Redox Biocatalysis: Fundamentals and Applications
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DESCRIPTION

Paves the way for new industrial applications using redox biocatalysis

Increasingly, researchers rely on the use of enzymes to perform redox processes as they search for novel industrial synthetic routes. In order to support and advance their investigations, this book provides a comprehensive and current overview of the use of redox enzymes and enzyme-mediated oxidative processes, with an emphasis on the role of redox enzymes in chemical transformations. The authors examine the full range of topics in the field, from basic principles to new and emerging research and applications. Moreover, they explore everything from laboratory-scale procedures to industrial manufacturing.

*Redox Biocatalysis* begins with a discussion of the biochemical features of redox enzymes as well as cofactors and cofactor regeneration methods. Next, the authors present a variety of topics and materials to the research and development of full-scale industrial applications, including:

- Biocatalytic applications of redox enzymes such as dehydrogenases, oxygenases, oxidases, and peroxidases
- Enzyme-mediated oxidative processes based on biocatalytic promiscuity
- All the steps from enzyme discovery to robust industrial processes, including directed evolution, high-throughput screening, and medium engineering
- Case studies tracing the development of industrial applications using biocatalytic redox reactions
Each chapter ends with concluding remarks, underscoring the key scientific principles and processes. Extensive references serve as a gateway to the growing body of research in the field.

Researchers in both academia and industry will find this book an indispensable reference for redox biotransformations, guiding them from underlying core principles to new discoveries and emerging industrial applications.

ABOUT THE AUTHOR

Daniela Gamenara, PhD, is Assistant Professor in the Organic Chemistry Department of the Faculty of Chemistry of Universidad de la República, Uruguay. After two short postdoctoral internships, her current scientific interest is the development of enzymatic methodologies for the synthesis of high added-value compounds and natural products as well, together with the use of new trends in organocatalysis for the same purposes.

Gustavo A. Seoane, PhD, is Full Professor and Head of the Organic Chemistry Department of the Faculty of Chemistry of Universidad de la República, Uruguay. His main scientific interest is the use of green procedures for the synthesis of bioactive natural products and analogs, in particular, intensive use of biotransformations to prepare polyoxygenated targets. He works actively to promote the development of biocatalysis in South America.

Patricia Saenz-Méndez, PhD, is Assistant Professor of Physical Organic Chemistry in the Faculty of Chemistry of Universidad de la República, Uruguay. She was previously appointed as postdoctoral fellow at the Örebro University, Sweden, and the National University of Ireland, Galway. Her work is devoted to the experimental and in silico development of biotechnological and organocatalytic tools for the preparation of high added-value chemicals and natural products.

Pablo Domínguez de María, PhD, is Group Leader at the Institute for Technical and Macromolecular Chemistry (ITMC), RWTH Aachen University, Germany. He was previously affiliated with AkzoNobel BV in the Netherlands and Degussa AG in Germany. Dr. Domínguez de María has also worked as a technical freelance advisor on emerging technologies (e.g., catalysis) applied to sustainable chemistry (www.sustainablemomentum.net). He was awarded the Young Scientist Prize by the Iberoamerican Academy of Pharmacy.

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