

Synthesis of Silver Nanoparticles by Glycolipid Biosurfactant Produced from *Pseudomonas aeruginosa* MA01

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Background & Objectives: Nanotechnology involving the production, manipulation and use of material ranging in size from less than a micron to that of individual. Nanoparticles are material with at least one dimension roughly between 1 and 100 nm.

Methods: The present study reports the synthesis of silver nanoparticles from biosurfactant. The surfactants are emerging as potential nanoparticle stabilizing agents. Therefore, the biosurfactants are described as a green alternate for the synthesis and stabilization of nanoparticles. It was found that the nanoparticles silver can be synthesized in reverse micelles using the glycolipid as stabilizer. The silver nanoparticles synthesized in this study were spherical with average diameter of 11nm for silver. Therefore, the biosurfactant-mediated nanoparticles synthesis can be considered as “green” stabilizer of nanoparticles.

Results: A new bacterial strain isolated from spoiled fruits, identified as *Pseudomonas aeruginosa* MA01 that is capable of producing rhamnolipids. Rhamnolipid is composed of rhamnose sugar molecule and b-hydroxyalkanoic acid. An optimum biosurfactant production of 25 g/l was obtained with the following medium composition: 35ml acidified soybean oil, 3g/l NaNO₃, 0.25g/l KH₂PO₄, 0.25g/l MgSO₄ 7H₂O and 1g/l yeast extract, with shaking at 200 rpm for an incubation period of 14 days at 30 °C. The production of the biosurfactant was found to be a function of cell growth, with maximum production occurring during the exponential phase. The crude extract of biosurfactant was purified and fractioned using column chromatography. Two major fractions were obtained and each fraction was analyzed by analytical Thin Layer Chromatography (TLC) and revealed the presence of two glycolipid compounds.

Conclusion: Although nanomaterials could be synthesized by using chemical approaches, it is now possible to include the use of biological materials. In this study we critically assess the role of microorganisms in the synthesis of nanoparticles.

Keywords: Silver Nanoparticles; Glycolipid Biosurfactant; *Pseudomonas aeruginosa*