

## Bioremediation of Hazardous Waste for Silver Nanoparticles Production

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### ABSTRACT

The synthesis of silver nanoparticles (SNPs) was extensively studied by using chemical and physical methods. In this study, the biological methods were used as it gave benefits in research field in the aspect of very low production cost (from waste to wealth) and time saving as well. The study aims to isolate and exploit the microbial power in the production of industrial important by-products in nano-size form with high economic value. It is also to extract the highly valuable materials from hazardous waste, to quantify nanoparticle size and characterization of SNPs by X-Ray Diffraction (XRD) analysis. Disposed X-ray films were used as substrate because it consumes about 1000 tons of total silver, which is chemically produced worldwide annually. The silver was wasted when these films were used and then disposed. Different bacterial isolates were obtained from various sources. Silver

was extracted as nanoparticles by microbial power degradation from disposed Xray film as the sole carbon source for ten days incubation period in darkness. The protein content was added to all the samples and analyse using XRD to characterize the silver (Ag) nanoparticles size in the form of silver nitrite. Bacterial isolates labelled CL4C (isolated from rotten chicken liver) showed the average size of SNPs of about 19.53 nm, GL7 (isolated from Gambang Lake, Kuantan) showed about 52.35 nm and JF Outer 2A (PDA) (isolated from rotten jackfruit) showed 13.52 nm. All bacterial isolates partially identified using Gram s reaction and the results obtained exhibited that belonging to Bacillus sp.

**KEYWORDS:** Nanotechnology, Bioremediation, Disposed X-ray film, Nanoparticle, Waste, XRD