

Modelling human and ecosystems impacts for life-cycle assessment: the USEtox model

Time of the course

26 November 2012, 9:00-12:00

Instructor(s)

Ralph K. Rosenbaum, DTU, Denmark

Introduction

To address the increasing need for methods to assess the impacts of toxic chemical emissions on human health and ecosystems, this course provides a practical overview of multimedia chemical fate modeling, multi-pathway human exposure modeling, and comparative indicators for human health and ecotoxicological impacts. We begin by explaining basic concepts for environmental mass balance modeling—including partitioning coefficients, first order rate coefficients, cross-media transport, persistence, and long-range transport. We next present the fundamentals of multi-pathway models for human intake via inhalation, drinking water and food. We will review hazard-based and risk-based effects modeling approaches that are used to assess damage factors and illustrate how fate, exposure, effects and damage factors can be combined to construct characterization factors. We then guide the participants through a series of examples in which they will develop characterization factors for human health and ecological impacts using the USEtox model. Students will explore USEtox as a tool for the comparative assessment of chemical fate, human exposure, and ecological impacts.

Learning objectives

The aim of this course is to introduce participants to the exposure science methods used in life-cycle and comparative risk assessment. The participants will learn to use and evaluate basic tools for mass-balance, fate modeling, and intake fraction estimation based on the example of USEtox.

The course is intended for LCA practitioners interested in the scientific fundamentals of chemical impact assessment for a broad range of environmental emissions. A basic background knowledge of environmental modeling, risk assessment is useful but not a requirement to understand the course contents.

Participants will come away with knowledge of basic concepts of exposure science for chemical impact assessment and be able to perform their own assessment using the USEtox model and interpret results.

Course content/programme

9:00 – 9:15	Introduction and overview
9:15 – 9:30	General introduction to the source-to-damage cause-effect chain relationship and modelling steps
9:30 – 10:00	Chemical fate modelling
10:00 – 10:30	Human exposure and effects modelling
10:30 – 10:45	Coffee break
10:45 – 11:15	Ecosystem effects modelling
11:15 – 12:00	Hands-on exercises, questions, discussion, course evaluation

Practicalities

Participants are requested to bring their own laptop.

Contact info

If you have questions specific to the content of the course, please contact Ralph K. Rosenbaum (rros@dtu.dk). For questions related to registration and fees, please look at the Symposium website (<http://lcacopenhagen.setac.eu/>) or contact the SETAC Europe office (valerie.verstappen@setac.org).