

***Monascus* Pigments Mediated Rapid Green Synthesis and Characterization of Gold Nanoparticles with Possible Mechanism**

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Abstract The present investigation is the first report for application of food grade *Monascus* pigments (MPs) as a reducing and capping agent for the green and rapid synthesis of nanosized gold particles in presence of sunlight. Present prodigious nano material synthesis methods are capital-intensive and health hazardous due to the use of toxic chemical reducing agents. Thus, still, there is a need of safe, nontoxic, and eco-friendly synthesis methods. On this background in the present study, the MPs mediated rapid synthesis of AuNPs was observed within 25 min as confirmed by UV–Vis Spectroscopy. The MPs synthesized gold nanoparticles are predominantly spherical, triangular and irregular shapes with an average size of 10–60 nm was confirmed with FE-SEM, TEM and EDAX show gold element. The stability and particle size distribution studies revealed that nanoparticles are stable (−10.5 mV) and disperse. The possible mechanism of MPs in reduction of gold chloride elucidated by FT-IR and TLC. The chemical changes in the fungal pigments (MPs) with the exposure of sunlight might be responsible for the reduction of metal salt into nanosized particles. Overall this is the ecofriendly rapid method for synthesis of metal nanoparticle without exploiting the additional energy and toxic chemical reducing agents.

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