



# Biocatalysis in the Pharmaceutical and Biotechnology Industries

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Because enzyme-catalyzed reactions exhibit higher enantioselectivity, regioselectivity, substrate specificity, and stability, they require mild conditions to react while prompting higher reaction efficiency and product yields. **Biocatalysis in the Pharmaceutical and Biotechnology Industries** examines the use of catalysts to produce fine chemicals and chiral intermediates in a variety of pharmaceutical, agrochemical, and other biotechnological applications.

Written by internationally recognized scientists in biocatalysis, the authors analyze the synthesis of chiral intermediates for over 60 brand-name pharmaceuticals for a wide range of drug therapies and treatments. From starting material to product, the chapters offer detailed mechanisms that show chiral intermediates and other by-products for each reaction—including hydrolytic, acylation, halogenation, esterification, dehalogenation, oxidation-reduction, oxygenation, hydroxylation, deamination, transamination, and C–C, C–N, C–O bonds formation. Cutting-edge topics include advanced methodologies for gene shuffling and directed evolution of biocatalysts; the custom engineering of enzymes; the use of microbial cells and isolated biocatalysts; the use of renewable starting materials; and generating novel molecules by combinatorial biocatalysis and high-throughput screening.

Focusing on industrial applications, the book also considers factors such as bulk processes, instrumentation, solvent selection, and techniques for catalyst immobilization, reusability, and yield optimization throughout. **Biocatalysis in the Pharmaceutical and Biotechnology Industries** showcases the practical advantages and methodologies for using biocatalysts to develop and produce chiral pharmaceuticals and fine chemicals.



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