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| Nota di contenuto | Front Cover; Biohydrogen; Copyright; Contents; Contributors; Foreword; Preface; Chapter 1: Biohydrogen Production: An Introduction; Essentials of energy; Hydrogen; Transition toward bioenergy; Genesis of biological H2 production; Photosynthetic Machinery of H2 Production; Dark-Fermentative Biohydrogenesis; In Vitro Hydrogenesis; Electrically Driven Biohydrogenesis; Thermochemical Process; Scientometric evaluation of the research on biohydrogen; Waste as renewable feedstock/substrate for biohydrogen production; Biocatalyst for biohydrogen production; Prospects of biohydrogen domain Acknowledgments References; Chapter 2: Fundamentals of Biohydrogen; Introduction; Enzymes; Overview of hydrogen-producing systems; Direct and Indirect Biophotolysis; Photofermentative Hydrogen Production by Photosynthetic Bacteria; Dark Fermentative Production of Hydrogen; Hydrogen Production in Microbial Electrolysis Cells; Use of Hybrid Systems; Tools; Conclusion; Acknowledgments; References; Chapter 3: Metabolic Engineering of Microorganisms for Biohydrogen Production; Introduction; Biophotolysis; General Overview; Improvement of Biophotolysis; Photofermentation; General Overview Photosystem Enzymes; Carbon Metabolism and Metabolic-Flux Analysis; Dark fermentation; General Overview; Metabolic Engineering for Extending Substrate Utilization; Metabolic Engineering of H2-Producing Native Pathways in Dark Fermentation; Incorporation of Nonnative Pathways for H2 Production in Dark Fermentation; Metabolic |

Reconstruction and In Silico Modeling; Perspectives and future directions; Acknowledgments; References; Chapter 4: Insurmountable Hurdles for Fermentative H2 Production?; The first hurdle is the thermodynamic limitation
The second hurdle is incomplete oxidation of substrate Engineering H2 pathways with maximum capability; Conclusion; References; Chapter 5: Hydrogenase; Introduction; Three distinct classes of hydrogenases; [NiFe]-hydrogenases; Group 1, Membrane-Bound [NiFe]-Hydrogenase (MBH); Group 2, Soluble Uptake [NiFe]-Hydrogenase; Group 3, Bidirectional Heteromultimeric Cytoplasmic [NiFe]-Hydrogenase; Group 4, Membrane-Associated, Energy-Converting [NiFe]-Hydrogenase; Group 5, High-Affinity [NiFe]-Hydrogenase; [Fe]-hydrogenases; [FeFe]-hydrogenases; [FeFe]-Hydrogenase Active Site Biosynthesis
Diversity in [FeFe]-Hydrogenase Domain Structure and Interaction with Metabolism Monomeric Forms; Multimeric [FeFe]-Hydrogenases; Multiple Pathways for Electron Flow to [FeFe]-Hydrogenase in Clostridia; Conclusion; Acknowledgments; References; Chapter 6: Biohydrogen Production from Organic Wastes by Dark Fermentation; Introduction; Present Energy Scenario; Benefits of Renewable Economy; Toward a Carbon-Neutral Fuel; Conventional Hydrogen Production Technologies and Limitations; Biohydrogen Production Technology; Microbiology of dark fermentative bacteria; Facultative Anaerobic Bacteria
Obligate Anaerobic Bacteria

Sommario/riassunto

This book provides in-depth information on basic and applied aspects of biohydrogen production. It begins with an introduction to the topic, and follows with the basic scientific aspects of biohydrogen production, such as the enzyme involved in biohydrogen production, the microorganisms and metabolic engineering information. It then provides state-of-art information on various aspects of biohydrogen production methods such as from solid wastes, from industrial effluents, thermo-chemical route for biohydrogen production, etc. It also includes information on engineering aspects such as the