



The aim of this study was to evaluate the influence of size and hydrolysis of metal oxides on ecotoxicity with bacterial (*Vibrio fischeri*) luminescence and growth inhibition, crustacean (*Daphnia magna*, *Thamnocephalus platyurus*) mortality and protozoan (*Tetrahymena thermophila*) growth inhibition. Tested chemicals were nanosized ZnO (50-70 nm), TiO₂ (25-70 nm), CuO (30 nm). Bulk forms of the metal oxides and ionic forms of the metals (ZnSO₄·7H₂O and CuSO₄) were assessed in parallel. Bioavailable ions from hydrolysis of oxides as potential contributors to the toxic effects were quantified by luminescent recombinant metal-specific *E.coli* sensor bacteria. The metal oxide suspensions were studied for particle size distribution by using Nanosight LM10 nanoparticle characterisation system.

Our study is the first comparison of toxicity of nanosized and bulk ZnO and CuO for *V. fischeri*, *D. magna*, *T. platyurus* and *T. thermophila* – representatives of different trophic levels. Our data showed that in case of all organisms nano and bulk ZnO exhibited practically the same toxicity, whereas nano CuO was up to 100-fold more toxic than its bulk form. Nearly all the toxicity of ZnO and a great part of toxicity of CuO was due to dissolved toxic concentrations of metal ions. TiO₂ had no effect (up to 20.000 mg/l) for all the test organisms. Visual appearance of test solutions and Nanosight LM10 analysis revealed that NPs had aggregated to the size of their bulk forms, which may also occur in natural conditions.

Keywords: ecotoxicology, nanoparticles, CuO, TiO₂, ZnO, bacteria, protozoa

Calendar of events

» **4th International SkinEthic Workshop,**
September 6-7, 2007,
Nice, France.

<http://www.skinethic.com>

» **18th Meeting of the International Society for Livestock Husbandry (Internationale Gesellschaft für Nutztierhaltung, IGN),**
September 20-21, 2007,
Giessen, Germany.

» **14th Congress on Alternatives to Animal Testing – Linz 2007,**
September 28-30, 2007,
University of Linz, Austria.

<http://www.zet.or.at/kongress/Linz2007/index.html>

» **EUROTOX 2007,**
October 7-10,
Amsterdam, The Netherlands.

<http://www.eurotox2007.org>

» **First International Forum Towards an Evidence-Based Toxicology (EBT),**
October 15-18, 2007,
Spazio Villa Erba, near Cernobbio,
Lake of Como, Italy.

<http://www.ebtox.org>, ebt.forum@jrc.it

» **AALAS National Meeting 2007,**
October 14-18, 2007,
Charlotte, NC, USA

<http://www.aalas.org/index.aspx>

» **2. REACH-Symposium,**
November 22, 2007,
Berlin, Germany.

<http://www.gd-online.de>