



Memorandum

Datum: 15. September 2015
Von J. Tits
Telefon: 4314
Raum: OHLD/001
E-Mail: jan.tits@psi.ch

An: siehe Verteiler
cc:

Einladung zu einem ausserordentlichen LES Palaver

Ich lade Sie herzlich ein.

Referent: Emmanuel Müller, Muttenz
Thema: Toxicity of engineered copper (Cu(0)) nanoparticles to the green alga *Chlamydomonas reinhardtii*
Zeit: Dienstag, 22. September 2015, 14.30 Uhr
Ort: Sitzungszimmer OHSA/E13

Abstract

Environmental context

Engineered copper nanoparticles are presently under development for various uses and may thus be finally released into the aquatic environment. Copper is well-known to be both an essential and a toxic element for aquatic organisms. We investigate here the toxicity of copper nanoparticles to a green alga and compare it to the toxicity of dissolved copper.

Abstract

Toxicity of carbon coated copper nanoparticles (CuNP) to the unicellular green alga *Chlamydomonas reinhardtii* was investigated and compared with effects of dissolved Cu²⁺. The CuNP with original size of 6 – 7 nm rapidly agglomerated in the medium to average particle sizes of 140 – 200 nm. Dissolved Cu from CuNP increased over 2 h to 1 – 2 % of total Cu. The photosynthetic yield of *C. reinhardtii* strongly decreased after exposure for 1 or 2 h to dissolved Cu(II) in the concentration range 0.1 – 10 µM, whereas this decrease occurred in the total Cu concentration range 1 – 100 µM after exposure to CuNP. Effects of CuNP were compared to those of dissolved Cu(II) on the basis of dissolution experiments. CuNP effects on photosynthetic yield were similar or somewhat stronger for the same dissolved Cu²⁺ concentration. Addition of EDTA as a strong ligand for Cu(II) suppressed the toxicity of dissolved Cu(II) and of CuNP. These results thus indicate mostly effects of free Cu²⁺ to the algae.

Freundliche Grüsse

J. Tits