Toxicity of coastal waters: use of a quick algal bioassay

Sjollema, S.B.; Booij, P; van der Geest, H.; Laane, R.; Leonards, P.; Lamoree, M.; Admiraal, W.; Vethaak, D.; de Voogt, P.

Publication date
2011

Document Version
Final published version

Citation for published version (APA):

General rights
It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

Disclaimer/Complaints regulations
If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: https://uba.uva.nl/en/contact, or a letter to: Library of the University of Amsterdam, Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.
TU 081
Optimization of the SPE step in the analysis of β-blockers and β-adrenoceptors in natural water samples by SPE-GC technique
M Calabu, A Michalik, M Cieczik, N Migova, M Kwiatkowska, P Stepnowski, J Kuminska
University of Lodz, GDANSK, Poland
Environmental samples from natural ecosystems, especially sewage and marine-water samples are complex and often contain interfering elements that can mask or interfere with the analyses performed.
Advantages of direct sample analysis for SPE is that low concentrations can be determined in a shorter time, but the choice of SPE is critical for the study of target analytes. The extraction (SPE) is the most common sample preparation technique used in environmental analysis. Choice of sorbent is a crucial point in SPE because it can control such parameters as selectivity, affinity, and capacity. This choice depends strongly on the target analytes and the interactions of the chosen sorbent with the functional groups of the analytes, but also on the kind of sample matrix and its interactions with both the sorbent and the analytes.

TU 082
Mustard fractionation based on normal phase SPE and reverse phase HPLC (RP-HPLC) for isolation of endocrine disrupting chemicals in environmental extracts
N Creuzet1, JM Porcher1, H Budzinski2, S Aït-Aïssa1
1Environnement, VESTEC ET, France
2MCE-IRSN, BRUGHERIO, Italy
The identification of unknown active chemicals is still time-consuming and cost-consuming due to the complexity of each active fraction (e.g., mixture effect). Hence, further fractionation steps are often needed. The aim of this study was to develop and to test the use of a first pre-fractionation step on SPE that will be followed by a RP-HPLC-fractionation. First the separation of 12 EDCs have been evaluated with several elution conditions. Silica cartridges with 4 step elution - heptane, heptane/dichloromethane (50/50, v/v), ethyl-acetate and methanol/water (50/50, v/v) have been used. The identity of the compounds isolated have been chosen for further investigations. For this investigations, recoveries were assessed for the mixture alone and for a blank sediment extract spiked with this mixture. Finally, a natural sediment known to exert estrogenic, PXR-, AhR- and VDR-activities has been fractionated using the conditions established. Good mixture recoveries (74–110 %), were obtained. The fractionation F1 contained only the PCBs and the PAHs, while 4-tert-octylphenol, triphenyl phosphate and fenofibrate were detected only in F2. Finally, steroids, bisphenol A and clortimazole were found in F3 while F4 contained more polar chemicals.
Fractionation on natural sediment allows isolation of TCDD-like activity in F1 and F2 while PAH-like activity was detected in F1, F2 and in F3. Then estrogenic compounds were only detected in F2 and F3. Interestingly, the sum of the estrogenic activity found in these 2 fractions is higher than the activity detected in the crude extract, which suggests an occurrence of anti-estrogenic chemicals. Finally, PXR-like activity was mainly detected in F3.

TU 083
Towards a common mass spectra database for the identification of unknowns in environmental samples
C Schulz1, K Schymanski1, S Neumann1, C Hug1, C Gallampos1, M Krauss1, J Slobodník4, W Brack2
1UFZ Helmholtz Centre for Environmental Research, LEIPZIG, Germany
2KWR Watercycle Research Institute, NIEUWEGEIN, The Netherlands
3CNR-IRSA, BRUGHERIO, Italy
4Ben Gurion University of the Negev, BEER SHEVA, Israel
The identification of unknown active chemicals is being developed at KWR. The bacteria are fixed on an optic fiber or a glass slide and placed in a continuous water flow. The light generated by the bacteria is then measured by photomultiplier tubes. The current prototype is highly adjustable and allows control of pH, temperature, flow, and pressure. Additionally, it is possible to add nutrients as well as test compounds to the flow. This sensor prototype is being tested in both the laboratory and at monitoring stations along Dutch rivers. The ultimate aim is to develop a sensor that measures several types of toxicity and that can be applied continuosly in the field, both at surface water inlets and in the distribution network.

TU 084
Construction of a water toxicity sensor based on luminescent bacteria
M Woutersen1, J Mask1, AP van Wezel2, A van der Geest1, RS Marks1, A Brouwer2, MB Herings1, W Kiewiet2, W Waterkloekse College, NIOO-KNAW, The Netherlands
12Engineering, VELTHOVEN, The Netherlands
2Ben Gurion University of the Negev, BEER SHEVA, Israel
3Biodetection Systems, AMSTERDAM, The Netherlands
4KWR Watercycle Research Institute, NIEUWEGEIN, The Netherlands
The first step to unravel the complex interaction between algae and toxic pressure is to provide toxicants to disturb regulatory mechanisms within algal communities, modifying the competitive abilities of individual species and resulting in shifts from highly nutritious to unfavourable algal species that may benefit from the food chain. It remains however difficult to quantify the toxic effects of these chemicals: the relative contribution of anthropogenic and natural chemicals on the total chemical pressure is unknown. Also insight in the potential synergistic action of toxicants and toxicity is lacking, while in the field many confounding factors (e.g. changing nutrient and light regimes) are acting on algal populations.

TU 085
Toxicity of coastal waters: use of a quick algal bioassay
SB Sjollema1, P Booij2, R Laane1, P Leonard1, M Lamoree2, W Admiraal1, D Tukasz3, P de Voogt1
1University of Amsterdam, AMSTERDAM, The Netherlands
2University of Groningen, GRONINGEN, The Netherlands
3KWR Watercycle Research Institute, NIEUWEGEIN, The Netherlands
The identification of unknown active chemicals is being developed at KWR. The bacteria are fixed on an optic fiber or a glass slide and placed in a continuous water flow. The light generated by the bacteria is then measured by photomultiplier tubes. The current prototype is highly adjustable and allows control of pH, temperature, flow, and pressure. Additionally, it is possible to add nutrients as well as test compounds to the flow. This sensor prototype is being tested in both the laboratory and at monitoring stations along Dutch rivers. The ultimate aim is to develop a sensor that measures several types of toxicity and that can be applied continuosly in the field, both at surface water inlets and in the distribution network.

TU 086
Dissolved and intracellular microcystins in lake waters during a Planktothrix rubescens algal bloom: HPLC quantification and crustacean acute toxicity test
M Cavaliere1, L Ghidini1, M Dall'Oligo1, D Copetti1
1CNR-IRSA, BRUGHERIO, Italy
2Microcystins, highly toxic cyclic peptides, are a group of hepatotoxins produced by a number of aquatic species of cyanobacteria, such as Microcystis, Anabaena and Plankothrix. Worldwide contamination in water has been recently reported, therefore microcystins are a potential problem for aquatic ecosystems. During the spring-summer 2009 season, water samples were concentrated and extracted by SPE-C18 cartridges. Toxicity test was performed using the crustacean Daphnia magna to evaluate the acute toxicity risk. The results indicated that toxification risk is increasing in the analyzed sites. For this reason water management strategies have to be implemented to reduce microcystins concentration in water.