

Determination of estrogens and photosynthesis II inhibitors in Swiss lake and river sediments

Estrogens and herbicides enter the aquatic environment via treated sewage effluents and runoff surface water from urban areas and agricultural fields. Once these compounds are in the environment, they may affect wildlife. When estrogens or herbicides enter rivers or lakes via the water phase, they will partition between water, suspended particles and sediment. On fields, both estrogens and herbicides can be particle bound and directly be transported to river or a lake sediment compartments during runoff events. Indeed, research conducted in, for example, the Saale, Danube and Rhine has shown that estrogens occur in river sediments. Also herbicides have been detected in river sediments.

In this master project, sediments from Lake Geneva (project SedLem15) and five small rivers (project NAWA SPEZ17) will be analysed for estrogenicity and herbicidal activity using *in vitro* bioassays. Sediments will be extracted by means of accelerated solvent extraction (ASE). Subsequently, estrogens will be determined using the yeast estrogen screen and the combined algae test will be used to determine herbicidal activity (endpoints are the inhibition of photosystem II and algal growth). Preliminary work showed that sulphur is a potential confounding factor, at least in ASE extracts from lake sediments. Therefore, part of the thesis will be dedicated to establishing a desulphurisation method that is compatible with both bioassays.

Concerning the Lake Geneva samples, the main research questions are: 1) are estrogenicity and herbicidal activity present in Lake Geneva sediment samples? 2) when toxicity can be observed in the *in vitro* tests, how does it relate to results from sediment *in vivo* tests and results from chemical analysis?

Within NAWA SPEZ17, river water and sediments will be sampled at five locations. River water will be analysed in the combined algae test and sediments will be analysed with an *in vivo* bioassay. In addition, water and sediment samples will be analysed for a variety of chemicals (these tasks will be conducted by the Ecotox Centre team and collaborators). The main research questions for the master thesis and within the NAWA SPEZ17 project are: 1) are estrogenicity and herbicidal activity present in river sediment samples? 2) how does herbicidal activity in water samples relate to herbicidal activity in sediments?