their design, including recombinant methods. Alongside the application of soluble and immobilized biocatalysts, including whole-cell systems, the authors treat the use of non-aqueous reaction systems, applications in organic synthesis, bioreactor design and reaction engineering. In line with the book's didactic approach, a number of case studies further exemplify the advantages of enzyme processes. Each topic includes exercises, designed to facilitate access to this flourishing area of research.

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Editorial Review

Review

"In a field that moves as fast as enzyme technology, the educational impact of a new specialized textbook is dependent on the content being completely up to date. This textbook goes a long way to achieving this aim."
Macromolecular Chemistry and Physics

"This book covers a very wide range of aspects, while also treating the material in depth, and therefore it is a good starting point for readers to approach the fascinating subject of biocatalysis." *Angewandte Chemie*

"The book is not only an excellent guidebook for the technological aspects of biocatalysis/enzyme technology, but also a supreme teaching and reference book and can be highly recommended."
ChemBioChem

"The textbook gives an instructive and comprehensive overview of our current knowledge of biocatalysis and enzyme technology. It is therefore highly recommended to advanced and graduate students in biology, chemistry and biotechnology and bioengineering, as well as engineers or scientists in industry and academia."
Engineering in Life Sciences

"The book ... is structured in a logical and straightforward way ... The book comes across as a solidly constructed textbook, with exercises and ample references at the end of every chapter."
Chemistry & Industry

"Biocatalysts and Enzyme Technology is an instructive and comprehensive overview of current knowledge of biocatalysts and enzyme technology. In each chapter, an introductory survey is provided together with exercises and recent references. This book will be a useful resource for all persons involved in chemistry, biochemistry, biotechnology and process engineering, and will make a real contribution to the flourishing area of enzyme technology."
International Journal of Biological Macromolecules

"This is a nicely produced, reasonably priced volume that should be on the library shelves of any organization concerned with biotechnology. It is an admirable text for final year biotechnology undergraduates and postgraduates."
Journal of Chemical Technology & Biotechnology

From the Back Cover

An instructive and comprehensive overview of our current knowledge of biocatalysis and enzyme technology. Following an introduction to the history of enzyme applications and the motivations for using these highly selective and environmentally friendly methods, the book goes on to cover enzyme mechanisms and kinetics, production, recovery, characterization and their design, including recombinant methods. Alongside the application of soluble and immobilized biocatalysts, including whole-cell systems, the authors treat the use of non-aqueous reaction systems, applications in organic synthesis, bioreactor design and reaction engineering. In line with the book's didactic approach, a number of case studies further exemplify the advantages of enzyme processes. Each topic includes exercises, designed to facilitate access to this

flourishing area of research.

From the contents

- Introduction
- Basics of Enzymes as Biocatalysts
- Enzymes in Organic Synthesis
- Production of Enzymes
- Application of Enzymes in Solution
- Immobilization of Enzymes
- Immobilization of Microorganisms and Cells
- Characterization of Immobilized Biocatalysts
- Reactors and Processes

About the Author

Born in 1941, Klaus Buchholz studied chemistry at the universities of Saarbrücken und Heidelberg, graduating in 1967. In 1969 he received his PhD from the TU Munich, after which he worked as a researcher at Dechema e.V. in Frankfurt/Main until 1982. In 1981 he qualified as a professor at the TU Braunschweig, where he then became department head at the Institute for Agricultural Technology and Sugar Industry. From 1988 onwards he was the provisional Head of the Institute, before becoming Professor for Technology of Carbohydrates at the Institute for Technical Chemistry in 1991. His main research areas include biocatalysts, enzymatic processes for the modification and synthesis of saccharides, environmental biotechnology, flow bed reactors with immobilized biocatalysts, and the synthesis of saccharide polymers.

Volker Kasche, born in 1939, studied chemistry, mathematics, and physics at the University of Uppsala, Sweden, receiving his degree in 1964. This was followed by a year as a NATO research fellow at Brandeis University, USA. He received his doctorate from the University of Uppsala in 1971, and in 1973 became Professor for Physical Biology at the University of Bremen, Germany. He has been Professor for Biotechnology at the TU Hamburg-Harburg, Germany, since 1986, focusing his research on fundamentals of equilibrium and kinetically controlled reactions catalyzed by free and immobilized hydrolases, the production, post-translational processing and purification of penicillin amidases and serine peptidases by affinity chromatography, as well as fundamentals of mass transfer in chromatography and enzyme technology.

Born in 1964, Uwe Bornscheuer studied chemistry at the University of Hanover, Germany, where he graduated in 1990. After receiving his PhD in 1993 from the Institute of Technical Chemistry at the same university, he spent a postdoctoral year at the University of Nagoya, Japan. He then joined the Institute of Technical Biochemistry, University of Stuttgart, Germany, where he qualified as a professor in 1998. He has been Professor for Technical Chemistry & Biotechnology at the University of Greifswald, Germany since 1999. Professor Bornscheuer's main research interest is the application of enzymes in the synthesis of optically active compounds and in lipid modification.

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