

Aarhus University PhD course, 22 – 28 June 2014

**Metabolisation and metabolomics of priority pollutants:
Transformation reactions, products and processes in the environment and
technical systems**

Course content:

Priority compounds (e.g. endocrine disruptors, pharmaceuticals, biocides) may be found in various environmental compartments such as water, soil, air. Many environmental processes are accompanied with transformation reactions. Analysis of the priority compounds is not trivial, nor is a prediction of the transformation products and transformation reactions. Typical transformations include: biodegradation or biotransformation, photo-oxidation, chemical transformation, hydrolysis, formation of bound residues. The course will focus on processes relevant for water (wastewater, water-soil sediment surfaces, surface and drinking water).

This PhD course will address:

- How to determine transformation products (set up of experiments, determination, identification, verification)
- How to determine transformation reaction: (reaction kinetics, what to learn from them)
- Instrumental techniques, demonstrated and used for exercises
- Experimental set-ups to perform transformation reactions

A student who has met the objectives of the course will be able to:

- Choose adequate methods for determining priority pollutants from diverse environmental matrices
- Determine transformation products
- Predict transformation reactions
- Analyse transformation reactions of priority pollutants in environmental compartments
- Perform reactor optimisation for transformation reactions/removal



Material to be covered in the sessions includes:

Environmental chemistry

- Oxidation reactions of priority pollutants in environmental systems
- Hydrolysis reactions of priority pollutants in environmental systems
- Reduction reactions of priority pollutants in environmental systems
- Formation of bound residues
- Transformation reactions in vertebrates

Analytical chemistry

- Methods to analyse priority pollutants in soil, water, sludge (GC-MS, HPLC-MS/MS, HR-MS, NMR)
- Methods to assess transformation reactions
- Methods to assess (identify and quantify) transformation reaction products

Course outline

- About 1 week of preparatory reading prior to the course
- The course is a combination of lectures, seminars and laboratory experiments
- The participants are expected to give a presentation of their PhD project

Course evaluation:

Students will be evaluated during the course through laboratory exercises and problem solving. Following the course, students must hand-in written assignments (about 7 days of preparation). The individual project presentations will also be assessed

Course venue: Environmental Science, Aarhus University, Frederiksborgvej 399, Roskilde, 4000

Course weight: 5 ECTS

Course fee: 5000 DKK, including education, meals on all working days, get-together party and course dinner please book you hotel yourself, we will help you with a hotel list

Deadlines: 15/5/2014

Contact: Kai Bester, kb@dmu.dk.

