

Enzyme mediated synthesis of silver nanoparticles using different fungi

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Different fungi like *Fusarium acuminatum*, *F. solani*, *F. culmorum*, *Phoma glomerata*, *Alternaria alternata*, etc. isolated from infected plant materials have been used for the enzyme mediated extracellular biosynthesis of silver nanoparticles. All the above mentioned species showed ability to produce silver nanoparticles by the reduction of Ag^+ ion to Ag^0 (silver nanoparticles) with the help of NADPH dependant nitrate reductase enzyme. The synthesized silver nanoparticles were characterized by UV-Vis spectroscopy, which showed absorbance at about 420 nm specific for silver nanoparticles. FTIR analysis confirmed the presence of proteins as capping agent, which were responsible for the stabilization of synthesized silver nanoparticles. TEM analysis carried out for the detection of shape and size of silver nanoparticles showed the formation of polydispersive spherical nanoparticles in the average range of 5-40 nm for all the above species.

Presence of nitrate reductase enzyme in the fungal cell filtrate was confirmed by using substrate specific disc (Hi-Media, Mumbai) for the enzyme nitrate reductase. The disc showed the colour change from white to brownish-red when exposed to cell filtrate.

Extracellular enzyme mediated synthesis of nanoparticles by phytopathogenic fungi serves as a simple, cheap, eco-friendly, reliable and safe method. Silver nanoparticles thus produced have many biological applications in different fields like agriculture, food processing and packaging, pharmaceutical and medicines. Further study on the detection and isolation of genes responsible for the production of NADPH dependant nitrate reductase and other related enzymes is under progress.

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