MEASUREMENTS OF ESTROGENIC ACTIVITY – TOOL

RIVER BASIN MANAGEMENT ISSUE

Water Quality						Water Quantity		Alterations		Others
1	2	3	4	5	6	7	8	9	10	
					C					

(1) Diffuse pollution by agriculture
(2) Salinisation
(3) Contaminated sediment and floodplain soils
(4) Large scale pollution due to past mining / industries activities
(5) Pollution by organic matter
(6) Emerging compounds
(7) Water scarcity
(8) Floods and low flow
(9) Hydromorphological alterations
(10) Soil erosion

C = System Characterisation
M = System Monitoring
T = System Trend
R = System Remediation, Mitigation

RIVER BASIN

Danube	Ebro	Meuse	Elbe	Brévilles	Others
	✓				Not river basin specific

Spec. : Results specific to selected River Basin

KEY FINDING TYPE

Laboratory based	Field based	Modelling
✓		

BENEFITS TO END-USERS

Technical		Management	Policy	
WFD Implementation	Research	River Basin	Compliance	Policy making
	✓			

INTRODUCTION

BGC 5 focuses on the degradation of pollutants under the existing and enhanced conditions present in the Basin cases. Biodegradation rates were determined in the laboratory (batch tests) and in the field (through stable isotopic analyses). Impact of temperature, redox conditions, and oxygen on biodegradation rate was quantified. BGC5 also dealt with bioavailability and toxicity tests of emerging compounds such as nonylphenol and other estrogens.

TOOL SUMMARY

The nonylphenol concentration showed a correlation with the total estrogenic activity of the tested sediment. Concentration measurements of one single compound such as NonylPhenol (NP) is much easier or faster compared to the measurement of all compounds that cause an estrogenic effect, (which can be difficult to implement due to low concentrations of a number of compounds, and the detection limits) or measurements of the total estrogenic activity. The behaviour (bioavailability, biodegradation and estrogenic activity) of all present estrogenic compounds and NP isomers in the tested sediment are equal to the behaviour of the total concentration of the NP isomers. Therefore, the NP concentration can be used as an indicator compound for estrogenic activity in this sediment. This tool enables to measure and understand toxicity of *emerging compounds* (estrogens). It can be useful for monitoring estrogenic activity. These measurements have been undertaken on one type of NP contaminated sediment sample so far. This laboratory protocol is quite reliable to date. In order for nonylphenol to be used as an indicator for overall estrogenic activity, it is necessary to perform a validation test which consists in assessing the correlation between nonylphenol concentration and overall estrogenic

toxicity. This tool looks promising and will be further validated and developped in a new project (currently a proposal).

The tool is described in the paper: de Weert, J., A. De la Cal, H. van den Berg, A. Murk, A. Langenhoff, H. Rijnaarts, T. Grotenhuis. 2007. "Bioavailability and biodegradation of nonylphenol in sediment determined with chemical and bioanalysis." Enviromental Toxicology and Chemistry 27 (4): 778-785.