

1. Record Nr.	UNINA9910835067703321
Autore	Chakravarty Archana
Titolo	Green Synthesis of Nanomaterials : Biological and Environmental Applications
Pubbl/distr/stampa	Newark : , : John Wiley & Sons, Incorporated, , 2024 ©2024
ISBN	1-119-90093-X 1-119-90091-3
Edizione	[1st ed.]
Descrizione fisica	1 online resource (399 pages)
Altri autori (Persone)	SinghPreeti IkramSaiqa YadavaR. N
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Intro -- Title Page -- Copyright Page -- Contents -- List of Contributors -- Preface -- Chapter 1 Introduction to Advanced and Sustainable Green Nanomaterial -- 1.1 Introduction -- 1.2 Synthesis Methods of Nanomaterials -- 1.3 Green Synthesis -- 1.4 Biosynthesis of Nanoparticles from Plants -- 1.5 Characterization of Nanomaterials -- 1.5.1 X-ray Diffraction (XRD) -- 1.5.2 Scanning Electron Microscope (SEM) -- 1.5.3 Energy Dispersive X-ray (EDX) -- 1.5.4 Thermogravimetric Analysis (TGA) -- 1.5.5 UV-Visible Spectroscopy (UV-Vis) -- 1.5.6 Asymmetric Flow Field Fractionation (AF4) -- 1.5.7 Electrospray Differential Mobility Analysis (ESDMA) -- 1.6 Environmental and Health Concerns -- 1.7 Application -- 1.7.1 Use as Sensor -- 1.7.2 Use as Medicine -- 1.7.3 Used for the Removal of Toxicants from Water -- 1.7.4 Soil Remediation Use for the Removal of Toxicants from the Soil -- 1.7.5 In Agriculture and Food Industries -- 1.7.6 Use as Photocatalyst -- 1.8 Future Scope -- 1.9 Ongoing Challenges -- 1.10 Conclusion -- Abbreviations -- References -- Chapter 2 Medicinal Plant-Mediated Nanomaterials -- 2.1 Introduction -- 2.2 Synthesis of Gold Nanoparticles -- 2.3 Synthesis of Silver Nanoparticles -- 2.4 Synthesis of Zinc Oxide Nanoparticles -- 2.5

Synthesis of Titanium Oxide Nanoparticles -- 2.6 Synthesis of Iron Oxide Nanoparticles -- 2.7 Conclusion and Future Perspective -- References -- Chapter 3 Microorganism-Based Synthesis of Nanomaterials and Their Applications -- 3.1 Introduction -- 3.2 Microorganism -- 3.2.1 Bacteria -- 3.2.2 Yeast -- 3.2.3 Fungi -- 3.2.4 Virus -- 3.3 Development of Microorganism-Based Synthesis of Nanomaterial -- 3.3.1 Organic Nanomaterial -- 3.3.1.1 Bacterial Nanocellulose (BNC) -- 3.3.2 Inorganic Nanomaterial -- 3.3.2.1 Gold Nanomaterials -- 3.3.2.2 Silver Nanomaterials -- 3.3.3 Other Nanomaterials.

3.4 Mechanism of Microorganism-Based Synthesis of Nanomaterial -- 3.4.1 Organic Nanomaterial -- 3.4.1.1 Bacterial Nanocellulose (BNC) -- 3.4.2 Inorganic Nanomaterial -- 3.4.2.1 Gold Nanomaterials -- 3.4.2.2 Silver Nanomaterials -- 3.4.3 Other Nanomaterials -- 3.5 Application of Microorganism-Based Synthesized Nanomaterial -- 3.6 Conclusion and Perspective -- Abbreviations -- References -- Chapter 4 Biopolymer-Based Nanomaterials and Their Applications -- 4.1 Introduction -- 4.2 Classification of Biopolymers -- 4.2.1 Sugar-Based Biopolymer -- 4.2.2 Starch-Based Biopolymer -- 4.2.3 Cellulose-Based Biopolymers -- 4.2.4 Lignin-Based Biopolymers -- 4.2.5 Biopolymers Based on Synthetic Materials -- 4.3 Synthesis Methods of Biopolymers -- 4.4 Characterization Methods of Biopolymers -- 4.5 Nanotechnology-Based Applications of Biopolymers -- 4.5.1 Drug Delivery Systems -- 4.5.2 Medical Implants -- 4.5.3 Antimicrobial Activity of Biopolymers -- 4.5.4 Wound Healing -- 4.5.5 Tissue Engineering Applications -- 4.5.6 Food Packaging Material -- 4.6 Conclusions -- Acknowledgments -- Conflict of Interest -- References -- Chapter 5 Photoinduced Synthesis of Nanoparticles -- 5.1 Introduction -- 5.1.1 Role of Nanomaterials -- 5.2 Methods of Synthesis -- 5.2.1 Physical Synthesis of Nanomaterials -- 5.2.2 Chemical Synthesis of Nanomaterials -- 5.3 Photochemical Synthesis of Nanomaterials -- 5.3.1 Synthesis of Gold Nanoparticles Using Ultraviolet Light -- 5.3.1.1 Influence of pH -- 5.3.1.2 Influence of Precursor Concentration -- 5.3.2 Synthesis of Silver Nanoparticles Using Ultraviolet Light -- 5.3.2.1 Influence of pH -- 5.3.2.2 Influence of Reducing Agents -- 5.3.3 Synthesis of Gold Nanoparticles Under Visible Light -- 5.3.4 Synthesis of Silver Nanoparticles Under Visible Light -- 5.4 Photochemical Synthesis of UO₂ Nanoparticles in Aqueous Solutions.

