World Academy of Science, Engineering and Technology
International Journal of Biomedical and Biological Engineering
Vol:17, No:05, 2023

Review on Green Synthesis of Gold Nanoparticles

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Abstract : Because of the impact of their greater surface area and smaller quantum sizes in comparison with other metal atoms or bulk metals, metal nanoparticles, such as those formed of gold, exhibit a variety of unusual chemical and physical properties. The size- and shape-dependent properties of gold nanoparticles (GNPs) are particularly notable. Metal nanoparticles have received a lot of attention due to their unique properties and exciting prospective uses in photonics, electronics, biological sensing, and imaging. The latest developments in GNP synthesis are discussed in this review. Green chemistry measures were used to assess the production of gold nanoparticles, with a focus on Process Mass Intensity (PMI). Based on these measurements, opportunities for improving synthetic approaches were found. With PMIs that were often in the thousands, solvent usage was found to be the main obstacle for nanoparticle synthesis, even ones that were otherwise considered to be environmentally friendly. Since ligated metal nanoparticles are the most industrially relevant but least environmentally friendly, their synthesis by arrested precipitation was chosen as the best chance for significant advances. Gold nanoparticles of small sizes and bio-stability are produced biochemically, and they are used in many biological applications.

Keywords : gold, nanoparticles, green synthesis, AuNP
Conference Title : ICNDDS 2023 : International Conference on Nanoparticles as Drug Delivery Systems
Conference Location : Rome, Italy
Conference Dates : May 04-05, 2023