

Evaluation of a Modified OECD 308 Test Design

Thomas Junker¹, Dieter Hennecke², Prasit Shrestha², Stefan Hahn³, Mark Honti⁴, Kathrin Fenner⁵

¹ECT Oekotoxikologie GmbH, Böttgerstrasse 2-14, 65439 Flörsheim, Germany, th-junker@ect.de

²Fraunhofer IME-AE, Auf dem Aberg 1, 57392 Schmallenberg, Germany

³Department for Chemical Risk Assessment, Fraunhofer ITEM, Nikolai-Fuchs-Strasse 1, 30625 Hannover, Germany

⁴Hungarian Academy of Sciences, Muegyetem rkp. 3, 1111 Budapest, Hungary

⁵Eawag, Überlandstrasse 133, 8600 Dübendorf, Switzerland

Keywords: OECD 308 guideline, biodegradation, water-sediment, Non Extractable Residue (NER), oxygen saturation

Guideline OECD 308 describes an essential environmental simulation study used to assess degradation of chemicals in water-sediment systems. The study is required for the registration of pesticides and medicinal products. Furthermore, in the assessment of industrial chemicals under REACH the results are used inter alia for the PBT assessment, since simulation studies are the only test systems that can provide a definitive degradation half-life that allows a direct numerical comparison to persistence criteria of REACH Annex XIII.

However, several shortcomings of the OECD 308 guideline have been identified and discussed within the last decade. The recommended water:sediment ratio of 3:1-4:1 does not reflect the conditions in the natural environment (e.g. river systems) and often results in rapid dissipation from the water phase into the sediment. Where sorption to sediment represents the main dissipation process from the water phase, this can result in unrealistically high levels of non-extractable residues (NER). However, no clear guidance is given on how to interpret NER and how they should be considered in risk assessment. Another concern is with the distinction between aerobic and anaerobic conditions in the sediment. Due to the stratified test design of OECD 308 studies, and a recommended sediment layer thickness of 2.5 cm ($\pm$ 0.5 cm) anaerobic areas in the sediment cannot be avoided. Thus, the test system is characterized by a thin aerobic sediment layer and a deeper anaerobic sediment layer. Beyond that, the static test design of OECD 308 does not consider flow velocity and sediment dynamics and it is therefore not considered suitable to represent conditions in flowing surface water bodies.

Within the scope of the CEFIC LRI-ECO18 project four different test substances with differing biodegradation and sorption potential were studied in a series of simulated water-sediment systems. Inter alia, a modified OECD 308 test setup was used besides standard OECD 308, characterized by a thinner sediment layer and a stirred water phase.

This poster presents a comparison and discussion of test results from standard OECD 308 and modified OECD 308. Particular attention is paid to the points of criticism mentioned above.