5.5 Photochemical Synthesis of ZnO Nanoparticles -- 5.6 Conclusion -- Abbreviations -- References -- Chapter 6 Green Nanomaterials in Textile Industry -- 6.1 Introduction -- 6.2 Nanomaterials Consistent with Textiles -- 6.3 Techniques Related to Textile Functionalization -- 6.3.1 Pad Dry Cure Method -- 6.3.2 In Situ Preparation -- 6.3.3 Green Nanotechnology -- 6.4 Utilization of Nanotechnology in Textile Industry -- 6.4.1 Nanofinishing -- 6.4.2 Nanofibers -- 6.4.3 Nanocoating -- 6.4.4 Nanocomposite -- 6.5 Nanomaterials with Different Functional Textiles -- 6.5.1 UV-Protective Textiles -- 6.5.2 Flame-Retardant Textile -- 6.5.3 Repellent Textiles -- 6.5.4 Antibacterial and Antimicrobial Textiles -- 6.5.5 Wrinkle-Free Textiles -- 6.5.6 Antiodor Textiles -- 6.6 Conclusion -- Conflict of Interest -- References -- Chapter 7 Drug-delivery, Antimicrobial, Anticancerous Applications of Green Synthesized Nanomaterials -- 7.1 Introduction -- 7.2 Gold Nanoparticles -- 7.2.1 Synthesis of AuNPs -- 7.2.2 AuNPs in Drug Delivery -- 7.2.3 Antimicrobial Activity of AuNPs -- 7.2.4 Anticancer Activity of AuNPs -- 7.3 Silver Nanoparticles -- 7.3.1 Synthesis of AgNPs -- 7.3.2 AgNPs in Drug Delivery -- 7.3.3 Antimicrobial Activity of AgNPs -- 7.3.4 Anticancer Activity of AgNPs --

7.4 Zinc Oxide Nanoparticles -- 7.4.1 Synthesis of ZnO NPs -- 7.4.2 Role of ZnO NPs in Drug Delivery -- 7.4.3 Antimicrobial Activity of ZnO NPs -- 7.4.4 Anticancer Activity of ZnO NPs -- 7.5 Titanium Dioxide Nanoparticles -- 7.5.1 Synthesis of Titanium Dioxide NPs (TiO₂NPs) -- 7.5.2 TiO₂NPs in Drug Delivery -- 7.5.3 Antibacterial Activities of TiO₂NPs -- 7.5.4 Anticancer Activities of TiO₂NPs -- 7.6 Iron Oxide Nanoparticles -- 7.6.1 Synthesis of IONPs -- 7.6.2 IONPs in Drug Delivery -- 7.6.3 Antibacterial Activity of IONPs -- 7.6.4 Anticancer Activity of IONPs -- 7.7 Carbon Based Nanomaterials.

