

1. Record Nr.	UNINA9910502971403321
Autore	Ansari Mohammad Azam
Titolo	Microbial nanotechnology : green synthesis and applications // Mohammad Azam Ansari, Suriya Rehman
Pubbl/distr/stampa	Singapore : , : Springer, , [2021] ©2021
ISBN	981-16-1923-9
Descrizione fisica	1 online resource (355 pages)
Disciplina	660.62
Soggetti	Microbial biotechnology Microbial biotechnology - Methodology Biotecnologia microbiana Ultraestructura (Biologia) Llibres electrònics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Intro -- Contents -- About the Editors -- 1: Prospectus and Development of Microbes Mediated Synthesis of Nanoparticles -- 1.1 Introduction -- 1.2 Nanoparticles Synthesized by Bacteria -- 1.2.1 Intracellular Production of Nanoparticles and Extracellular Production of Nanoparticles -- 1.3 Fungus-Mediated Nanoparticle Synthesis -- 1.4 Viral Nanoparticles and Virus-Like Particles -- 1.5 Synthesis of Nanoparticles Using Algae -- 1.6 Advantages of Microbial Synthesis of Nanoparticles -- 1.7 Disadvantages of Microbial Synthesis of Nanoparticles -- 1.8 Future Perspectives -- References -- Section I: Microbial Green Synthesis -- 2: Prokaryotic and Microbial Eukaryotic System for the NP Synthesis -- 2.1 Introduction -- 2.1.1 Bio-Synthesis of NPs Using Microbes -- 2.2 Microorganism Mediated Synthesis -- 2.2.1 Mechanisms of MNPs Synthesis by Microbes -- 2.2.2 Extracellular Enzymes -- 2.2.3 Intracellular Enzymes -- 2.2.4 Ag Nanoparticles -- 2.2.4.1 Trichoderma Reesei Mediated Ag NPs -- 2.2.4.2 Usage of Bacillus subtilis -- 2.2.4.3 Usage of Probiotic Bacillus licheniformis -- 2.2.4.4 Usage of Anogeissus latifolia -- 2.2.4.5 Usage of Marine Sediment Fungi -- 2.2.4.6 Usage of Salmonella typhirium Extract --

2.2.4.7 Using *Aspergillus terreus* -- 2.2.4.8 Usage of Macroalgae  
*Spirogyra varians* -- 2.2.4.9 Using *Pestalotiopsis pauciseta* -- 2.2.4.10  
Using Endophytic Fungi *Pestalotiopsis pauciseta* -- 2.2.4.11 Usage of  
Marine Nanoparticle for the Extraction of Metal Nanosized Particle --  
2.2.5 Au Nanosized Particles -- 2.2.5.1 Using Bacteria Enzyme --  
2.2.5.2 Using *Bacillus marisflavi* -- 2.2.5.3 Using *Pseudomonas veronii*  
AS41G -- 2.2.5.4 Using Filamentous Cyanobacteria -- 2.2.5.5 Usage of  
*Galaxaura elongata* -- 2.2.6 ZnO Nanosized Particles -- 2.2.7 Cu  
Nanoparticles -- 2.2.8 Bio-Synthesis Factories as Algae -- 2.3  
Conclusion -- References.

