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Nota di contenuto	Biocatalysis; Preface; Acknowledgments; Contents; 1 Introduction to Biocatalysis; 1.1 Overview: The Status of Biocatalysis at the Turn of the 21st Century; 1.1.1 State of Acceptance of Biocatalysis; 1.1.2 Current Advantages and Drawbacks of Biocatalysis; 1.1.2.1 Advantages of Biocatalysts; 1.1.2.2 Drawbacks of Current Biocatalysts; 1.2 Characteristics of Biocatalysis as a Technology; 1.2.1 Contributing Disciplines and Areas of Application; 1.2.2 Characteristics of Biocatalytic Transformations; 1.2.2.1 Comparison of Biocatalysis with other Kinds of Catalysis 1.2.3 Applications of Biocatalysis in Industry1.2.3.1 Chemical Industry of the Future: Environmentally Benign Manufacturing, Green Chemistry, Sustainable Development in the Future; 1.2.3.2 Enantiomerically Pure Drugs or Advanced Pharmaceutical Intermediates (APIs); 1.3 Current Penetration of Biocatalysis; 1.3.1 The Past: Historical Digest of Enzyme Catalysis; 1.3.2 The Present: Status of Biocatalytic Processes; 1.4 The

Breadth of Biocatalysis; 1.4.1 Nomenclature of Enzymes; 1.4.2 Biocatalysis and Organic Chemistry, or "Do we Need to Forget our Organic Chemistry?"

2 Characterization of a (Bio-)catalyst

2.1 Characterization of Enzyme Catalysis; 2.1.1 Basis of the Activity of Enzymes: What is Enzyme Catalysis?; 2.1.1.1 Enzyme Reaction in a Reaction Coordinate Diagram; 2.1.2 Development of Enzyme Kinetics from Binding and Catalysis; 2.2 Sources and Reasons for the Activity of Enzymes as Catalysts; 2.2.1 Chronology of the Most Important Theories of Enzyme Activity; 2.2.2 Origin of Enzymatic Activity: Derivation of the Kurz Equation; 2.2.3 Consequences of the Kurz Equation; 2.2.4 Efficiency of Enzyme Catalysis: Beyond Pauling's Postulate

2.3 Performance Criteria for Catalysts, Processes, and Process Routes

2.3.1 Basic Performance Criteria for a Catalyst: Activity, Selectivity and Stability of Enzymes; 2.3.1.1 Activity; 2.3.1.2 Selectivity; 2.3.1.3 Stability; 2.3.2 Performance Criteria for the Process; 2.3.2.1 Product Yield; 2.3.2.2 (Bio)catalyst Productivity; 2.3.2.3 (Bio)catalyst Stability; 2.3.2.4 Reactor Productivity; 2.3.3 Links between Enzyme Reaction Performance Parameters; 2.3.3.1 Rate Acceleration; 2.3.3.2 Ratio between Catalytic Constant k_{cat} and Deactivation Rate Constant k_d ; 2.3.3.3 Relationship between Deactivation Rate Constant k_d and Total Turnover Number TTN

2.3.4 Performance Criteria for Process Schemes, Atom Economy, and Environmental Quotient; 3 Isolation and Preparation of Microorganisms; 3.1 Introduction; 3.2 Screening of New Enzyme Activities; 3.2.1 Growth Rates in Nature; 3.2.2 Methods in Microbial Ecology; 3.3 Strain Development; 3.3.1 Range of Industrial Products from Microorganisms; 3.3.2 Strain Improvement; 3.4 Extremophiles; 3.4.1 Extremophiles in Industry; 3.5 Rapid Screening of Biocatalysts; 4 Molecular Biology Tools for Biocatalysis

4.1 Molecular Biology Basics: DNA versus Protein Level

Sommario/riassunto

The whole range of biocatalysis, from a firm grounding in theoretical concepts to in-depth coverage of practical applications and future perspectives. The book not only covers reactions, products and processes with and from biological catalysts, but also the process of designing and improving such biocatalysts. One unique feature is that the fields of chemistry, biology and bioengineering receive equal attention, thus addressing practitioners and students from all three areas.
