EFFECT OF EUTROPHICATION ON TOXICITY OF METALLIC NANOPARTICLES TO *DAPHNIA MAGNA*

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The speciation and toxicity of metal nanoparticles (NPs; Ø 1 to 100 nm in at least one dimension) and salts are affected by the components of the test medium [1]. The aim of this study was to compare the toxicity of ionic and NP form of metals in standardised test conditions and conditions mimicking eutrophied freshwaters.

The toxicity of CuO, ZnO, Ag NPs and $CuSO_4 \cdot 5H_2O$, $ZnSO_4 \cdot 7H_2O$, $AgNO_3$ salts to pelagic water flea *Daphnia magna* was tested. Both standardised (OECD 202) and modified test conditions were used: i) standardised toxicity testing using synthetic (mineral) freshwater; ii) toxicity testing in natural freshwater from Estonian lakes Ülemiste and Raku and iii) to simulate eutrophication, high content of microalga (*R. subcapitata*) was added to both standardized and natural waters during the toxicity testing.

As anticipated, natural waters with organic carbon content mitigated Cu and, to a lesser extent, Ag formulations' toxicity to *D. magna* [2]. ZnO NPs and Zn salt were more toxic in natural waters compared to synthetic freshwater possibly because of differences in water hardness [3]. Addition of algae considerably mitigated the toxicity of Ag NPs and salts (100-fold) and had little or no effect on Zn formulations' toxicity. CuO NP toxicity decreased in natural waters (10-fold) but not in synthetic (mineral) freshwater after addition of algae. On the contrary, Cu salt toxicity was not mitigated in natural test medium in the presence of algae. I conclusion, eutrophication decreases the toxicity of metallic NP to *D. magna* equally or more than the toxicity of corresponding metal salt.

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References

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