

1. Record Nr.	UNINA9910595045303321
Autore	Shah Maulin P.
Titolo	Phytonanotechnology // Maulin P. Shah and Arpita Roy
Pubbl/distr/stampa	Singapore : , : Springer, , [2022] ©2022
ISBN	981-19-4811-9
Descrizione fisica	1 online resource (335 pages)
Disciplina	660.6
Soggetti	Nanobiotechnology Nanostructured materials - Analysis
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	<p>Intro -- Contents -- Plant Synthesized Nanoparticles for Dye Degradation -- 1 Introduction -- 2 Impact of Dyes on the Environment -- 2.1 Textile Industry -- 3 Synthesis of Plant-Derived Nanoparticle -- 3.1 Synthesis of Iron Nanoparticles (NPs) -- 3.2 Synthesis of Silver NPs -- 3.3 Synthesis of ZnO NPs -- 3.4 Synthesis from Different Metallic NPs -- 4 Characterization of Plant-Derived Nanoparticles -- 4.1 UV Visible Spectrophotometer -- 4.2 Fourier Transform Infrared Spectroscopy -- 4.3 X-Ray Diffraction -- 4.4 Transmission Electron Microscopy -- 4.5 Atomic Force Microscopy -- 4.6 Scanning Electron Microscopy -- 4.7 Thermo Gravimetric Analysis -- 4.8 X-Ray Photoelectron Spectroscopy -- 5 Mechanism of Dye Degradation -- 5.1 Catalytic Degradation by Metal Nanoparticles with the Aid of Reducing Agent -- 5.2 Photocatalytic Degradation by Silver Nanoparticles -- 5.3 Application of Plant-Derived Nanoparticles for Dye Degradation -- 6 Future Prospectives and Conclusions -- References -- Plant-Mediated Green Synthesis of Nanoparticles for Photocatalytic Dye Degradation -- 1 Introduction -- 2 Need for Dye Degradation -- 2.1 Dyes -- 2.2 Classification of Dyes -- 2.3 Natural Dyes -- 2.4 Synthetic Dyes -- 2.5 Dyes Impact Living Things, and the Environment -- 3 The Superiority of Plant-Mediated Routes Over Other Routes -- 3.1 Comparative Study of Metal and Metal Oxide Nanomaterials -- 4 Possible Mechanism of Degradation -- 4.1 Charge Carriers' Formation/Generation -- 4.2</p>

Charge Carriers Trapping -- 4.3 Charge Carriers' Recombination -- 4.4 Photocatalytic Degradation of Dyes -- 5 Photocatalysts -- 5.1 ZnO NPs -- 5.2 CuO NPs -- 5.3 CaO NPs -- 5.4 TiO₂ NPs -- 5.5 Ag NPs -- 5.6 Au NPs -- 6 Future Scope of the Chapter -- 7 Conclusions -- References -- Plant-Derived Nanoparticles for Heavy Metal Remediation -- 1 Introduction.

2 Plant-Derived Synthesis of Nanomaterials -- 2.1 Plant-Derived Synthesis of Metal Nanoparticles -- 2.2 Plant-Derived Synthesis of Nano Metal Oxides -- 2.3 Plant-Derived Carbon Dots Synthesis -- 3 Heavy Metal Remediation -- 3.1 Plant Derived Metal Nanoparticles for Heavy Metal Remediation -- 3.2 Plant Derived Metaloxide Nanoparticles for Heavy Metal Remediation -- 3.3 Plant Derived Carbon Dots for Heavy Metal Remediation -- 4 Conclusion -- References -- Biomedical Applications of Phytonanotechnology -- 1 Introduction -- 1.1 Different Approaches to Synthesize Phytonanoparticles -- 2 Phytonanoformulations and their Diversified Therapeutic Applications -- 2.1 As an Anticancer Agent -- 2.2 As Antimicrobial Agents -- 2.3 As Wound Healing Agents -- 2.4 As Drug and Gene Delivery Agents -- 2.5 In Neurodegenerative Disorders -- 2.6 As an Anti-Diabetic Agent -- 2.7 In the Treatment of Metabolic Disorders -- 2.8 As Thrombolytic Agents -- 3 Conclusions and Future Prospective -- References -- Application of Nanotechnology in Plant Secondary Metabolites Production -- 1 Introduction -- 2 Importance of Nanoparticles Under Stress Conditions -- 2.1 Abiotic Stress -- 2.2 Drought Stress and Nanoparticles -- 2.3 Salinity Stress and Nanoparticles -- 2.4 Metal Toxicity and Nanoparticles -- 2.5 Biotic Stress -- 3 Antifungal Properties of Nanoparticles -- 4 Anti-bacterial Properties of Nanoparticles -- 5 Interaction of Nanoparticles in Plants -- 5.1 Nanoparticle's Uptake -- 5.2 Nanoparticle-Plant Interactions -- 5.3 Role of Nanoparticles in Plant Secondary Metabolites -- 6 Impact of Metal Nanoparticles -- 6.1 Silver -- 6.2 Gold -- 6.3 Zinc -- 7 Impact of Metal Oxide Nanoparticles -- 7.1 Iron Oxide -- 7.2 Zinc Oxide -- 7.3 Titanium Dioxide -- 7.4 Copper Oxide -- 7.5 Engineered Nanoparticles -- 8 Conclusion and Future Directions -- References. Applications of Nanotechnology in Preservation and Development of the Plants: A Look Back -- 1 Introduction -- 2 Agriculture's Next Frontier: Nano-Farming -- 3 Nanomaterials in Plant Science -- 4 Nanofertilisers Are a Cost-Effective Way to Provide Optimum Crop Nutrition -- 5 Plant Nanoparticle Accumulation, Remobilisation, and Biological Effects -- 6 Nanoparticles' Contribution to Photosynthesis -- 7 Plant Surface Delivery Methods and Primary Interactions -- 8 Plant Nanoparticle Aggregation -- 9 Toxicology of Nanomaterials -- 10 Relevant Plant Science Implications -- 10.1 Biosensors -- 10.2 Controlled Release of Agrochemicals and Nutrients -- 11 Plant Genetic Engineering Using Nanocomposites -- 12 Insights and Prognostications for the Future -- References -- Environmental Applications of Phytonanotechnology: A Promise to Sustainable Future -- 1 Introduction -- 2 Phytonanotechnology: A Historical Perspective -- 3 Nanotechnology and Plants -- 4 Applications of Phytonanotechnology -- 4.1 Fate of Phytonanoparticles in Plants -- 4.2 Removal of Recalcitrant Pollutants -- 4.3 Environmental Pollution Detection -- 4.4 Current Challenges and Prospects in Phytonanoparticle Synthesis -- 4.5 Different Properties of Phytonanoparticles -- 4.6 Applications of Agriculture Use Nano Fertilizers and Insecticides. -- 4.7 Nanoparticle Uptake and Transport in Plants -- 5 Conclusion -- 6 Future Outlook -- References -- Phytonanotechnological Approach for Silver Nanoparticles: Mechanistic Aspect, Properties, and Reliable Heavy Metal Ion Sensing -- 1 Introduction -- 2 Synthesis Methods

of AgNPs -- 2.1 Green/Bio-mediated Synthesis of AgNPs -- 3
Application of AgNPs for Heavy Metal Ion Sensing -- 3.1 Plausible Mechanism of Sensing of Heavy Metal Ion -- 4 Conclusion -- References -- Plant Material Assisted Magnetic Nanoparticles (MNPs) for the Separation of Inorganic Pollutants.

