

MO 038

Use of the Simultaneous Extractable Metal (SEM) concentration to predict accumulation in the benthic oligochaete *Lumbriculus variegatus*

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SEM-AVS (Simultaneous Extractable Metal -Acid Volatile Sulfide) concept has been used to predict the toxic or accumulative fraction of metal in sediment which is available to organism. Dietary metal uptake appears to be the dominant source of metals for deposit feeders and during the gut passage of the ingested sediment the sulfide-bound metals could solubilize and become available for the gastrointestinal uptake.

In this study the use of SEM concentrations to predict the metal fraction available to the accumulation was evaluated. Specimens of *Lumbriculus variegatus* were exposed for 28 days to river and bottom lake sediments with different sum SEM/AVS ratios (ranging from 0.1 to 20). Metal tissue concentrations and biological parameters (reproduction and biomass) were measured at the end of the exposure period. No significant differences among sediments were observed for reproduction and biomass.

Some metals (Ni, Pb and As) showed little or no accumulation in *L. variegatus* (BAF ranging from 0.1 to 2) for all the sediment investigated; for these metals tissue concentrations were highly correlated ($R^2 > 0.98$) to total recoverable sediment concentration suggesting that surface sorption should be the predominant route of organisms contamination.

On the contrary the concentrations of Cu, Cd and Zn in *L. variegatus* did not correlate with total recoverable sediment concentrations, but the BAFs of these metals calculated from SEM concentrations were inversely related to the AVS amount.

The results highlight that in the case of endobenthic organisms both the sum SEM/AVS ratio and the absolute AVS content should be taken into account for deriving sediment quality criteria based on bioaccumulation.

MO 039

Accumulation of sediment bound metals to aquatic invertebrates: The role of feeding behavior and ecology.

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Recent studies indicated the importance of exposure routes when assessing metal accumulation from natural sediments. The present study investigated the role of feeding behavior and general ecology on the accumulation of sediment bound metals in aquatic invertebrates. Natural sediments, pore water, surface water and several invertebrate species with different feeding behavior (deposit feeders, filter feeders,) and ecology were collected from 29 historical polluted Flemish lowland rivers and measured on present metal concentrations. Different sediment characteristics were determined (AVS-SEM, organic matter and clay content) and multiple regression was used to study their relationship with accumulated metals in the invertebrates. The first results indicated that metal accumulation in pelagic invertebrates better correlated with Zn, Cd and Pb concentrations in the surface water while bioaccumulation in sediment feeding invertebrates was better correlated with total metal concentrations in the sediment and sediment metal concentrations normalized for organic matter. Moreover, Cd, Pb and Cu accumulation was noticed in benthic invertebrate species (e.g. Chironomidae and Tubificidae) while $[SEM-AVS] < 0$. The latter was not observed for species which mainly live and feed in the water column (e.g. Trichoptera and Ephemeroptera). These results indicate that differences in accumulation of sediment bound metals are directly related to the feeding behavior and ecological preferences of aquatic invertebrates.

MO 040

Speciation of water soluble ions and carbonaceous fraction in PM2.5, PM2.5-10 and PM>10 collected in Yokohama, Japan

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This study elucidated the characteristics of ambient PM2.5, PM2.5-10 and PM>10 with water soluble ions i.e. Cl⁻, NO₃⁻, SO₄²⁻, Na⁺, NH₄⁺, K⁺, Mg²⁺ and Ca²⁺ and carbonaceous aerosol i.e. Elemental Carbon (EC) and Organic Carbon (OC) in the above size fractions from the samples collected for the period of September 2007 - October 2008. The total number of PM2.5, PM2.5-10 and PM>10 samples collected with MCI low volume air sampler were 91, 87 and 79, respectively. The ambient particulate samples were collected at the roof top of a three storied building of Yokohama National University and twice in a week. The annual arithmetic mean concentrations of PM2.5, PM2.5-10 and PM>10 were measured as 20.6, 9.6 and 5.1 $\mu\text{g}/\text{m}^3$. Measurements indicated that 67% samples of PM2.5 exceeded the US EPA's annual national ambient air quality standards (15 $\mu\text{g}/\text{m}^3$) while 95% in respect of WHO standard (10 $\mu\text{g}/\text{m}^3$). The total concentrations of water soluble ions in PM2.5, PM2.5-10 and PM>10 accounted for 40%, 31% and 19%, respectively. The estimation of non-sea salts particles implied that the major sources of water soluble ions in PM2.5 were anthropogenic. On the other hand, large proportion of sea salts particles contributed to PM2.5-10 and PM>10. The results of the Spearman correlation indicated that the concentrations of OC and EC in PM2.5 can originate from similar type of sources. However, the concentration of OC and EC in PM2.5-10 and PM>10 can have multiple sources. In addition, some atmospheric reactions were also characterized in this study.

MO 041

Surface water quality assessment: A case study of Bang Pakong River, Thailand

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Bang Pakong River is the major river in the eastern part of Thailand which drains into the Gulf of Thailand. The river supports a great number of communities who are involved in agro-forestry, irrigated crops, livestock, fisheries, industries and tourism. Water contaminants are released to the river from numerous sources such as municipal wastewater, manufacturing industries, rural agricultural cultivation and fertilization. Moreover, at the estuary, the Irrwaddy dolphins (*Orcaella brevirostris*), one of the world's most endangered dolphins, use as their habitat during November to February. Therefore, contaminants in water will cause adverse effects to dolphins and aquatic species as well. The objective of this study is to evaluate and to assess the quality of surface water in both physical and chemical properties. Nine monitoring stations from upstream to downstream (122 kilometre distance) have been selected. The water samples were taken every month from June to October, 2008. Monitoring parameters include temperature, color, turbidity, conductivity, pH, suspended solids, total dissolved solids, dissolved oxygen (DO), biochemical oxygen demand (BOD), chemical oxygen demand (COD), nitrate, ammonia-nitrogen, TKN, cyanide, phosphate and heavy metals (As, Cd, Cr, Cu, Hg, Mn, Ni, Pb and Zn). The water quality then evaluates with the National Thailand surface water quality standard. Overall surface water quality is plausible for its use according to the surface water quality standard: Class 3. However, the results indicated that Pb, Hg and Cd concentrations are higher than the standard at different station and time. Also Dissolved oxygen from 9 stations is $< 4 \text{ mg/L}$ in September and October. Therefore, cause of dissolved oxygen depletion in water should be investigated.

CH04P - Emerging contaminants: identification strategies and occurrence

MO 045

Development of an analytical method for analyzing iodinated contrast agents in water by LC-MS/MS

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Among all pharmaceuticals used in hospitals, radiographic contrast agents are the most frequently applied substances. Iodinated contrast media are used for X-ray imaging of soft tissues. Tri-iodinated compounds enhance the contrast between organs and the surrounding tissues and enable visualization of organ details which otherwise could not be investigated. The contrast media are applied by intravenous injection and are rapidly eliminated via urine or faeces.

The iodinated contrast media are substances which are highly hydrophilic, polar and relatively high molecular weight. They exhibit high biochemical stability and hence are excreted mainly un-metabolized almost quantitatively within a day. So these molecules can enter the public sewage system.

The contamination of sewage treatment plants with iodinated X-ray contrast media may be seen as the result of the almost complete and non-metabolized excretion by patients (above 90% were recovered mainly in urine) and the relatively high persistence of these compounds during sewage treatment. So these compounds are present at appreciable quantities in the sewage effluent (in the range of $\mu\text{g/L}$)

The purpose of this poster is to present the development of an analytical method to analyze several iodinated contrast agents in wastewater.

The poster is divided into several main parts: