



Silver nanoparticles and silver nitrate induce high toxicity to *Pseudokirchneriella subcapitata*, *Daphnia magna* and *Danio rerio*

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Abstract

Silver nanoparticles (AgNP) have gained attention over the years due to the antimicrobial function of silver, which has been exploited industrially to produce consumer goods that vary in type and application. Undoubtedly the increase of production and consumption of these silver-containing products will lead to the entry of silver compounds into the environment. In this study we have used *Pseudokirchneriella subcapitata*, *Daphnia magna* and *Danio rerio* as model organisms to investigate the toxicity of AgNP and AgNO₃ by assessing different biological endpoints and exposure periods. Organisms were exposed following specific and standardized protocols for each species/ endpoints, with modifications when necessary. AgNP were characterized in each test-media by Transmission Electron Microscopy (TEM) and experiments were performed by Dynamic Light Scattering (DLS) to investigate the aggregation and agglomeration behavior of AgNP under different media chemical composition and test-period. TEM images of AgNP in the different test-media showed dissimilar patterns of agglomeration, with some agglomerates inside an organic layer, some loosely associated particles and also the presence of some individual particles. The toxicity of both AgNO₃ and AgNP differ significantly based on the test species: we found no differences in toxicity for algae, a small difference for zebrafish and a major difference in toxicity for *Daphnia magna*.

Reference

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