1 Introduction -- 2 Separation of Heavy Metals Using Plat Mediate Synthesized Nanomaterials -- 2.1 Removal of Hg(II) -- 2.2 Removal of Hexavalent Chromium Cr(VI) -- 2.3 Eradication of Arsenic (V and III) -- 2.4 Removal of Cd(II) -- 3 Conclusions and Future Perspectives -- References -- Environmental Applications of Green Engineered Silver Nanoparticles -- 1 Introduction -- 2 Properties of Silver Nanoparticles -- 3 Synthesis of Nanoparticles -- 4 Characterisation of Nanoparticles -- 5 Importance of Green Engineered Synthesis of Nanoparticles -- 6 Green Synthesis of AgNPs -- 6.1 Synthesis of AgNPs Using Bacteria -- 6.2 Synthesis of Ag-NPs via Fungi -- 6.3 Synthesis of Ag-NPs via Plant Extracts -- 6.4 Synthesis of AgNPs via Algae -- 6.5 Synthesis of AgNPs via Yeast -- 7 Environment Applications of AgNPs -- 7.1 Water Treatment and Wastewater Treatment Process -- 7.2 Agro Systems with Nanoparticles -- 7.3 Catalytic Elimination of Contaminant Dyes -- 7.4 AgNPs as Sensors -- 8 Challenges and Future Perspectives -- 9 Conclusion -- References -- Bioremediation of Heavy Metal Contaminated Sites Using Phylogenetic Nanoparticles -- 1 Introduction -- 2 Occurrence of Heavy Metal, Toxicity on Health and Environment -- 3 Synthesis of Green Nanoparticles Over Chemical Nanoparticles -- 3.1 Microorganisms-Based Synthesis of NPs -- 3.2 Plant-Based Synthesis of NPs and Phytonanotechnology -- 3.3 Plant and Microbial-Based Synthesis of Phytonanoparticles -- 4 Mechanism of Toxicity Caused by Heavy Metals on Cellular Structures -- 5 Application of Phytonanotechnology in Heavy Metal Bioremediation -- 5.1 Geogenic Pollutions -- 5.2 Industrial Waste -- 5.3 Agricultural Waste -- 6 Future Prospective -- 7 Conclusion -- References -- Environmental Applications of Green Engineered Copper Nanoparticles -- 1 Introduction -- 2 Synthetic Strategies of Green Engineered CuNPs.

3 Green Synthesis of CuNPs -- 3.1 Plant-Based Green Engineered CuNPs -- 3.2 Microbes-Based Green Engineered CuNPs -- 4 Environmental Applications of Green Engineered CuNPs -- 4.1 Waste Water Treatment -- 4.2 Bioremediation -- 4.3 Photo Catalytic Degradation of Dyes in Effluents -- 4.4 Agriculture and Plant Pathology -- 5 Future Prospectives -- 6 Conclusions -- References -- Plant Mediated Nanocomposites for Water Remediation -- 1 Introduction -- 1.1 Nanotechnology and Nanocomposites -- 1.2 The Synthesis Process of Nanocomposites -- 1.3 Green Synthesis Approach for Nanotechnology -- 2 Plant-Derived Nanocomposites -- 3 Plant-Derived Nanocomposites for Water Treatment -- 3.1 Basic Sources of Water Pollution -- 3.2 Nanocomposites for Water Treatment -- 3.3 Plant-Derived Nanocomposites for Water Treatment -- 3.4 Remediation Processes of Contaminant from the Eco Systems -- 3.5 Removal of Organic Contaminants and Toxic Dyes -- 3.6 Removal of Heavy Metals -- 4 Challengers and Future Prospective -- 5 Conclusion -- References -- Photocatalytic Degradation of Dye from Various Metal/Metal Oxides Derived from Diverse Plants -- 1 Introduction -- 2 Importance of Plant-Mediated Route Over Other Routes -- 3 Need of Degradation of Dyes from Aqueous/Nonaqueous Medium -- 4 Current Progress in Phyto-Nanotechnology Towards Dye Degradation -- 5 Review Based on the Recent Literature -- 6 A Comparative Study With Different Substrate -- 7 Further Improvements Needed -- 8 Future Scope of the Chapter -- 9 Conclusions -- References -- Phytonanotechnology for the Removal of Pollutants

from the Contaminated Soil Environment -- 1 Introduction -- 2
Photosynthetic Strategies of Nanoparticles -- 2.1 Chloroplast-
Nanoparticle Interactions -- 2.2 Silver Nanoparticles (Ag-NPs) -- 2.3
Titanium Dioxide (TiO₂ NPs) -- 3 Remediation of Soil from Heavy
Metals -- 3.1 Bioremediation Technique.
3.2 Nano Bioremediation.
