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When statistics encounter ecotoxicology - Towards new insights in environmental risk assessment

Within EU only, more than 100000 man-made chemicals are awaiting assessment of their risk to the environment. Based on statistical analyses providing toxicity indices at different tiers, risk assessment faces today new challenges to meet all expectations in terms of regulatory requirements together with the use of advanced and sound statistical methods. In particular, EFSA today recommends a clear and unambiguously identification of uncertainty sources, the use of TKTD models to refine tier 2 risk assessment in particular for plant protection products acting on aquatic organisms when exposed to environmentally realistic concentration profiles and that models be documented in a transparent way ensuring reproducible results. If plenty ideas, methods and tools already exist in the academic world to meet these expectations, practitioners struggle in appropriate them for reasons mostly attributable to modellers themselves. These reasons mainly come from lacks of support: (1) to easily quantify uncertainties, then their propagation to model outputs and subsequent predictions; (2) to better accept changing paradigm using new modelling approaches often appearing as black boxes, together with a lack of support to fully perceive the concrete added-value of these novelties for their daily work; (3) to easily interpret goodness-of-fit criteria and therefore trust model results in their ability to support decisions from predictions; (4) to appropriate recent user-friendly turn-key facilities, while already recognised as automatically providing toxicity indices of interest in full compliance with regulatory guidelines and risk assessment decision criteria. Based concrete case studies dealt with a suite of convenient and relevant tools freely available within an all-in-one facility, this presentation will illustrate how the above-mentioned difficulties can be overcome to facilitate the use of models in the environmental risk assessment (ERA).