

Toxic potential of green synthesized silver nanoparticles using *Annona glabra* leaf extract against *Daphnia magna*

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This study aims to evaluate the acute toxicity of biosynthetic AgNPs produced using *Annona glabra* leaf extract, against a selected aquatic-indicator, *Daphnia magna*. The toxicity of the biosynthetic AgNPs was compared against the Ag⁺ ion solution.

Aqueous leaf extracts of *A. glabra* were prepared by heating chopped leaves (20.0 g) with water (100.0 mL) at 100 °C for 1 hour. AgNPs were synthesized by incubating the leaf extract of *A. glabra* (2 mL) with AgNO₃ solution (1 mM, 20 mL) for 3 hours. The formed AgNPs were separated using centrifugation (6000 rpm, 20 minutes) and the separated AgNPs were freeze dried. AgNPs were characterized by UV – visible spectrometer, particle size analyzer and scanning electron microscopy. The acute toxicity tests against *D. magna* were conducted according to the Organization for Economic Co-operation and Development (OECD) standard procedure using neonates aged less than 24 hours reproduced using parthenogenesis. *D. magna* neonates were exposed to solutions within the concentration range of 0.01 – 10 mg/L of AgNP solutions and concentration range of 0.5 – 2 µg/L of Ag⁺ ion solutions for 48 hours. Tests were conducted in quadruplicate and 95% confidence interval was calculated. Biosynthesized AgNPs showed a plasmon resonance peak at 419 nm, were spherical in shape and the size ranged between 10 – 190 nm. The EC₅₀ value against *D. magna* for Ag⁺ ions were 1.41 ± 0.2 µg/L and for AgNPs it was 3.96 ± 1.1 mg/L after 48 hours. Results obtained from this study suggests that the toxicity of biosynthetic *A. glabra* - AgNPs exerts lesser toxic effect to *D. magna* than the Ag⁺ ions.

Keywords: Biosynthesized silver nanoparticles, *A. glabra*, Acute toxicity, *Daphnia magna*

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