Toxicity of coastal waters: use of a quick algal bioassay
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Optimization of the SPE step in the analysis of β-blockers and β-adenomineceptors in natural water samples by SPE-GC technique

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Environmental spectrometric problems, especially sewage and marine water samples are complex and often contain interfering elements that can mask or interfere with the analysed pharmaceuticals of interest. In this study direct analyses of these samples are not possible, and therefore, the most reliable isolation methods for the target compounds are a crucial part of the sample preparation procedure. Solid phase extraction (SPE) is the most common sample preparation technique employed in environmental analyses.

Choice of sorbent is a crucial step in SPE because it can control such parameters as selectivity, affinity and capacity. This choice depends strongly not only on the target analytes and the interactions of the chosen sorbent through the functional groups of the analytes, but also on the kind of sample matrix and its interactions with both the sorbent and the analytes. This work describes the application of the different kinds of SPE sorbents: C18 bonded silica gel (Strata C18), copolymers (Osmon HLB, Strata X, and LiChrospher EN), functionalized copolymers (Isolute ENV+), mixed-mode sorbents (phenylboronate and aminophenylboronate, ISCO Silica Gel), and two β-adenomineceptors (terbutaline, salbutamol) from natural water samples. Parameters such as pH of the loading samples, the amount and the kind of solvents used in conditioning, washing and eluting steps, were selected and optimized. The obtained extracts were evaporated to dryness, subjected to silution by BSTFA, and finally analysed by GC-FID technique. The recovery of the analytes form natural water samples in the mentioned above SPE conditions will be discussed.

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TU 082 Mustard fractionation based on normal phase SPE and reverse phase HPLC (RP-HPLC) for isolation of endocrine disrupting chemicals in environmental extracts

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This approach identifies active fractions, which contain the highest concentrations of PCBs and the PAHs, while 4-tert-octylphenol, triphenyl phosphate and fenofibrate were detected only in F2. Finally, steroids, bisphenol A and clortomiazole 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 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 indicates the occurrence of anti-estrogenic chemicals. Finally, PXR-like activity was mainly detected in F3.

TU 083 Towards a common mass spec database for the identification of unknown environmental compounds

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Construction of a water toxicity sensor based on luminescent bacteria

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The challenge of today is to identify phytotoxic effects of toxicants and toxins from natural water samples by SPE-GC technique. Different tools are available to process the raw data and upload the data to MassBank including a spreadsheet based record editor for the addition of metadata.

References:

TU 084 Construction of a water toxicity sensor based on luminescent bacteria

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Environmental contamination of water has prompted the development of detection methods for their identification and quantification. A massive seasonal development of Planktothrix rubescens in a reservoir destined for crop irrigation located in Southern Italy has lead to quantify algal toxin content in water to identify the possible health risk. Microcystins dissolved into the water were isolated using passive samplers which extract the freely dissolved concentration in the water during a period of 6 weeks to 5 months. Extracts isolated from a P. rubescens bloom were treated by different methods in order to characterize the most similar marine algal species (e.g. Dunaliella tertiolecta, Phaeodactylum tricornutum) to include different algal sensitivity. Use of Pulse Amplified Modulation (PAM) fluorometry provides a quick (4s) method to determine toxicity of algae based on changes in photosynthetic efficiency. An Effect Directed Analysis (EDA) will be performed to unravel which chemical compounds are responsible for the toxic effect on the algae. In 2010-2011 passive samplers are exposed at Hansweert, (Westerschelde, The Netherlands) and collected every 6 weeks to include the seasonal dynamics of both anthropogenic as well as natural compounds. First, results of this sampling campaign are presented and discussed. The results of the EDA analysis will be used in experiments where mixture toxicity, multi stress and community effects are taken into account to describe the overall toxic effect under relevant field conditions.

TU 085 Toxicity of coastal waters: use of a quick algal bioassay

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The toxicity of coastal waters is still a challenging subject, as phytotoxic effects are not surprising anymore. In 2010-2011 passive samplers are exposed at Hansweert, (Westerschelde, The Netherlands) and collected every 6 weeks to include the seasonal dynamics of both anthropogenic as well as natural compounds. First, results of this sampling campaign are presented and discussed. The results of the EDA analysis will be used in experiments where mixture toxicity, multi stress and community effects are taken into account to describe the overall toxic effect under relevant field conditions.