3: Intracellular and Extracellular Microbial Enzymes and Their Role in  
Nanoparticle Synthesis -- 3.1 Introduction -- 3.2 Bio-Synthesis of  
Nanoparticles and Enzymes Involved -- 3.2.1 Intracellular Synthesis --  
3.2.2 Extracellular Synthesis -- 3.3 Applications of Biosynthesized  
Nanoparticles -- 3.3.1 Anticancer Tools -- 3.3.2 Anti-Microbial Activity  
-- 3.3.3 Degradation of Dyes -- 3.3.4 Dehalogenation -- 3.3.5 Heavy  
Metal Ions Removal -- 3.4 Conclusion and Future Prospects in Research  
and Development -- References -- 4: Bacterial Synthesis of NPs and  
Their Scale-Up Technologies -- 4.1 Introduction -- 4.1.1 Silver  
Nanoparticles -- 4.1.2 Gold Nanoparticles -- 4.1.3 Zinc Oxide  
Nanoparticles -- 4.1.4 Magnetic Nanoparticles -- 4.1.5 Non-magnetic  
Nanoparticles -- 4.1.6 Other Types of Nanoparticles -- 4.2 Mechanism  
of Synthesis of Nanoparticles -- 4.2.1 Control of Size and Morphology  
of Nanoparticles -- 4.3 Demerits and Future Prospective -- 4.3.1  
Selection of the Bacteria -- 4.3.2 Growth Conditions and Enzyme  
Activity -- 4.3.3 Stabilization of the Nanoparticles -- 4.3.4 The  
Extraction and Purification -- 4.3.5 Optimization and Scaling Up of the  
Nanoparticles -- 4.4 Conclusion -- References -- 5: Fungal Biogenesis  
of NPs and Their Limitations -- 5.1 Introduction -- 5.1.1  
Nanotechnology -- 5.1.2 Nanoparticles (NPs) -- 5.1.3 Metal NP  
Synthesis -- 5.1.4 Biosynthesis of NPs by Fungi -- 5.1.4.1 Intracellular  
Synthesis of NPs by Fungi -- 5.1.4.2 Extracellular Synthesis of NPs by  
Fungi -- 5.1.5 Mechanism Involved in the Synthesis of Nanoparticle  
Using Fungi -- 5.1.6 Various Experimental Parameters for the Fungal  
Synthesis of Metal NPs -- 5.2 Characterisation Techniques for NPs --  
5.2.1 UV-Visible Spectroscopy -- 5.2.2 Fourier Transform Infrared  
Spectroscopy (FTIR) -- 5.2.3 X-Ray Diffraction Technique (XRD) --  
5.2.4 Transmission Electron Microscopy (TEM).  
5.2.5 Scanning Electron Microscopy (SEM) -- 5.2.6 Energy-Dispersive  
X-Ray Spectroscopy (EDS or EDX) -- 5.3 Limitations of Fungal Mediated  
NPs -- 5.3.1 Limitation of Nano Fertilizers -- 5.3.1.1 The Movement  
and Take-Up of NPs in Plants -- 5.3.1.2 Transformation and Collection  
of NPs in Plants -- 5.3.2 Nanomedicine -- 5.3.2.1 Biological Systems: A  
Test for Nanomedicine -- 5.3.2.2 Nanomedicine's Social Setting: How  
Inside Irregularities Can Obstruct Progress -- 5.3.3 In Water Treatment,  
Basic Application Viewpoints -- 5.4 Conclusion -- 5.5 Future  
Perspective -- References -- 6: Role of Viruses in Nanoparticles  
Synthesis -- 6.1 Introduction -- 6.2 Nanoscience and Nanotechnology  
-- 6.2.1 Nanomaterial -- 6.2.1.1 Size -- 6.2.1.2 Particle Size  
Distribution -- 6.2.1.3 Surface Area -- 6.3 Application of  
Nanotechnology -- 6.4 Viruses as Nanomaterials -- 6.5 Different Types  
of VNPs/VLPs and their Roles -- 6.5.1 Plant Viruses -- 6.5.2  
Icosahedral Plant VNPs and VLPs -- 6.5.2.1 Carnation Mottle Virus  
(CarMV) -- 6.5.2.2 Cowpea Mosaic Virus (CPMV) -- 6.5.2.3 Maize  
Rayado Fino Virus (MRFV) -- 6.5.2.4 Sesbania Mosaic Virus (SeMV) --  
6.5.2.5 Brome Mosaic Virus (BMV) -- 6.5.2.6 Cowpea Chlorotic Mottle  
Virus (CCMV) -- 6.5.2.7 Hibiscus Chlorotic Ringspot Virus (HCRSV) --  
6.5.2.8 Red Clover Necrotic Mottle Virus (RCNMV) -- 6.5.2.9 Turnip

