

1. Record Nr.	UNINA9910506376603321
Titolo	Microbial communities and their interactions in the extreme environment / / Dilfuza Egamberdieva [and three others], editors
Pubbl/distr/stampa	Gateway East, Singapore : , : Springer, , [2021] ©2021
ISBN	981-16-3731-8
Descrizione fisica	1 online resource (348 pages)
Collana	Microorganisms for sustainability ; ; Volume 32
Disciplina	578.758
Soggetti	Extreme environments - Microbiology Microbial ecology Biotechnology - Environmental aspect
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	Intro -- Foreword -- Contents -- About the Series Editor -- About the Editors -- Chapter 1: Extremophiles in Saline Environment: Potential for Sustainable Agriculture -- 1.1 Introduction -- 1.2 Microbial Diversity Under Saline and Drought Conditions -- 1.3 Plant Growth Promotion and Stress Tolerance -- 1.4 Mechanisms of Plant Growth Stimulation -- 1.5 Conclusion -- References -- Chapter 2: Insights into the Microbial Diversity in Saline-Alkaline Soils of China -- 2.1 Introduction -- 2.2 The Characteristics and Distribution of Saline Soils in China -- 2.2.1 Distribution of Saline-Alkali Soil in Northwest China -- 2.2.2 Distribution of Saline-Alkali Soil in Northeast China -- 2.3 Culture-Independent Microbial Diversity and Its Related Influencing Factors in Saline Soils -- 2.3.1 Bacterial Diversity in Saline-Alkali Soil of Northeast China -- 2.3.2 Arbuscular Mycorrhizal Fungal Diversity in Saline-Alkali Soil of Northeast China -- 2.3.3 Archaeal Diversity in Saline-Alkali Soil of Northwest China -- 2.4 Culture-Dependent Haloalkaliphilic Resources from Saline Soils -- 2.4.1 Haloalkaliphilic Microorganisms in Northwest Saline-Alkali Soil -- 2.4.2 Haloalkaliphilic Microorganisms in Northeast Saline-Alkali Soil -- 2.5 Halophiles and Alkaliphiles in Biotechnology -- 2.6 Conclusions and Future Perspectives -- References -- Chapter 3: Microbial Diversity of High-Altitude Geothermal Springs in Tajikistan -- 3.1 Introduction -- 3.2 Geothermal

Springs in Tajikistan and their Geochemical Profiling -- 3.3 Bacterial Diversity of Geothermal Springs in Tajikistan Based on Cultivation-Dependent and Molecular Studies -- 3.4 Biotechnological Potential of Thermophilic Isolates Obtained from Tajik Geothermal Springs -- 3.5 Conclusions and Future Perspectives -- References.