7.7.1 Synthesis of Carbon-Based Nanomaterials -- 7.7.2 Carbon Based Nanomaterials in Drug Delivery -- 7.7.3 Antimicrobial Activity of Carbon-Based Nanomaterials -- 7.7.4 Anticancer Activity of Carbon-Based Nanomaterials -- 7.8 Conclusion and Future Directions -- Acknowledgment -- Conflicts of Interest -- References -- Chapter 8 How Eco-friendly Nanomaterials are Effective for the Sustainability of the Environment -- 8.1 Introduction -- 8.2 Eco-friendly Nanomaterials -- 8.3 Green Nanomaterial for Removal of Water Contamination -- 8.4 Green Nanomaterial for Removal of Soil Pollution -- 8.5 Conclusion -- References -- Chapter 9 Magnetotactic Bacteria-Synthesized Nanoparticles and Their Applications -- 9.1 Introduction -- 9.1.1 Magnetotactic Bacteria (MTB) -- 9.1.2 Types of MTB -- 9.2 Characteristics of Magnetosomes (MNPs)-Biogenic NPs and Their Physico-Chemical Properties -- 9.3 Synthesis of Magnetosomes -- 9.4 MNPs Relative to Chemically Synthesized NPs -- 9.5 Applications of Magnetosomes -- 9.5.1 Magnetosomes in Functionalization and Immobilization of Bio-active Molecules -- 9.5.2 Magnetosomes in DNA, Xenobiotics and Antigen Detection Assays -- 9.5.3 Treatment of Magnetic Hyperthermia -- 9.5.4 Food Safety -- 9.5.5 Cell Separation -- 9.5.6 Drug Delivery -- 9.6 Conclusion and Future Perspective -- References -- Chapter 10 Biofabrication of Nanoparticles in Wound-Healing Materials -- 10.1 Introduction -- 10.2 Nanoparticles -- 10.2.1 Silver Nanoparticles -- 10.2.2 Gold Nanoparticles -- 10.3 Nanocomposites or Composite Nanoparticles -- 10.4 Coatings and Scaffolds -- 10.5 Green Synthesis of Silver Nanoparticles -- 10.5.1 Synthesis of Silver Nanoparticles by Aqueous Extract of Arnebia nobilis Roots -- 10.5.2 Honey-Based Nanoparticles in Wound-Healing Process -- 10.6 Conclusion -- Abbreviations -- References.

Chapter 11 Cellulosic Nanomaterials for Remediation of Greenhouse Effect -- 11.1 Introduction -- 11.1.1 Fundamentals of the Greenhouse Effect -- 11.1.2 Cellulosic Contribution to the Remediation of Greenhouse Effect -- 11.2 Cellulosic Nanomaterials in Automotive Application -- 11.2.1 Nanocellulose-Enabled Lightweight Vehicles -- 11.2.2 Processing and Performance of Nanocellulose in Automotive Parts -- 11.3 Cellulosic Nanomaterials in the Application of Thermal Insulation -- 11.3.1 Nanocellulose Reinforced Polymeric Insulation Toward Zero Energy Usage -- 11.3.2 Processing and Performance of Nanocellulose in Insulation Material -- 11.4 Cellulosic Nanomaterial for Gas Capture and Separation -- 11.4.1 Nanocellulosic Membrane for Capturing/Separating Greenhouse Gases -- 11.4.2 Processing and Performance of Nanocellulose Membrane for Gas Capture and Separation -- 11.5 Conclusion and Future Prospective -- Abbreviation -- References -- Chapter 12 Ecofriendly Nanomaterials for Wastewater Treatment -- 12.1 Introduction -- 12.2 Application of Ecofriendly Nanomaterials -- 12.3 Inorganic Nanoparticles -- 12.4 Synthesis of Green Nanomaterials -- 12.5 Nanocellulose Nanomaterials for Water Treatment -- 12.6 Graphene-CNT Hybrid/Graphene Hybrids (GO and Biopolymer) -- 12.7 Green Nanocomposite -- 12.7.1 Guar Gum-Based Nanocomposites -- 12.8 Ecofriendly Nanomaterials

from Agricultural Wastes -- 12.8.1 Ecofriendly Nanomaterials for Clean Water -- 12.8.2 Clay-Based Material are Also Used for Wastewater Treatment -- 12.9 Conclusion -- Financial Support -- Abbreviations -- References -- Chapter 13 Bio-nanomaterials from Agricultural Waste and Its Applications -- 13.1 Introduction -- 13.2 Lignin -- 13.2.1 Lignin Nanocomposites (NCs) -- 13.2.2 Lignin-Based Catalysts and Photocatalyst -- 13.2.3 Lignin-Based NC Coatings -- 13.3 Cashew Nut Shell Liquid (CNSL).

13.3.1 CNSL NC-Based Surfactants.