EDA-EMERGE Specialized Course 4:

"Special course on the water cycle and human health"

Venue: KWR Headquarters, Nieuwegein, Netherlands

Organizer: Dr. Merijn Schriks, Dr. Annemieke Kolkman, Victoria Osorio Torrens

Date: 20.01.2014

Time: 9h00 – 20h00

Course description

The SC4 was a 1 day EDA-EMERGE training course on the water cycle and human health. This specialized course intended to give an insight into the drinking water production and policy in the Netherlands and in Europe. The participants learned about chemical and microbial aspects of human health risk assessment and the strategies applied to ensure the safety of drinking water supplies such as the monitoring and remedial actions for hazardous constituents of water. The introduction into these were given by lectures of international-level experts, which have been combined with open discussions and supporting reading material provided by the lecturers.

This amounted to a minimum total academic involvement of 15 hours and equivalent to 0.5 ECTS points for the participants.

AGENDA

Monday, 20.01.2014			
Time	**Title**	**Lecturer**	**Supporting documents**
9:00-9:10	Welcome by the host	Dr. Merijn Schriks (KWR)	None
9:10-9:50	Drinking water production in the Netherlands and in Europe	Prof. dr. Jan Peter van der Hoek (Waternet/TUD)	Van der Hoek et al., 2012
9:50-10:30	Drinking water policy in the EU	Dr. Adriana Hulsmann (KWR)	None
10:30-10:50	Coffee break		
10:50-11:30	Assessment of human health risks of chemicals in (drinking) water; legal aspects, existing and evolving methods and prioritization	Prof. Dr. Annemarie van Wezel (KWR/UU)	Schriks et al., 2010, de Jongh et al., 2012, Mons et al., 2013
11:30-12:10	Risk assessment, microbial aspects	Prof. dr. Gertjan Medema (KWR/TUD)	Medema. G. 2013
12:10-13:00	Lunch		
13:00-13:35	Bioassays in drinking water monitoring: Challenges and solutions	Dr. Varvara Kokkali (Vitens)	None
13.35-14:10	Emerging contaminants in surface waters and their relevance for the production of drinking water in Europe	Dr. Corine Houtman (Het Water Laboratorium)	Houtman et al., 2010, Houtman et al., 2013
14:10-14:30	Coffee break / short tour on the lab		
14:30-15:05	Removal of genotoxic activity during advanced drinking water treatment	Bram Martijn (PWN/Wageningen University)	Martijn and Kruithof, 2011, Kruithof and Martijn, 2013. Hughes et al., 2013
15:05-15:40	Monitoring of anthropogenic compounds in the Rhine/Meuse delta	Andre Bannink (RIWA)	None
15:40-16:15	Smart monitoring strategy for quality assessment of the water cycle	Dr. Ron van der Oost (Waternet)	Van der Oost et al., 2003; Allan et al., 2006; Martinez et al., 2010
16:15-16:50	Preliminary results from the Dutch case studies in the European demonstration program	Dr. Victoria Osorio Torrens (KWR)	None
16:50-17:00	Concluding remarks	Dr. Merijn Schriks (KWR)	
17:00-20:00	Dinner-Roundtable discussion and opportunity to talk to the speakers, Closure		

COURSE CONTENT

In detail the course covered the following topics:

- Introduction to the drinking water production in the Netherlands and in Europe
    - Drinking water supply in the Netherlands (drinking water supply: the multiple resource approach of the Waternet in Amsterdam; drinking water production plants and process schemes; monitoring the water quality of the resource)
    - Drinking water treatment technologies in Europe (state of the art, challenges, research needs)
- Drinking water policy in the EU
- Assessment of human health risks of chemicals in (drinking) water; legal aspects, existing and evolving methods and prioritization
    - Characteristics of Dutch tapwater - use of drinking water
    - EU Drinking water directive and guidelines
    - Increasing pressure on drinking water sources - health risk of emerging substances
    - toxicological relevance and thresholds
    - Understanding quality of drinking water sources - relating consumption of pharmaceuticals with occurrence in water
    - Pharmaceuticals and transformation products in the drinking water cycle
    - Health risk assessment of pharmaceuticals and TPs
- Quantitative Microbial Risk Assessment (QMRA)
    - Probability of exposure to pathogens x health effect of exposure
    - Framework for QMRA
    - WHO Guidelines for Drinking Water Quality
    - QMRA example: Cryptosporidium in surface water system
    - Application of QMRA in water supply (hazard identification, exposure assessment, risk characterization, risk management)
- Bioassays in drinking water monitoring: Challenges and solutions
- Emerging contaminants in surface waters and their relevance for the production of drinking water in Europe
    - Emerging contaminants
    - Relevance of contaminants for dw companies?
    - Analytical approaches
    - Examples of pharmaceutical target analysis

    - A multicomponent snapshot of pharmaceuticals and pesticides in the river Meuse basin
    - Medicinal footprint of pharmaceuticals in the river Rhine
- Removal of genotoxic activity during advanced drinking water treatment
- Monitoring of anthropogenic compounds in the Rhine/Meuse delta
    - About RIWA & our monitoring network
    - How to know if there are (new) substances we should be concerned about?
    - And what do you do when you find new substances?
- Smart monitoring strategy for quality assessment of the water cycle
    - Monitoring of ‘emerging substances’
    - Water Framework Directive monitoring
    - Smart monitoring projects Waternet
    - Design of a ‘smart monitoring’ strategy