



Study on biosynthesis of gold nanoparticles assisted by purified laccase of *Paraconiothyrium variable*

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Abstract: Application of gold nano particles (AuNPs) in various fields encouraged investigators to synthesize it. The ability of gold to produce heat after absorbing light provides a medicinal usage named as photothermal therapy. Application of nanogold in gene and drug delivery increased studies on development of methods for GNPs production. Hazardous effects of chemicals used for synthesis of AuNPs on the environment encouraged researchers to study on preparation of gold nanoparticles via biological ways. In the present study the ability of the purified laccase from a newly soil isolated ascomycete *Paraconiothyrium variable* was aimed.

Aqueous solution of purified laccase from broth culture of *Paraconiothyrium variable* was prepared by dissolving 40 mg of purified laccase in 5 mL of deionized water, thereafter 500 μ L of such solution (corresponding to 73 U laccase activity) was added to aqueous solution of HAuCl₄ (2.5 mL) with concentrations range of 0.1–1 mM followed by incubation of reaction mixtures at different temperatures (30–80 °C). Characteristics of produced nanogold were determined using TEM, SEM equipped with EDX and UV-Vis spectrophotometer instruments. The average particle size of AuNPs was measured by Zetasizer MS2000.

Increasing concentration of chloroauric acid to 0.6 mM led to increase in absorbance of 520 nm corresponded to gold nanoparticle formation. The best temperature and HAuCl₄ concentration for AuNPs production were found to be 70 °C and 0.6 mM, respectively where the average particle size was found to be 124 nm. Elemental analysis of treated samples by EDX microanalysis confirmed the gold composition of prepared nanoparticles. SEM and TEM analysis showed good properties of AuNPs.

The purified laccase from *P. variable* was applied for synthesis of gold nanoparticles and the produced nanostructure was characterized.

Keyword: Gold nanoparticles, Laccase, Green synthesis, *Paraconiothyrium variable*