EFFECT OF COPPER NANOPARTICLES (CuO-NPs) ON THE TROPICAL CLADOCERAN CERIODAPHNIA SILVESTRII

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INTRODUCTION: Copper oxide nanoparticles (CuO-NPs) are metallic nanoparticles (MNPs) known for their high electrical and thermal conductivity as well as their biocidal effects due to antibacterial and antifungal properties. They are used in industrial applications such as gas sensors, batteries, electronic chips, and others. However, their increasing use increases the risk of their release into the aquatic environment, potentially affecting non-target organisms. AIM-Objective: To evaluate the ecotoxicological effects of isolated CuO-NPs on the Neotropical cladoceran Ceriodaphnia silvestrii. MATERIALS AND METHODS: Acute toxicity tests were performed with 48 h exposures, assessing mobility (%) and measuring water pH and conductivity throughout the experiment. RESULTS: Immobility rate was the main parameter evaluated and the effective concentration (EC50) was calculated to determine the toxicity of CuO-NPs. The preliminary test yielded an EC50 of 3.91 μg-L-¹, which served as the basis for the definitive tests, which were repeated three times to ensure reliability. In the final results, the final tests showed consistent EC50 values for CuO-NPs with an average of 3.26 ± 0.19 μg-L-¹. pH and conductivity values remained stable over the 48 hours, indicating that CuO-NPs did not significantly alter the physical and chemical conditions of the medium. Control mortality remained below 10%, confirming the results. The EC50 values obtained were similar to those reported in the literature, which found EC50 values ranging from 2.5 to 12.6 μg-L-¹ for other species of the genus.CONCLUSION: The results demonstrated the acute toxicity of CuO-NPs to C. silvestrii, highlighting the importance of ecotoxicological studies to assess the impact of these nanomaterials on aquatic ecosystems. The variation in reported EC50 values suggests that factors such as pH, temperature, and chemical form of the nanoparticles influence toxicity. Furthermore, our data and literature reviews suggest that the effects of CuO-NPs are species-specific, with C. silvestrii being more sensitive than other temperate species, highlighting the importance of using Neotropical species as test organisms.

Keywords: ecotoxicology; cladocerans; nanoparticles; tests; copper.

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