Session: Effect Modelling for Regulatory Risk Assessment: Current Applications and Future Directions (P)
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Beyond GUTS: DEBtox and primary producer TKTD models in ERA of pesticides

Authors: M. Reed[1], M. Arena[2], T. Brock[3], N. Cedergreen[4], S. Charles[5], S. Duquesne[6], A. Focks[3], A. Ippolito[2], M. Klein[7], I. Teodorovic[8]

[1] HSE, England
[2] EFSA - European Food Safety Authority
[3] Wageningen Environmental Research, The Netherlands
[4] University of Copenhagen, Denmark
[5] University Lyon 1, France
[6] German Environment Agency UBA, Germany
[7] Fraunhofer Institute for Molecular Biology and Applied Ecology IME, Germany
[8] University of Novi Sad, Hungry

In 2018, the Panel on Plant Protection Products and their Residues (PPR) of the European Food Safety Authority (EFSA) published a scientific opinion on the state of the art of Toxicokinetic Toxicodynamic (TKTD) models in regulatory risk assessment of pesticides for aquatic organisms (*EFSA PPR, 2018. EFSA Journal 2018;16(8):5377*). In this scientific opinion, it is concluded that Dynamic Energy Budget theory for ecotoxicology (DEBtox models) and models for some primary producers are not yet sufficiently developed to use them in the risk assessment scheme when assessing the risks of time-variable exposure. This poster considers how these models could be used as a Tier-2 option for environmental risk assessment (ERA) and what still needs to be done to permit routine use. The DEBtox modelling framework, based on the DEB theory, is developed to address individual level lethal and sublethal chronic effects. It may be an appropriate approach to use in the refined chronic risk assessment scheme for aquatic invertebrates, fish and aquatic stages of amphibians, particularly when sublethal endpoints are most critical in chronic toxicity tests. Both the physiological DEB part of DEBtox models and their TKTD part need to be fully evaluated to use the model. Three primary producer models are considered, *Lemna*, algae and *Myriophyllum*. The *Lemna* model appears suitable for use in risk assessment to evaluate effects of time-variable exposure on *Lemna* growth; however, some remaining aspects of the model require further work to make applications acceptable for use in regulatory risk assessment. The algae model is also described but currently its largest drawback is that the flow-through experimental setup, used for model validation to simulate long-term variable exposures of pesticides to fast growing populations of algae, has not yet been standardised. The *Myriophyllum* model looks promising, but currently there is insufficient information available to recommend its use for ERA. For all the models presented, the poster aims to provide recommendations for future developments that will help the models be accepted for regulatory risk assessment of pesticides.