

Assessment of Assimilation and Elimination of Silver and TiO₂ Nanoparticles in *Artemia franciscana* in Different Salinities

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Abstract

Artemia is a passive filter-feeder organism that uptakes particles between 1-50 micron without selection. In this study, potential of *Artemia franciscana* for nano particles assimilation and release in different salinities were investigated. *Artemia nauplii* were exposed to colloidal silver nano particles (32 mg/l) as well as TiO₂ nano particles (100 mg/l) for 12 and 48 hours, respectively. Treated *Artemia nauplii* were collected and dried and the uptake rate of nanoparticles was measured by atomic absorption analysis. Also, to examine the elimination rate of adsorbed nano materials in naupliies, treated *Artemia* were returned to freshwater and were sampled after 5, 15, 30, 60, and 120 minutes, the release rate of nano materials was measured and 35, 70, 105 and 140 mg/l salinities was investigated in periods of 2, 6, 24, 48, 72 and 96 hours by spectrophotometer by furnace atomic absorption analysis. The results of silver and TiO₂ nano particles absorption indicated that the uptake of TiO₂ (68.16±38.18) has been significantly higher than metal silver ion (2.13±1.79) (P<0.05). In addition, the release rate of silver ion in comparison with titanium ion in nauplies were returned to freshwater has been higher significantly (P<0.05). Moreover, the results of 24 h spectrophotometry showed that the silver ion deposition rate was increased by increasing salinity. Regarding the TiO₂ with concentration of 100 mg/l, in the salinity of 70 mg/l, although, the deposition and aggregation rate in solution phase increased, the deposition rate of particles reached the maximum rate in 105 and 140 mg/l salinities. Conclusion of this research confirmed that, in the presence of silver or TiO₂ nano particles in natural habitats of artemia or in the culture media with different salinities, a part of this nano materials deposited in salt waters and the rest would be absorbed by this organism which could be transmitted to the next consumer of *Artemia*.

Keywords: Uptake and release, Silver and TiO₂ nanoprticles, *Artemia franciscana*, Salinity.
