عنوان مقاله:

Evaluation of silver nanoparticles toxicity in Daphnia magna: Comparison of chemical and green biosynthetic productions

محل انتشار:

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خلاصه مقاله:

Recently nanoparticles, particularly silver nanoparticles, are broadly used in industry, hence the contamination of the environment with AgNPs has caused considerable concern. In this study, the toxicity of biosynthetic nanosilver produced by two macroalgae: Sargassum boveanum and Ulva flexuosa extracts were compared with chemical nanosilver in Daphnia magna. Size and quality of nanoparticles evaluated by TEM, FT-IR spectrum, and Particle size analyzer. The acute toxicity test was evaluated following the OECD and Test guideline No: 211. D. magna were reproduced using parthenogenesis from a single individual according to OECD guideline. Then Daphnia exposed to eight serial dilutions of each nanosilver in triplicates for 48 hours. The mortality rate after 12h, 24h, 36h, and 48h were recorded and analyzed using probit software. Results showed that all nanosilver (regardless of their synthesis origin) were toxic in Daphnia and acute toxicity of this nanosilver was different ($p<0.05$). The 48h LC50 of SPN, UPN, and CPN in Daphnia were 1.03, 3.24 and 0.03 mg L-1 respectively. The mortality rate in D. magna enhanced in all tested groups, along with increasing nanosilver concentration and exposure time duration. Highest toxicity belongs to chemical nanosilver (LC50 = 0.03 mg L-1), which was 30 and 100 times more toxic than SP (LC50 = 1.03) and UP (LC50 = 3.24 mg L-1) respectively. According to the high toxicity of chemosynthetic nanosilver compare to biosynthetic ones, biosynthetic nanoparticles are highly recommendable and environmentally friendly alternative to .chemical oriented nanoparticles

کلمات کلیدی:

Nanosilver, Daphnia magna, Sargassum boveanum, Ulva flexuosa, Biosynthetic