



Effect of aluminum oxide nanoparticles on aquatic organisms – a microcosm study

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ABSTRACT

The study examined structural and functional changes in the microcosm, inhabited by representatives of all trophic levels of the aquatic food chain, in the presence of aluminum oxide nanoparticles and their bulk counterparts (100 mg/L). The 28 d experiment showed negative effects of nano- Al_2O_3 on aquatic ecosystems, as evidenced by reduced biodiversity of microbenthic and plankton organisms. Furthermore, exposure to nanoparticles contributed to the increase of the activity of antioxidative enzymes of benthos. Cytochemical analysis of *Daphnia magna* crustacean cells showed accumulation of nanoparticles on the surface of organisms and in their mitochondria, causing swelling of mitochondrial cristae, as well as disturbances of their system with a clear matrix in the centre of organelles. However, there were no significant changes in microcosms with bulk counterparts of nanoparticles, as well as no accumulation of aluminum oxide on the surface, nor in the mitochondria of *D. magna*, was detected.

Keywords: Nanoparticles; Aluminum oxide; Microcosms; Ecotoxicity; Biodiversity

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