

Time-Dependent Toxicity of Silver Nanoparticles to *Daphnia magna*Rahime ORAL¹, Fatma KOÇBAŞ², Gökür ŞİŞMAN AYDIN¹¹ Faculty of Fisheries, Ege University, Turkey² Biology Department, Faculty of Arts and Science, Manisa Celal Bayar University, Turkey
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Aim of the study: Due to its antimicrobial properties, silver is the most produced nanomaterial. Thus, large quantities of silver nanoparticles (AgNPs) could be released and enter freshwater environments. The goal of our study is to examine and better understand the potential ecotoxicological impacts of nano-sized (<100 nm) silver particles on freshwater biota by using the *Daphnia magna* acute toxicity test.

Material and Methods: In this research, *D. magna* were cultured, handled and used in ecotoxicological tests according to the procedures outlined in the U.S. Environmental Protection Agency. Four replicates of five neonates (less than 24 h old) were used for each treatment and control without feeding. The *D. magna* tests were performed using different concentrations of AgNPs (1, 2.5, 5, 10 and 25x10⁻⁷M). After 24 and 48 hours of exposure, the immobilization and mortality of the *D. magna* in each test beaker were observed. An animal was recorded as dead when it was immobile. The LC₁₀, LC₅₀, and LC₉₀ values were calculated using the probit analysis program after 24-h and 48-h.

Results: The results obtained from the exposure studies showed that the toxicity of AgNPs on *D. magna* neonates was dose and time dependent. The 24-h LC₁₀, LC₅₀ and LC₉₀ concentrations of AgNP were calculated as 2.4, 6.1 and 15.7 x10⁻⁷ M, respectively. In addition of these results, the 48-h LC₁₀, LC₅₀ and LC₉₀ concentrations of AgNP were calculated as 1.4, 4.2 and 12.3x10⁻⁷ M, respectively. In conclusion, the release of nano-sized silver particles into the freshwater environment should be carefully considered to protect biodiversity.

Keywords: *Daphnia magna*, Silver, Nanoparticle, Acute toxicity