

## Biosynthesis of Silver-Phosphate Nanoparticles Using the Extracellular Polymeric Substance of *Sporosarcina pasteurii*

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**Abstract :** Silver ions ( $\text{Ag}^+$ ) and their compounds are consequentially toxic to microorganisms, showing biocidal effects on many species of bacteria. Silver-phosphate (or silver orthophosphate) is one of these compounds, which is famous for its antimicrobial effect and catalysis application. In the present study, a green method was presented to synthesis silver-phosphate nanoparticles using *Sporosarcina pasteurii*. The composition of the biosynthesized nanoparticles was identified as  $\text{Ag}_3\text{PO}_4$  using X-ray Diffraction (XRD) and Energy Dispersive Spectroscopy (EDS). Also, Fourier Transform Infrared (FTIR) spectroscopy showed that  $\text{Ag}_3\text{PO}_4$  nanoparticles was synthesized in the presence of biosurfactants, enzymes, and proteins. In addition, UV-Vis adsorption of the produced colloidal suspension approved the results of XRD and FTIR analyses. Finally, Transmission Electron Microscope (TEM) images indicated that the size of the nanoparticles was about 20 nm.

**Keywords :** bacteria, biosynthesis, silver-phosphate, *Sporosarcina pasteurii*, nanoparticle

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