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Biodegradation; 1.9.4 *Escherichia coli*: A Candidate Extremophile; 1.9.5 Oil-Spill-Cleaning Bacteria; 1.9.6 Potential Applications and Benefits 1.10 Implications of Engineered Extremophiles on Ecology, Environment, and Health 1.11 Conclusions and Recommendations; References; 2 ATTAINING EXTREMOPHILES AND EXTREMOLYTES: METHODOLOGIES AND LIMITATIONS; 2.1 Introduction; 2.2 Extremophiles: Types and Diversity; 2.2.1 Thermophiles; 2.2.2 Psychrophiles; 2.2.3 Halophiles; 2.2.4 Alkaliphiles; 2.2.5 Acidophiles; 2.2.6 Barophiles; 2.3 Extremolytes; 2.3.1 Production and Purification of Extremolytes; 2.3.2 Detection, Identification, and Quantification of Extremolytes; 2.3.3 Limitations; 2.4 Conclusions; References 3 STRATEGIES FOR THE ISOLATION AND CULTIVATION OF HALOPHILIC MICROORGANISMS 3.1 Introduction; 3.2 Thalassohaline and Athalassohaline Hypersaline Environments; 3.3 Case Studies; 3.3.1 Isolation of Aerobic Chemoheterotrophic Archaea from Solar Salterns; 3.3.2 Magnesium-Requiring and Magnesium-Tolerant Archaea from the Dead Sea; 3.3.3 Isolation of Acidophilic Halophilic Archaea; 3.3.4 Isolation of Unusual Anaerobic Halophiles from Deep-Sea Brines; 3.3.5 Isolation of Polyextremophilic Anaerobic Halophiles; 3.3.6 Isolation of Halophilic Microorganisms Associated with Plants and Animals 3.3.7 Isolation of Halophilic Archaea from Low-Salt Environments 3.4 The Upper Salinity Limits of Different Types of Energy Generation; 3.5 Final Comments; References; 4 HALOPHILIC PROPERTIES AND THEIR MANIPULATION AND APPLICATION; 4.1 Introduction; 4.2 Industrial Applications of Halophilic Organisms and Their Proteins; 4.3 Extreme and Moderate Halophiles and Their Proteins; 4.4 Generation of Low-Salt Stable Extreme-Halophilic Proteins; 4.5 Interconversion of Halophilic and Nonhalophilic Proteins; 4.5.1 Dimer-Tetramer Conversion of HaNDK and PaNDK; 4.5.2 Generation of Halophilic PaNDK 4.6 Soluble Expression of Recombinant Proteins

Sommario/riassunto

Explores the utility and potential of extremophiles in sustainability and biotechnology. Many extremophilic bio-products are already used as life-saving drugs. Until recently, however, the difficulty of working with these microbes has discouraged efforts to develop extremophilic microbes as potential drug reservoirs of the future. Recent technological advances have opened the door to exploring these organisms anew as sources of products that might prove useful in clinical and environmental biotechnology and drug development. Extremophiles features outstanding articl
