# GREEN BIOSYNTHESIS OF NANOPARTICLES MECHANISMS AND APPLICATIONS

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What is green synthesis of nanoparticles and its application? In general, the methods and procedures for the green synthesis of various nanoscale metals can be summarized as follows: obtain plant extract, mix extract with metal salt solution in specific set of conditions, reduce the metal particles, carry out filtration and other steps to obtain the target nanoscale metal.

What are the applications of nanoparticles biosynthesis? The biosynthesized nanoparticles have been used in a variety of applications including drug carriers for targeted delivery, cancer treatment, gene therapy and DNA analysis, antibacterial agents, biosensors, enhancing reaction rates, separation science, and magnetic resonance imaging (MRI).

What are the applications of green nanomaterials? Green nanomaterials are intriguing due to their eco-friendly production methods, reduced toxicity, resource efficiency, and versatility across industries. They offer health benefits in medicine, address environmental issues, enhance agriculture, advance technology, reduce waste, and align with ethical considerations.

What is the green method of nanotechnology? Green nanotechnology is a branch of green technology that utilizes the concepts of green chemistry and green engineering. It reduces the use of energy and fuel by using less material and renewable inputs wherever possible.

What is the advantage of green synthesis of nanoparticles? Plant-based green synthesis ensures non-toxic, biocompatible nanoparticles, making it a safe, eco-friendly alternative to chemical methods, particularly with regard to biomedical applications.

What is green synthesis in simple terms? Green synthesis is a straightforward, low-cost, and ecologically friendly method of producing a wide range of NPs without using hazardous chemicals, corrosive acids (Hydrochloric acid, Sulfuric acid), or toxic organic solvents (benzene, toluene, methyl chloride, carbon tetrachloride, etc.).

What are the advantages of biosynthesis of nanoparticles? Green Synthesis of Nanoparticles. Green-mediated nanoparticle synthesis is a low-cost, environmentally friendly method with no toxic properties. This method uses various stabilizing and reducing substances, such as plants, microbes, and some natural agents, to develop NPs.

What are the techniques used to synthesize nanoparticles? The chemical approach of nanoparticle synthesis includes sol-gel method, solution evaporation method, reduction of precursor molecules like silver nitrate (AgNO3), Gold chloride (HAuCl4), and Zinc acetate dihydrate (C4H6O4Zn · 2H2O) by using non eco-friendly toxic chemicals [10].

What is the principle of nanoparticle synthesis? Nanoparticle synthesis refers to methods for creating nanoparticles. Nanoparticles can be derived from larger molecules, or synthesized by "bottom—up" methods that, for example, nucleate and grow particles from fine molecular distributions in liquid or vapor phase.

What is an example of green nanotechnology? For example, nanoscale membranes can help separate desired chemical reaction products from waste materials from plants. Nanoscale catalysts can make chemical reactions more efficient and less wasteful. Sensors at the nanoscale can form a part of process control systems, working with nano-enabled information systems.

What are the benefits of green nanotechnology? The main benefits of green nanotechnology are: increased energy efficiency, reduced waste and greenhouse gas emissions, and minimized the consumption of non-renewable raw materials.

What are the application of green nanotechnology in biotechnology? Green nanotechnology employs several biotechnological techniques to produce nanomaterials (or nanoparticles) utilizing biological means, such as bacteria, fungi, or plants [74]. The resultant nanoparticles are safe for the environment and nontoxic.

What is green synthesis of organic nanoparticles? Synthesis of nanoparticles through green synthesis methods is cost-effective, nontoxic, and ecofriendly. The effective green chemistry approach for the synthesis of nanoparticles is the best ecofriendly technique which uses biogenic materials such as plants, algae, waste biomass, and microorganisms.

What is green synthesis of nanoparticles using bacteria? The green synthesis of NPs utilizes microbial cells like fungi, yeast, and bacteria as the process can be controlled by manipulating the culture conditions, like nutrient, pH, pressure, and temperature. The microbial system possesses an intrinsic mechanism of synthesizing NPs from metallic salts (Li et al., 2011).

