Poster Number

21

Topic	Effect assessment
Title	**Advanced Research on Nickel Toxicity in Sediment: Species, Bioavailability and Toxicity**
Poster submitter	Ms Lien NGUYEN
Organization	Laboratory of Environmental Toxicology and Aquatic Ecology. Ghent University, Belgium
Authors	**Lien T.H NGUYEN, Marnix VANGHELUWE, Michiel B. VANDEGEHUCHTE, Jan GARREVOET, Emily R. GARMAN, Chris E. SCHLEKAT, Laszlo VINCZE and Colin R. JANSSEN**

Keywords: Sediment, Ni, bioavailability, species sensitivity

Summary: Sediment toxicity is known to be affected by abiotic factors such as the concentration of total organic carbon (TOC) and acid volatile sulphide (AVS) in the sediment, but also by biotic factors such as the intrinsic sensitivity and the behaviour of (epi)benthic test species. The goal of this project is to evaluate the relative importance of species sensitivity and bioavailability for the toxicity of nickel (Ni) in freshwater sediments. In order to achieve this, Ni toxicity and uptake are being evaluated with several species representing different taxonomic groups and life styles. Three uncontaminated natural sediments covering a range of different binding capacities (AVS and TOC) are used.

The first results demonstrate that in sediment with low AVS and TOC concentrations (1.4-2.1 mmol/kg and 1.45%, respectively), a concentration-effect relation could be observed for the biomass of *Tubifex tubifex* after 28 days exposure. The EC_{10} (95% confidence intervals) for biomass is 1103 (883-1379) mg Ni/kg dry sediment. For the midge *Chironomus riparius*, body mass of larvae after 12 days of exposure was affected at 1061 mg Ni/kg dry sediment. The EC_{10} (95% confidence intervals) for development rate is 762 (324-1788) mg Ni/kg dry sediment. For the mollusc *Sphaerium corneum*, the EC_{10} (95% confidence intervals) for biomass (soft tissue) is 388 (123-1229) mg Ni/kg dry sediment.

In this low AVS sediment, the difference between the molar concentrations of simultaneously extracted Ni (SEM_{Ni}) was greater than zero for all tested concentrations. Ni tissue concentrations increased as the difference between SEM and AVS increased. This supports the basis of the SEM-AVS concept, as it is reflective of the presence of Ni in exchangeable sediment phases, as opposed to sulphide phase.

In ongoing and future experiments, additional species and sediments will be evaluated. By

means of micro-X-ray fluorescence (XRF) analysis and based on previous research, we will test the hypothesis that Ni accumulation and the internal distribution of Ni over different tissues is affected by bioavailability modifying factors such as TOC, AVS or diet.