

| | |
|-------------------------|---|
| 1. Record Nr. | UNINA9910746898003321 |
| Titolo | Aquatic Contamination : Tolerance and Bioremediation // edited by Rouf Ahmad Bhat [and three others] |
| Pubbl/distr/stampa | Hoboken, NJ : , : John Wiley & Sons Ltd, , [2024] ©2024 |
| ISBN | 1-119-98929-9 1-119-98930-2 1-119-98931-0 |
| Edizione | [First edition.] |
| Descrizione fisica | 1 online resource (419 pages) |
| Disciplina | 628.5 |
| Soggetti | Bioremediation |
| Lingua di pubblicazione | Inglese |
| Formato | Materiale a stampa |
| Livello bibliografico | Monografia |
| Nota di bibliografia | Includes bibliographical references and index. |
| Nota di contenuto | Cover -- Title Page -- Copyright Page -- Dedication Page -- Contents -- About the Book -- About the Editors -- Preface -- Chapter 1 Emerging Techniques for Treatment of Wastewater -- 1.1 Introduction -- 1.2 Composition of Untreated Wastewater and Its Effect on Water Bodies -- 1.2.1 Effect on River Water -- 1.2.2 Effect on Marine Environment -- 1.3 Strategies to Treat Wastewater -- 1.3.1 Primary Treatment -- 1.3.2 Secondary Treatment -- 1.3.3 Activated Sludge -- 1.3.4 Trickling Filter -- 1.3.5 Rotating Biological Contactors -- 1.3.6 Oxidation Ditches -- 1.4 Tertiary Treatment -- 1.5 Natural Processes for Wastewater Management -- 1.5.1 Constructed Wetlands (CWs) -- 1.5.2 Aquatic Plant Ponds -- 1.6 Emerging or Advanced Techniques for the Treatment of Wastewater -- 1.6.1 Wastewater Treatment by Means of Nanoparticles -- 1.6.2 Activated Carbon -- 1.6.3 Carbon Nanotubes -- 1.6.4 Microbial Fuel Cells -- 1.6.5 Fenton's Method in Combination with Cavitation -- 1.6.6 Molecularly Imprinted Polymers (MIPs) -- 1.6.7 Ceramic Foam Fabrication Techniques for Wastewater Treatment -- 1.7 Conclusion -- References -- Chapter 2 Aquatic Ecosystems and Health Threats: Case Study on the Nickel Pollution in Gölba Lake in Hatay - Turkiye -- 2.1 Introduction -- 2.2 Threats to the Health of Aquatic Ecosystems -- 2.2.1 Threats from Agricultural Practices: Agrochemicals and Other Chemicals -- 2.2.2 Popular |

Anthropogenic Threats: Sewages from Industrial, Municipal, and Household Wastes -- 2.2.3 Eutrophication: A Threat to Water Quality Deterioration, Economic Extinction of Fisheries, and a Risk to Public Health -- 2.2.4 Plastics as an Ignored Global Threat -- 2.2.5 A Toxic Threat to All Life Forms: Oil Spills -- 2.2.6 Threats Posed by Nonecofriendly Practices in Aquatic Ecosystems: Land Reclamation, Reservoir, and Dam Constructions.