Yellow Mosaic Virus (TYMV) -- 6.6 Role of VNPs in Therapeutic Interventions -- 6.7 Role of VNPs as Drug Delivery Agents -- 6.8 Role of VNPs Against Infectious Diseases -- 6.9 Conclusion with Future Perspective -- References -- 7: Overview and Prospectus of Algal Biogenesis of Nanoparticles -- 7.1 Introduction -- 7.2 Algal Role in Green Synthesis -- 7.3 Algal Mediated Nanoparticle Synthesis -- 7.3.1 Intracellular Mode -- 7.3.2 Extracellular Mode -- 7.4 Factors Affecting the Algal Mediated Biosynthesis of NPs -- 7.4.1 Temperature. 7.4.2 pH of the Reaction Medium -- 7.4.3 Incubation Time -- 7.4.4 Algal Biomass Concentration -- 7.4.5 Illumination -- 7.5 Conclusion -- References -- 8: Protozoa: As Emerging Candidates for the Synthesis of NPs -- 8.1 Introduction -- 8.2 Biosynthesis of Nanoparticles (NPs) -- 8.2.1 The Intracellular and Extracellular Synthesis of Nanoparticles(NPs) by Microorganisms -- 8.3 Protozoa for theSynthesis of BiocompatibleNanoparticles(NPs) -- 8.3.1 Advantages of Protozoa for Biosynthesis ofNanoparticles (NPs) -- 8.3.2 Plausible Mechanism(s) for theSynthesis of BiocompatibleNanoparticles (NPs)by Protozoa -- 8.4 Conclusion -- References -- SectionII: Application of Microbial Nanoparticles -- 9: Industrial Perspective of Microbial Application of Nanoparticles Synthesis -- 9.1 Introduction -- 9.2 Classification of NPs -- 9.3 Chemical and Physical Synthesis of Nanoparticles -- 9.3.1 Chemical Synthesis -- 9.3.1.1 Sol-Gel Method -- 9.3.1.2 Pulsed Laser Method -- 9.3.1.3 Spray Pyrolysis -- 9.3.1.4 Co-Precipitation -- 9.3.2 Physical Methods -- 9.3.2.1 Mechanical/Ball Milling -- 9.3.2.2 Physical Vapor Deposition -- 9.4 Microbial-Mediated Synthesis of Nanoparticles -- 9.4.1 Bacterial-Biosynthesized Nanoparticles -- 9.4.2 Actinomycetes-Biosynthesized Nanoparticles -- 9.4.3 Fungal-Biosynthesized Nanoparticles -- 9.4.4 Microalgal-Biosynthesized Nanoparticles -- 9.4.5 Advantages of Biological Synthesis of NPs -- 9.5 Mechanisms of Microbial Synthesis of NPs. -- 9.6 Features of Biosynthesized NPs -- 9.6.1 Morphological Characterizations -- 9.6.2 Toxicity of Biosynthesized NPs -- 9.7 Potential Industrial Applications of Biosynthesized NPs -- 9.7.1 Applications of Nanoparticles for Wastewater Management -- 9.7.1.1 Removal of Radioactive Pollutants -- 9.7.1.2 Removal of Heavy Metals -- 9.7.1.3 Removal of Inorganic Compounds. 9.7.1.4 Application of Biogenic NPs in the Textile Industry -- 9.7.1.5 Application of NPs in the Food Industry -- 9.7.1.6 Application of NPs in Agricultural Purposes -- Nano-Fertilizers -- Nanopesticides -- 9.7.2 Nanomedicine and Biomedical Application of Nanoparticles. -- 9.7.2.1 Antimicrobial activities and Cytotoxicity Agents -- 9.7.2.2 Drug Delivery System -- 9.7.2.3 Antitumor and Anticancer Agents -- 9.7.3 Biosensors Applications -- 9.8 Conclusion and Future Perspective -- References -- 10: Microbial Nanotechnology in Treating Multidrug-Resistance Pathogens -- 10.1 Introduction -- 10.2 Overview on MDR Mechanisms of Pathogens -- 10.2.1 MDR Mechanisms in Viral Pathogens -- 10.2.2 MDR Mechanisms in Prokaryotic and Eukaryotic Pathogens -- 10.2.2.1 Antimicrobial Efflux -- 10.2.2.2 Antimicrobial Uptake Prevention -- 10.2.2.3 Antimicrobial Inactivation and Alteration -- 10.2.2.4 Antimicrobial Targeted Site Modification -- 10.2.2.5 Biofilm Formation and Quorum Sensing -- 10.3 New Therapeutic Alternatives for Combating MDROs -- 10.3.1 Antimicrobial Combination Therapy -- 10.3.2 Antimicrobial Peptide Therapy -- 10.3.3 Antimicrobial Nanoparticle Therapy -- 10.4 Microbial Nanotechnology in Treating MDROs -- 10.4.1 Microbial NPs as Antibacterial Agents -- 10.4.2 Microbial NPs as Antiviral Agents -- 10.4.3 Microbial NPs as Antifungal Agents -- 10.4.4 Microbial NPs as Antiprotozoal Agents -- 10.5 Advantages and Challenges of Microbial

NPs -- 10.6 Conclusion and Future Perspectives -- References -- 11:  
Microbial Nanoparticles for Cancer Treatment -- 11.1 Introduction --  
11.2 Microbial NPs: An Insight into Cancer Theranostics -- 11.2.1  
Microbes as Synthesizers of Anticancer NPs -- 11.2.2 Microbes as an  
Anticancer Agent -- 11.2.3 Microbe as a Sensing Agent -- 11.3  
Genetically Engineered Microbes as Nanocarriers for Anticancer  
Nanoparticles.  
11.4 Challenges of Microbial NPs as Alternative Cancer Treatments.

---