

Preliminary results on toxicity of nanosized and bulk ZnO to a plant-feeding nematode, *Xiphinema vuittenezi*

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ABSTRACT

The production of engineered nanoparticles is increasing and they are being used in a wide range of application. Therefore, these particles are being released into the environment in growing amounts. But there is still a lack of knowledge about their effects on living organisms. Photocatalytic active nanoparticles are included in toothpaste and sunscreens. Data on ecotoxicological effects of nanoparticles on nematodes have been derived so far from *Caenorhabditis elegans* tests only. The phototoxic effects of ZnO nanoparticles were found more toxic than their bulk form.

The toxic effect of ZnO nanoparticles (average size 35 nm) was investigated and compared their bulk form in this study. Adult *Xiphinema vuittenezi* females were extracted from collected soil samples using modified Cobb's decanting and sieving method. All mortality tests were carried out in microtriter plates. The survival of nematodes was counted after an exposure period of 24 hours and 7 days, respectively.

Results show an increasing trend of toxicity along the gradient of increasing concentration. All of the tested concentrations of nano ZnO caused higher mortality value than the negative control (distilled water) and the bulk ZnO considered as positive control. After 7 days of exposure the mortality was almost 100% in the highest nanosized ZnO test concentration in each well. The toxicity of nano ZnO to nematode was appreciable at a concentration of 1 mg L⁻¹. Bulk ZnO particles were not toxic up to the highest test concentration 1000 mg/l. Our results give an alert on toxicity of ZnO nanoparticles and support the suggestions for more careful exploration of possible adverse effects caused by releasing nanomaterials in the environment.

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