2.2.7 Other Deadly Threats in Aquatic Ecosystems: Acidic Rains and Radioactive Wastes -- 2.2.8 A Threat with a Very High Input Rate into Aquatic Ecosystems: Heavy Metals -- 2.3 Data Analysis -- 2.3.1 Study Area -- 2.3.2 Water, Soil, and Plant Materials -- 2.3.3 Determination of Nickel Concentrations -- 2.4 Results from the Study -- 2.5 Conclusions -- References -- Chapter 3 Endophytic Fungi and Bacteria: Enhancement of Heavy Metal Phytoextraction -- 3.1 Introduction -- 3.2 Main Anthropogenic Sources Releasing HMs into the Environment -- 3.3 Phytoremediation of HMs -- 3.4 Advantages and Disadvantages -- 3.5 Factors that Increase HMs Phytoextraction -- 3.5.1 Physicochemical -- 3.5.2 Biological -- 3.6 Phytoremediation Mechanisms -- 3.6.1 Phytoextraction -- 3.6.2 Phytostabilization -- 3.6.3 Phytodegradation -- 3.6.4 Phytovolatilization -- 3.6.5 Rhizofiltration -- 3.7 Microbiota in Plants Used in Phytoremediation -- 3.7.1 Fungi that Enhance Phytoremediation -- 3.7.2 Mechanisms Involved in Fungal-Mediated Phytoremediation -- 3.8 Bacteria that Enhance Phytoremediation -- 3.8.1 Mechanisms Involved Bacterial-Mediated Phytoremediation -- 3.9 Conclusion -- References -- Chapter 4 Mechanism of Heavy Metal-Induced Stress and Tolerance -- 4.1 Introduction -- 4.2 Heavy Metal-Induced Stress -- 4.3 Metal Tolerance Mechanisms -- 4.4 Root Exudates -- 4.5 Cellular Wall -- 4.6 Plasma Membrane -- 4.7 Vacuole -- 4.8 Xylem -- 4.9 Phloem -- 4.10 Sequestering of Metals in the Cytosol by Various Ligands -- 4.10.1 Glutathione (GSH) -- 4.10.2 Phytochelatins -- 4.10.3 Metallothioneins -- 4.10.4 Other Chelating Compounds -- 4.11 Considerations -- 4.12 Conclusion -- References -- Chapter 5 Biotechnology for Sustainable Remediation of Contaminated Wastewater -- 5.1 Introduction -- 5.2 Organic Contaminants -- 5.2.1 Inorganic Contaminants -- 5.2.2 Biological Contaminants.

5.2.3 Radiological Contaminants -- 5.3 Biotechnology in Environmental Engineering -- 5.3.1 Activated Sludge -- 5.3.2 Anaerobic Treatment -- 5.3.3 Aerobic Treatment -- 5.3.4 Anaerobic Fixed Film Reactor (AFFR) -- 5.3.5 Membrane Bioreactor (MBR) -- 5.4 Biological Treatment -- 5.4.1 Bacterial Treatment -- 5.4.2 Adsorption -- 5.4.3 Nanofiltration -- 5.5 Electrochemical Method -- 5.5.1 Biologically Active Carbon Filtration -- 5.5.2 Distillation -- 5.5.3 Hydrogenation of Nitrates -- 5.5.4 Phosphorus Removal Mechanisms -- 5.6 Heavy Metal Treatment -- 5.6.1 Vegetated Filter Strips -- 5.7 Conclusion -- References -- Chapter 6 Novel Trends of Biotechnology in Wastewater Treatment -- 6.1 Introduction -- 6.2 The Nascent Organic Methods -- 6.2.1 Key Roles Played by Enzymes in Wastewater Treatment -- 6.2.2 Use of Oligonucleotide Probes to Treat Water -- 6.2.3 The Implication of Efficient Microbial Fuel Cell -- 6.2.4 Algal Bacterial System - A Lost Cost Solution to Solve Wastewater Problems -- 6.2.5 Nano Chitosan - Reinventing Bioavailability -- 6.2.6 Impact of Antibiotic Levels on Treating Wastewater -- 6.2.7 Advanced Oxidation Processes -- 6.2.8 Moving Bed Biofilm Reactor -- 6.2.9 Film Technologies -- 6.2.10 Channelizing Technologies Electrochemically -- 6.2.11 Fabrication of an Aquaporin-Based Forward Osmosis Membrane -- 6.2.12 Biosensors: Biomorphosis in a Chip -- 6.2.13 Anaerobic Sludge Technology -- 6.2.14 Nano Chitosan - Reinventing Bioavailability --

