

OpenGUTS, user-friendly software for survival modelling

Abstract for poster

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Mechanistic effect models are rapidly gaining interest in the context of environmental risk assessment. In 2018, this interest culminated in a dedicated EFSA opinion on toxicokinetic-toxicodynamic (TKTD) models for use in aquatic risk assessment of pesticides. This opinion focussed on three modelling frameworks; for the endpoint survival, the focus was on GUTS (the General Unified Threshold model for Survival). Since the EFSA opinion judged GUTS to be “ready to be used in risk assessment”, there is now a pressing need for robust and user-friendly software to perform analyses with this model, following the proposed workflow in the opinion. In a Cefic-LRI funded project, we have developed such a software: openGUTS, which comprises a standalone Windows executable and a Matlab-based version (both open source and free). The software performs the procedures for calibration, testing and model predictions as outlined in the EFSA opinion. Furthermore, openGUTS performs these analyses with minimal demands on user experience in modelling and statistics. However, this software is not restricted to risk assessment of pesticides. It can also be used for other tasks, such as the derivation of classical LC50 values (as function of time) from standard and non-standard toxicity data, using all of the observation on survival over time. Specifically, openGUTS enables meaningful calibration to toxicity data that result from tests with time-varying exposure, which cannot be achieved using traditional dose-response curves. The software was released in December 2019, and in this contribution, we provide an overview of the software’s layout, algorithm, functionality and look.