What is green synthesis of hybrid nanoparticles? Green synthesis of nanoparticles is known as the synthesis the nanoparticles by utilizing plants or plant extracts or microorganisms to bio-reduce metal ions into their elemental form which ranges from 1 to 100 nm in size [97].

What are the applications of green nanoparticles? Green nanotechnology has various potential applications, such as the removal of contaminants and pollutants from water, more effective energy technologies like batteries and so on. In the agriculture field, green nanotechnology is used to monitor crop growth and reduces the usage of chemical compounds for plant growth.

What are the factors affecting green synthesis of nanoparticles? Factors such as pH, extract and salt concentrations, temperature, solvent, biomolecules in plants, and reaction time significantly influence the quality and quantity of metallic NPs synthesized via green nanotechnology.

What is the difference between chemical and green synthesis of nanoparticles? Plant-based nanoparticle synthesis is advantageous compared to chemical and physical methods because it is a cheaper and faster method involving

only a single step, it is eco-friendly, it does not require high pressure, energy, or temperature, and it eliminates the need for large quantities of toxic chemicals [18].

What are the green methods of synthesis of nanoparticles? Green synthesis, which refers to the eco-friendly and sustainable production of nanoparticles without the use of hazardous chemicals or toxic solvents, has gained attention in recent years within biological processes. Natural sources, such as plants and microorganisms, are popular green synthesis approaches [20].

How to make nanoparticles from plants? On the whole, the mechanism of metal nanoparticle synthesis in plants and plant extracts includes three main phases: 1) the activation phase during which the reduction of metal ions and nucleation of the reduced metal atoms occur; 2) the growth phase during which the small adjacent nanoparticles spontaneously coalesce ...

**Is biosynthesis the same as green synthesis?** The method of nanoparticle biosynthesis utilizing plant extracts, also known as green synthesis, has become a promising method considering the advantages it has compared to other synthesis methods.

What is the application of nanocatalysts in green chemistry? Applications of nanocatalysts Wastewater-containing dyes may be toxic, mutagenic, and carcinogenic [100]. Therefore, removing synthetic dyes with azo aromatic groups is extremely important. Nanomaterials can be used to clean the water bodies from such harmful effects of dye, as depicted in Figure 4.

What are the biomedical applications of green synthesized nanoparticles? The earlier literature demonstrated that green-synthesized metal nanoparticles using polysaccharides can be employed for versatile biomedical applications which include (i) drug delivery, (ii) anticancer activity, (iii) antimicrobial activity, (iv) wound healing, (v) bioimaging, (vi) bio-sensing, (vii) blood ...

What are the application of green nanotechnology in biotechnology? Green nanotechnology employs several biotechnological techniques to produce nanomaterials (or nanoparticles) utilizing biological means, such as bacteria, fungi, or plants [74]. The resultant nanoparticles are safe for the environment and nontoxic.

What are the application of nanoparticles in organic synthesis? Medicines, vitamins and other nutritional goods, cosmetics, polymers and plastics, high energy fuels and high-tech materials are some of the benefits of organic synthesis to society.

#### **Exploring Social and Political Thought: Readings from Plato to Gandhi**

John Somerville's "Social and Political Philosophy: Readings from Plato to Gandhi" is a seminal text that presents a comprehensive overview of the foundational ideas in Western and Eastern thought. The book features a curated selection of primary sources from renowned thinkers spanning over 2,500 years.

#### 1. What is the purpose of studying social and political philosophy?

Social and political philosophy examines the fundamental questions of how individuals relate to society and government. It explores concepts such as justice, equality, freedom, and the nature of the state. By studying these ideas, we gain insights into the historical development of political systems and the challenges facing society today.

#### 2. What are the key themes in Plato's "The Republic"?

Plato argues that the ideal state is ruled by philosopher-kings who are guided by reason and justice. He proposes a hierarchical society with distinct classes, each performing a specific function. Plato also explores the nature of virtue and the consequences of unjust actions.