6.3 Forthcoming Technologies/Incubating Ideas: Theory of Existential Growth -- 6.4 Conclusion: Progression of Trending Technologies in Water Science -- Acknowledgments -- References -- Chapter 7 Role of Free-Floating Macrophytes in the Abatement of Disturbed Environments -- 7.1 Introduction -- 7.2 Nutrient Equilibrium -- 7.3 Importance of Free-Floating Macrophytes in Ecosystem Structure and Function. 7.4 How Toxins are Added to the Environment -- 7.5 Role of Aquatic Plants in Water Bodies -- 7.5.1 Mode of Action-Free-Floating Plants -- 7.6 Phytoremediation -- 7.6.1 Duckweeds -- 7.6.2 Water Hyacinth -- 7.6.3 Free-Floating Macrophytes and Its Their Relationship with Other Aquatic Ecosystems -- 7.7 FFPs as Bioabsorbants -- 7.7.1 FFPs as Decomposers -- 7.7.2 Climate Change and its Influence on FFP -- 7.7.3 Problematic Free-Floating Macrophytes -- References -- Chapter 8 Enzymatic Approach for Phytoremediation -- 8.1 Introduction -- 8.2 Mechanism and Types of Phytoremediation -- 8.2.1 The Kinetics of Plant Enzymes -- 8.2.2 Soil Enzymes Facilitating Phytoremediation -- 8.2.3 Classification of Peroxidases -- 8.2.4 Arsenate Reductase -- 8.2.5 Hydrolytic Enzymes Involved in Phytoremediation -- 8.3 Conclusion -- References -- Chapter 9 Phyto-Metalloproteins and Restoration of Freshwater Ecosystems -- 9.1 Introduction -- 9.2 Phytoremediation -- 9.2.1 Phytoremediation Mechanisms -- 9.2.2 Advantages and Disadvantages of Phytoremediation for Restoration of Freshwater Ecosystems -- 9.3 Role of Metalloproteins in Phytoremediation -- 9.3.1 Heavy Metal Removal from Metal-Contaminated Sites -- 9.3.2 Metalloproteins as Sensitive Biomarkers for Heavy Metal Toxicity -- 9.4 Use of Phytometalloproteins for Remediation of Contamination and Restoration of Freshwater Ecosystems -- 9.5 Heavy Metal Uptake from Contaminated Water -- 9.5.1 Metal Uptake -- 9.5.2 Phytoextraction or Phytoaccumulation Mechanism -- 9.5.3 Factors Influencing the Ability to Uptake Heavy Metals -- 9.6 Phytometalloproteins in Remediation of Contaminated Freshwater Ecosystems -- 9.6.1 Metal Tolerance: Response of Metalloproteins to Heavy Metal Stress in Plants -- 9.6.2 Hyperaccumulation and Detoxification: Complexation and Sequestration of Metals by Metalloproteins Within Plants. 9.7 Genetically Engineered or Modified Metalloproteins for Improved Remediation of Contaminated Water -- 9.8 Conclusion -- References -- Chapter 10 Phytoremediation: The Way Forward -- 10.1 Introduction -- 10.2 Need for Phytoremediation -- 10.3 Phytoremediation Approaches -- 10.3.1 Phytoextraction -- 10.3.2 Phytostabilization -- 10.3.3 Phytodegradation -- 10.3.4 Rhizofiltration -- 10.3.5 Phytovolatilization -- 10.4 Hyperaccumulation -- 10.5 Genetically Engineered Plants and Phytoremediation -- 10.6 Multiple Benefits of Phytoremediation from Ecological to Socioeconomic -- 10.6.1 Aesthetic Value -- 10.6.2 Biodiversity Conservation -- 10.6.3 Produced Biomass from Phytoremediation -- 10.6.4 Economic Benefits of Phytoremediation -- 10.6.5 Recovery of a Metal -- 10.7 Phytoremediation-Theoretical Aspects -- 10.8 Phytomanagement: A New Paradigm -- 10.9 Future Prospects -- 10.10 Conclusions -- References -- Chapter 11 Biotechnological Advancements in Phytoremediation -- 11.1 Introduction -- 11.2 Types of Phytoremediation -- 11.2.1 Phytoextraction or Phytoaccumulation -- 11.2.2 Phytodegradation or Phytotransformation -- 11.2.3 Phytovolatilization -- 11.2.4 Rhizoremediation/Rhizodegradation, Microbe-Assisted Phytoremediation, and Rhizosphere Bioremediation -- 11.2.5 Phytostabilization -- 11.2.6 Rhizofiltration -- 11.3 Types of Pollutants -- 11.3.1 Organic Pollutants -- 11.3.2 Inorganic

Pollutants -- 11.4 Naturally Available Plant Species
for Phytoremediation -- 11.5 Phytoremediation of Organic Pollutants
-- 11.5.1 Phytoremediation of Inorganic Pollutants -- 11.6 Advances
in Biotechnological Approaches for Phytoremediation of Different
Pollutants -- 11.7 Biotechnology Advances in the Phytoremediation
of Inorganic Pollutants -- 11.8 Biotechnology Advances in the
Phytoremediation of Organic Pollutants.
11.9 Implications of Transgenic Plants for Phytoremediation against
Herbicides.