Chapter 4: Study of Bacterial Diversity from Saline Environments (Salt Mines) of Pakistan and their Applications at Regional L... -- 4.1 Introduction -- 4.2 Phylogenetic Analysis of Halophiles -- 4.3 Strategies of Halophiles for Adaptation to High Salt Environments -- 4.4 Geographical Distribution of Salt Mines in Pakistan -- 4.5 Bacterial Diversity of Halophilic Environments in Pakistan by Culture-Dependent and Culture-Independent Methods -- 4.5.1 Methodology -- 4.6 Study of Bacterial Diversity by Culture-Dependent Method from Pakistan Salt Mines -- 4.6.1 Karak/Bahadur Khel Salt Mines -- 4.7 Validly Published Novel Bacterial Species Isolated from Karak Salt Mines, Pakistan -- 4.7.1 *Bacillus pakistanensis* sp. nov and *Kushneria pakistanensis* sp. nov -- 4.7.2 Khewra Salt Mines -- 4.8 Study of Bacterial Diversity by Culture-Independent Method from Pakistan Salt Mines -- 4.8.1 Karak/Bahadur Khel Salt Mines (16S rRNA Illumina Amplicon Sequencing) -- 4.8.2 Khewra Salt Mines (High-Throughput Sequencing of the 16S rRNA Gene) -- 4.9 Potential Applications of Bacterial Strains Isolated from Saline Habitats of Pakistan -- 4.10 Conclusions and Future Perspectives -- References -- Chapter 5: Taxonomic Characteristics of Dominant Microbial Communities in Hot Spring Sediments in Western Georgia -- 5.1 Introduction -- 5.2 Zugdidi-Tsaishi Geothermal Field -- 5.3 Physicochemical Parameters of Geothermal Waters in the Zugdidi-Tsaishi Region -- 5.4 Taxonomic Profiles of the Thermal Spring Sediments -- 5.5 Conclusion -- References -- Chapter 6: Analysis and Characteristics of Thermal Springs in Kazakhstan -- 6.1 Introduction -- 6.2 Geographical Distribution and Formation of Geothermal Springs in the Territory of the Republic of Kazakhstan -- 6.2.1 Mangyshlak-Ustyurt System of Thermal Springs -- 6.2.2 Syrdarya Artesian System of Thermal Springs. 6.2.3 Ili Artesian System of Thermal Springs -- 6.3 Microbiological Analysis -- 6.4 Conclusion -- References -- Chapter 7: Purple Photosynthetic Bacteria: A Brief Research Overview on Distribution in Armenia and Biotechnological Applicati... -- 7.1 Introduction -- 7.2 Ecology and Biodiversity of Photosynthetic Bacteria of Different Geographical Zones of Armenia -- 7.2.1 Photosynthetic Bacteria of Mineral Springs of Armenia -- 7.2.2 Photosynthetic Bacteria of Natural Water Sources of Armenia -- 7.2.3 Photosynthetic Bacteria of the Soda Saline Soils of the Ararat Valley -- 7.2.4 Taxonomy of Domestic Strains of Purple Photosynthetic Bacteria -- 7.3 The Importance of Photosynthetic Bacteria in Biotechnology -- 7.3.1 Enzymatic Activity of Photosynthetic Bacteria -- 7.3.1.1 Aspartase Activity -- 7.3.1.2 Aminoacylase Activity -- 7.3.1.3 Asparaginase Activity -- 7.3.2 Synthesis of Carotenoid Pigments by Purple Photosynthetic Bacteria -- 7.3.3 Synthesis of Vitamins -- 7.3.4 Synthesis of 5-aminolevulinic Acid -- 7.4 Conclusion -- References -- Chapter 8: The Genus *Thermus*: A Brief History of Cosmopolitan Extreme Thermophiles: Diversity, Distribution, Biotechnological ... -- 8.1 Introduction -- 8.2 Taxonomy and Phylogeny -- 8.3 Morphology, Physiology, Metabolism, and Biochemical Characteristics -- 8.4 Ecology and Distribution -- 8.5 Genome Structure and Natural Competence -- 8.6 Biotechnological Potential and Applications of *Thermus* -- 8.6.1 *Thermus* as Source of Extremozymes -- 8.6.1.1 Lipolytic Enzymes -- 8.6.1.2 Proteases -- 8.6.1.3 Pullulanases, Xylanases, and Other Polymer Degrading Thermozyms -- 8.6.1.4 Nucleic Acid Manipulation Tools -- 8.6.1.5

Other Extremozymes with Biotechnological and Industrial Relevance -- 8.6.2 Host-Vector Systems and Cell Factories -- 8.6.3 Thermus as Metal-Converters and Possible Applications in Bioremediation -- 8.7 Conclusion.