#### 3. How does Aristotle's "Politics" differ from Plato's "The Republic"?

Aristotle takes a more empirical approach than Plato, relying on observation and experience to understand political phenomena. He favors a mixed constitution that combines elements of monarchy, aristocracy, and democracy. Aristotle also emphasizes the importance of citizenship and the need for citizens to participate in government.

#### 4. What are the key ideas in Gandhi's "Hind Swaraj"?

Gandhi argues for the rejection of Western civilization and the adoption of nonviolent resistance as a means of social and political change. He believes that true freedom lies in local self-government and the preservation of traditional values. Gandhi's ideas have had a profound impact on social movements around the world.

## 5. How can the insights from these thinkers help us understand contemporary social and political issues?

By examining the ideas of great thinkers across time, we gain a deeper understanding of the complex challenges facing our modern world. Their perspectives provide valuable insights into the nature of power, the role of ethics in politics, and the potential for social change. By studying these texts, we can critically engage with current events and contribute to informed discussions about the future of our society.

#### The Tragedy of Macbeth Act 2: A Tapestry of Guilt and Ambition

Question 1: What is the significance of Duncan's murder in Act 2? Answer: Duncan's murder is the pivotal event that triggers Macbeth's spiral into guilt and madness. It shatters the natural order and sets into motion a cycle of violence and retribution.

Question 2: How does Macbeth's guilt manifest itself after the murder? Answer: Macbeth's guilt manifests in various ways, including paranoia, hallucinations, and psychological torment. He sees visions of Banquo's ghost, hears voices accusing him of murder, and becomes increasingly withdrawn and isolated.

Question 3: What is the role of Lady Macbeth after the murder? Answer: Lady Macbeth attempts to suppress Macbeth's guilt initially, but she gradually becomes overwhelmed by her own. Her guilt drives her to sleepwalk and engage in irrational behavior, ultimately leading to her death.

Question 4: How does the killing of Banquo contribute to Macbeth's downfall? Answer: Banquo's presence as a potential threat to Macbeth's reign prompts him to order his murder. However, Banquo's ghost returns to haunt Macbeth, symbolizing his unresolved guilt and the inevitability of his downfall.

**Question 5: What themes are explored in Act 2?** Answer: Act 2 explores themes such as ambition, guilt, power, and the consequences of evil actions. It delves into the psychological and moral complexities of Macbeth and Lady Macbeth as they navigate the treacherous path of their ambition.

Yonggi Cho: The Holy Spirit, My Senior Partner

**Question 1: Who is Yonggi Cho?** Answer: Yonggi Cho (1936-2021) was a South Korean pastor and founder of the world's largest megachurch, Yoido Full Gospel Church. He is known for his emphasis on the Holy Spirit and the importance of lay ministry.

Question 2: What did Yonggi Cho mean by the Holy Spirit being his "senior partner"? Answer: Cho believed that the Holy Spirit was the guiding force in his ministry. He saw the Spirit as a teacher, counselor, and empowerer. Cho often credited the Spirit with the growth and success of Yoido Full Gospel Church.

Question 3: How did Cho's view of the Holy Spirit influence his leadership? Answer: Cho's conviction that the Holy Spirit was his senior partner led him to embrace a decentralized leadership style. He empowered lay leaders with responsibility and encouraged them to seek guidance from the Spirit in their ministries. This approach fostered a sense of ownership and engagement among church members.

Question 4: What were the practical implications of Cho's partnership with the Holy Spirit? Answer: Cho believed that the Holy Spirit could accomplish supernatural things through ordinary people. He emphasized the importance of prayer, fasting, and faith in the Spirit's leading. This approach resulted in numerous healings, miracles, and conversions at Yoido Full Gospel Church.

Question 5: How can we apply Cho's principles today? Answer: While not everyone may experience the Holy Spirit's presence in the same way as Cho, his principles can provide valuable guidance. We can strive to seek the Spirit's guidance in our daily lives, empower others to use their gifts, and trust in the Spirit's ability to work through us for the glory of God.

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