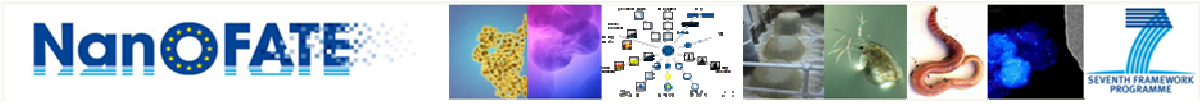

NanoFATE Deliverable 6.1

Report on perceived current and future use of silver, ceriumoxide and zincoxide Nanoparticles, including a compilation of available data on production volumes and predicted environmental concentrations

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Research Report – Summary

This report aimed at providing information on production volumes and predicted environmental concentrations for the following three types of engineered nanoparticles (ENPs): silver (Ag), cerium-oxide (CeO_2) and zinc-oxide (ZnO). The collated information provides the basis for the environmental risk assessment of those three particle types (workpackage 6 of Nanofate).

Information was collected (a) by means of an electronic survey and (b) by compiling the information published in the peer-reviewed literature, research reports and conceptual reports from regulatory authorities. The electronic survey was distributed directly to 549 ENP-producing companies and to 14 industrial organizations (e.g. CEFIC) and regulatory authorities (e.g. various commission services). However, the feedback (3 filled-in surveys) was not sufficient to draw any reliable conclusions on current or anticipated production volumes of any of the three ENP types.

Measured environmental concentrations are currently not available for any of the three ENPs (June 2011), while modelled environmental concentrations are published for all ENP types for surface water as well as soil (and sometimes also for STP sludge, sediments and air). However, modelled values differ by 3-5 orders of magnitude for each environmental compartment. These enormous differences are due to different spatial scales, assumed production volumes and market penetration factors as well as specific assumptions on elimination processes (especially clearance rates in STPs and dissolution kinetics for Ag and ZnO particles).

The worst case (maximum) estimates for each environmental compartment can be used for providing an upper limit for the ecotoxicological investigations in NanoFATE and are as follows:

Particle Type	**Surface Water**	**Soil**	**STP Effluent**	**Sludge**	**Sediment**
Silver (Ag)	800 ng/L	4.26 µg/kg	(127 ng/L)*	6.24 mg/kg	10 Δ µg/(kg year)
Cerium oxide (CeO_2)	0.1 ng/L	0.75 Δ µg/(g year)	n.a.	0.01 µg/kg	n.a.
Zinc oxide (ZnO)	760 µg/L	32 mg/kg	(1.42 µg/L)*	21.7 g/kg	56 Δ µg/(kg year)

n.a. = data not available; values with a Δ indicate concentration increases per year.
*The maximum concentration predicted in STP effluents for silver-ENPs was 127 ng/L, which is clearly below the maximum predicted concentration of silver in surface waters (800 ng/L). Hence, a reasonable upper limit for testing in NanoFATE would be the higher of the two values (i.e. 800 ng/L). The same rational leads to an assumption of 760 µg/L Zn-ENPs for testing of STP effluents.