References -- Chapter 9: Thermoacidophiles for Bioleaching of Copper -- 9.1 Introduction -- 9.2 Bioleaching of Sulfide Minerals -- 9.2.1 Mechanisms of Oxidation of Sulfide Minerals -- 9.2.2 Microorganisms Involved in the Leaching of Sulfide Minerals in Technological Processes -- 9.2.3 Factors Affecting the Intensity of Leaching of Sulfide Minerals in Technological Processes -- 9.2.3.1 Influence of the Composition of Microbial Consortia -- 9.2.4 Bioleaching of Chalcopyrite -- 9.2.4.1 Effect of Growth Conditions -- 9.2.4.2 Effect of Concentration of Substrate -- 9.2.4.3 Effect of pH -- 9.2.4.4 Effect of Pulp Density -- 9.2.4.5 Effect of Particle Size -- 9.2.4.6 Effect of Oxidative-Reductive Potential -- 9.2.4.7 Influence of Ferric Iron ( $Fe^{3+}$ ) -- 9.2.4.8 Tolerance of Microorganisms to Copper Ion -- 9.2.4.9 Oxidation of  $CuFeS_2$  by Mixed Cultures -- 9.3 Conclusion -- References -- Chapter 10: Extreme Thermophilic Microorganisms as an Unique Source of Inspiration for Next Generation Biotechnological Produc... -- 10.1 Introduction -- 10.2 Thermophilic Environments and Their Microbial Biodiversity -- 10.3 Thermophilic Microorganisms as a Unique Source of Inspiration for Next Generation Biotechnological Products -- 10.3.1 Enzymes -- 10.3.1.1 Proteases -- 10.3.1.2 Amylases -- 10.3.1.3 Lipases -- 10.3.2 Antimicrobial Agents -- 10.3.3 Biorefining -- 10.3.4 Biofuel -- 10.3.5 Biomining -- 10.3.6 Biosurfactant Production -- 10.3.7 Waste Treatment -- References -- Chapter 11: Biodiversity, Ecological, and Commercial Importance of Psychrophilic Microorganisms -- 11.1 Introduction -- 11.2 Cold Habitats -- 11.2.1 Atmosphere and Clouds -- 11.2.2 Snow -- 11.2.3 Cryoconite Holes -- 11.2.4 Glaciers -- 11.2.5 Permafrost -- 11.2.6 Deep Oceans -- 11.3 Adaptation in Psychrophiles -- 11.3.1 Cellular Mechanism of Cold Adaptation -- 11.3.2 Protein Adaptation to Cold. 11.3.3 Enzyme Mechanism in Cold Adaptation -- 11.3.4 Other Factors Affecting Enzyme Adaptation -- 11.3.5 Cold-Adapted Enzymes and Climate Change -- 11.3.6 Ice Binding Proteins -- 11.3.6.1 Antifreeze Proteins (AFP) -- 11.3.6.2 Ice Nucleation Proteins (INP) -- 11.4 Biotechnological Applications -- 11.4.1 Applications in Agriculture -- References -- Chapter 12: Microbial Stress Response to Heavy Metals -- 12.1 Introduction -- 12.1.1 Environmental Features of Heavy Metals -- 12.1.2 Effects of Heavy Metals on Plants -- 12.1.3 Mechanisms of Protection of Microorganisms from Toxic Effects of Heavy Metals -- 12.2 Methods -- 12.2.1 Determination of the Resistance of Micromycetes to Heavy Metals -- 12.3 Results and Discussion -- 12.3.1 Screening of Micromycetes Resistant to High Concentrations of Heavy Metals -- 12.3.2 Changes in the Content of Mobile Zinc in Soil Inoculated with Micromycetes -- 12.3.3 Study of the Effect of Micromycetes on Plant Resistance to Heavy Metals -- 12.4 Conclusion -- References -- Chapter 13: Heavy Metal Resistance in Prokaryotes: Mechanism and Application -- 13.1 Heavy Metals and Its Toxicity on Microbes -- 13.2 Microbial Heavy Metal Transporters -- 13.3 Heavy Metal Resistance in Prokaryotes -- 13.3.1 Active Transport of Heavy Metals -- 13.3.2 CBA Family Transporters -- 13.3.3 CDF Family Transporters -- 13.3.4 P-Type ATPase Family Transporters -- 13.3.5 Limitation of Metal Intake Due to Changes in Cell Permeability -- 13.3.6 Intracellular Binding of Toxic Metals and Their Detoxification -- 13.3.7 Reduction of Heavy Metal Ions and Enzymatic Detoxification -- 13.4 Application and Prospects of Heavy Metal Resistant Microbes -- References -- Chapter 14: Bioremediation Potential of Soil Bacteria of

Heavy Metal Polluted Environments of Kyrgyzstan -- 14.1 Introduction  
-- 14.2 Kyrgyz Republic -- 14.3 Uranium Tailings in Kyrgyzstan.  
14.3.1 Tailings Ponds and Dumps in the Ak-Tyuz Settlement.

---