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GREEN SYNTHESIS OF NANOPARTICLES: STATE OF ART AND FURTHER PERSPECTIVES

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With the development of science and technology, a growing number of scientists are merging green chemistry with nanotechnology, and these researchers see a bright future for a new field known as 'green nano'. Some want to help green up industries using nanotechnologies. Others who are working on green technologies such as solar cells, remediation techniques and water filters are turning to nanotechnology in order to achieve their goals of creating better devices to help the environment. These researchers assert that a strong marriage between nanotechnology and green chemistry/engineering holds the key to building an environmentally sustainable society. The preparation and application of nanostructured materials has become a key technology in many more fields, for example pharmacy, regenerative medicine, and food technology. The chemical methods involves the reduction of metal ions to nanoparticles and preventing the aggregation of metallic nanoparticles. Usually, with using of various reducing agents (sodium borohydride, methoxypolyethylene glycol, potassium bitartarate or hydrazine), and stabilizers (sodium dodecyl benzylsulfate or polyvinyl pyrrolidone). The major disadvantage in the physical methods is the low yield, and in the chemical method is the use of toxic solvents (2-mercaptoethanol, thioglycerol) and also the production of hazardous wests. These factors limit the applications of synthesized nanoparticles. Biogenesis refers to the biological synthesis of nanoparticles. The major implication of this biological approach is its relative simplicity in the synthesis of nanoparticles, and it is less time-consuming. In addition to this, the high yield, low toxicity, low cost and its biocompatibility adds to its value. The use of stabilizers to prevent aggregation is not required as the proteins in the system act as stabilizers. Nanoparticles with smaller radius of curvature have higher catalytic activity; hence, angular shapes are preferable due to their smaller radii of curvature compared to spherical particles of the same volume.

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