

EDA-EMERGE Specialized Course 5:

“Fate of emerging pollutants in the aquatic water cycle”

Venue: EAWAG, Dübendorf, Switzerland

Organizer: Dr. Juliane Hollender

Date: 02.07 to 03.07.2013

Time: 13h00 – 17h25, 8h45 – 17h00

Course description

The SC5 was a two day EDA-EMERGE training course on the fate of emerging pollutants in the aquatic water cycle. It provided theoretical background on micropollutants from urban sources and from agriculture, corresponding biodegradation and transformation processes as well as methods for removal due to wastewater treatments. During guided tour through a wastewater treatment plant, the participants became an insight into practical matters.

This amounted to a minimum total academic involvement of 15 hours (0.5 ECTS) for the participants.

AGENDA

Tuesday, 02.07.2013		
Time	Title	Lecturer
13:00 - 13:10	Welcome and Introduction to the course	Juliane Hollender
13:10 - 13:55	Overview on sources and fate of micropollutants in the aquatic water cycle	Christa McArdell
13:55 - 14:40	Fate processes - photolysis	Silvio Canonica
14:40 - 15:25	Fate processes – biodegradation	Kathrin Fenner
15:25 - 15:55	Coffee Break	
15:55 - 16:40	Tracking pollutant transformation processes with compound specific isotope analysis	Thomas Hofstetter
16:40 - 17:25	Fate during river bank filtration	Juliane Hollender
17:25	Closure	

Wednesday, 03.07.2013		
Time	Title	Lecturer
8:45 - 9:30	Advanced treatment – oxidation	Urs von Gunten
9:30 - 10:15	Representative sampling	Christoph Ort
10:15 - 10:35	Coffee Break	
10:35 - 11:20	Effect tests for assessing the efficiency of wastewater treatment	Cornelia Kienle
11:20 - 12:05	Effect directed analysis – case study Glucocorticoid like activity	Marc Suter
12:05 - 13:05	Lunch	
13:05 - 13:30	Short walk to the wastewater treatment plant at Dübendorf	
13:30 - 15:30	Guided tour through the wastewater treatment plant at Dübendorf	Marc Böhler
15:30 - 16:00	Walk back to Eawag	
16:00 - 17:00	Guided tour through the experimental hall at Eawag	Adriano Joss
17:00	Closure	

COURSE CONTENT

The course covered the following topics:

- Sources and fate of micropollutants in the aquatic water cycle
 - EU legislation relevant for water, priority substances within WFD
 - Input pathways and loads of pesticides and biocides
 - Technologies to eliminate micropollutants
- Fate processes – photolysis and biodegradation
 - General principles of biodegradation: metabolism, mineralization, co-metabolism
 - Kinetics of biotransformation: Monod kinetics, Michaelis-Menten type kinetics
 - Main biotransformation reactions
 - Prediction of biodegradability/biotransformation products
- Tracking pollutant transformation processes with compound specific isotope analysis
 - Challenges associated with micropollutants transformation –a struggle with complexity
 - Which approaches & tools provide reliable information?
 - Micropollutant transformation & isotope effects
- Fate during river bank filtration
 - Natural treatment systems
 - Soil aquifer treatment
 - Example of River Thur catchment
 - Push-Pull tests
- Advanced treatment – oxidation
 - Role and application of oxidants in water treatment
 - Forms of chlorine addition to the water
 - Ozone and chlorine dioxide characteristics
 - Advanced oxidation processes including pH-dependence and kinetics
- Effect tests for assessing the efficiency of wastewater treatment
 - How can the efficiency of wastewater treatment be evaluated with bioassays? (Pilot studies in the project „Strategy Micropoll“; Effects of micropollutants on different biological levels)
 - How efficient are advanced wastewater treatment methods in reducing biological effects?
- Effect directed analysis – case study glucocorticoid-like activity
 - Advantages and disadvantages of EDA
 - Glucocorticoid consumption and concentrations in wastewater and rivers
- Guided tour through the wastewater treatment plant in Dübendorf
- Guided tour through the experimental hall at Eawag