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Mycogenesis of silver nanoparticles using nonpathogenic, opportunistic and pathogenic fungi

Nanobiotechnology is an important field of modern research dealing with design, synthesis, and manipulation of particle structures ranging from approximately 1-100 nm. It serves as an imperative technique in the development of clean, nontoxic, and eco-friendly procedures for the synthesis of metal NPs having the intrinsic ability to reduce metals by specific metabolic pathways. Biosynthesis of such nanoparticles is replacing chemical and physical methods of synthesis. It can be performed by fungi, bacteria, yeast or plant extracts. The size, shape and morphology of Ag NPs depend on the tendency of reduction by the organic reducing agent. The precise mechanism for the synthesis of nanoparticles employing biological agents have not been conceived as yet. This is because different biological agents react differently with metal ions leading to the formation of nanoparticles. Many microorganisms produce inorganic materials either intra or extra-cellular. But the mechanism for intra and extracellular synthesis of nanoparticles is different with different biological agents. The cell wall of the microorganisms plays an important role in the intracellular genesis. The mechanism involves electrostatic interaction of the positive charge of the metal ions with negative charge of the cell wall. The enzymes which are present within the cell wall reduce the ions to nanoparticles and these nanoparticles get diffused off through the Cell wall. The extracellular synthesis of silver nanoparticles using microbes is basically found to be nitrate reductase-mediated synthesis. Production of silver nanoparticles through fungi has several advantages over the other microorganisms. They include tolerance towards high metal nanoparticle concentration in the medium, easy management in large-scale production of nanoparticles, good dispersion of nanoparticle and much higher amounts of protein expressions. Our project is dealing with potential silver nanoparticle inducing fungi either non-pathogenic, opportunistic and pathogenic selected fungal strains.

Biography

M Bassam Aboul-Nasr is an emeritus Professor in the Department of Botany and Microbiology since 2015. His B.Sc. and M.Sc. were obtained in botany and mycology from the Faculty of Science, Assiut, Egypt, and his Ph.D. was awarded to him by the University of Maryland, USA. He was employed by FDA, USA (1983-1985), appointed as TA and lecturer in UMDP, USA (1985-1989). He did postdoctoral work at the University of Maryland, USA in 1989. He worked in University of Sohag as a senior demonstrator in 1976, a lecturer in 1990. He worked in KSA universities from 1993-2005. He supervised numerous Master and Ph.D thesis, editor of one book and main author of a lot of internationally published articles. His main research interest is fungi, mycotoxins, aspergillosis causing fungi and bionanoparticles. His hobbies are reading, listening to soft music, and camping.

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