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TITLE

COMPARATIVE MOLLUSCICIDAL ACTIVITY OF TWO SILVER NANOPARTICLES AGAINST BIOMPHALARIA GLABRATA (SAY, 1818)

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ABSTRACT

The neotropical snail *Biomphalaria glabrata* is considered the main intermediate host of the trematode *Schistosoma mansoni* in Brazil, the etiological agent of schistosomiasis, a neglected tropical disease. To reduce the prevalence of the disease, the World Health Organization recommends the development of technologies to control intermediate hosts. Silver nanoparticles (AgNPs) have been indicated as a technological alternative for the control of medically important gastropods. However, knowledge about the toxicity of mercaptosuccinic acid (MSA)-functionalized AgNPs (MSA-AgNPs) to *B. glabrata* is still scarce. Therefore, this study aimed to evaluate the toxicity of two MSA-AgNPs, both with the same synthesis route, having the same substances, but differing with heating in the last step for 60 minutes, giving rise to AgNPs functionalized with heated MSA (Δ -MSA-AgNPs) and the other without heating (MSA-AgNPs). Embryotoxicity tests on *Biomphalaria* spp. was conducted using 9 egg clutches per concentration in 12-well microplates for 168h. Embryos were exposed individually to both AgNPs at concentrations from 0.39 to 24.96 mg L⁻¹. The parameters analyzed were mortality, hatching, delay in embryonic development, morphological changes, and cardiotoxicity. The acute toxicity test on newly hatched animals was carried out using 15 animals per concentration, with concentrations ranging from 6.24 to 49.92 mg L⁻¹ for 96 hours, with the mortality and cardiotoxicity parameters analyzed. The results demonstrated that both MSA-AgNPs caused mortality, hatching inhibition, delayed embryonic development, and morphological changes such as shell malformation and hydropic snails. For newly hatched snails, both NPs did not induce cardiotoxicity and changes in the mortality rate when compared to the negative control. Therefore, MSA-AgNPs are more promising in controlling intermediate host embryos in comparison with Δ -MSA-AgNPs. Overall, the molluscicidal activity of AgNPs to *B. glabrata* is dependent on the synthesis method and developmental stages of snails.

KEYWORDS

Gastropods; Mollusks; Nanomedicine; Nanotoxicology; Schistosomiasis

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