

NRP Endocrine Disruptors

Final Summary

Original project title Evaluation of Aquatic Environmental Estrogens with Passive Sampling - EPSA
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Project number 4050-111386

Evaluation of environmental estrogens with passive sampling

Estrogens and many other classes of relatively polar chemicals are released into the aquatic environment via treated sewage effluent. This release is continuous, but not constant. Passive sampling is an effective tool to monitor fluctuating concentrations of pseudo-persistent polar substances.

Project description (not exceeding 2000 characters):

Research questions

Passive sampling of polar organic compounds in the aquatic environment is a relatively recent research area. Earlier work within NRP50 had shown that the passive sampler "POCIS" is able to sample estrogens, apparently in a similar relative pattern as do fish. The main objective of the project EPSA was to extend the use of POCIS and evaluate the release of estrogens by sewage treatment works. Also temporal changes of the emissions, and river profiles of estrogenic compounds, were part of the investigation. The chemical analysis of the passive sampler extracts focussed on nonylphenol, bisphenol A and three steroidal estrogens. Extracts were also analysed using a bioassay for estrogenic activity

Results

The estrogenic activity of POCIS extracts that were exposed to treated sewage effluents varied greatly between sites (more than 100-fold). One site was sampled four times, for various sampling durations, and we observed a 20-fold difference in the weekly sampled amounts of estrogens between the lowest and the highest value. Beside the treated sewage effluents, rivers were also sampled in this project. However, due to a major and Swiss wide rain event, many samplers were lost and a proper comparison between sampling effluents and sampling receiving waters was thwarted. In collaboration with other NRP50 projects we

repeatedly sampled the river Glatt. This work is still ongoing but preliminary data indicate a rather even distribution of estrogens along this river.

Perspectives

The fact that the efficiencies of the sewage treatment process varies to such a large degree across sites and within a site is somewhat unsuspected and warrants further analysis and research. Passive sampling of effluent proved fairly unproblematic and appears to be a very efficient tool to monitor for the presence of micropollutants – including endocrine disruptive compounds. We will continue this research with a renewed focus on the biomimetic properties of passive samplers.