External validation of Tier 1-workers dermal exposure estimates in ECETOC TRA

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INTRODUCTION

In worker risk assessments under REACH, both inhalation and dermal exposure need to be assessed. In contrary to assessment for inhalation exposure, the available methods and data available for dermal exposure are limited. Additionally, most previous work on dermal exposure has focused on pesticides, which cannot always be extrapolated to industrial chemicals. Consequently, relatively little research has been done on the validation of dermal exposure models.

The majority of 2010/2013 REACH dossiers have used ECETOC TRA. The dermal predictions of the Tier 1 exposure assessment tool ECETOC TRA uses the outline and data of the UK-HSE EASE model with some notable upgrades that have been described in various reports (i.e. ECETOC TR93, TR107, TR114, TR124). An important asset of ECETOC TRA is that it offers a direct link to the REACH use descriptors for worker exposure, the Process Categories (PROCs), as direct input for exposure modelling.

The so-called E-Team project (www.eteam-project.eu), financed by the German BAuA, recently compared the inhalation estimates of REACH Tier 1 models to available measured data, and performed a reliability exercise investigating user-friendliness and between-user variability. However, the E-Team project did not address worker dermal exposure.

OBJECTIVE OF THE PROJECT

The project will produce a transparent, objective and reliable set of dermal exposure estimates aligned with PROCs suitable for Tier-1 chemical safety estimates. At the same time PROCs will be identified for which information is missing that prevents a proper conclusion regarding the validity of the ECETOC TRA. A desk-top validation will be conducted, based on a critical assessment of available field study reports.

The project is divided into five Work Packages, which are described below. Figure 1 gives an overview of the project organization.Below the project flow is presented in a figure. The project has started in September 2015 and will be finished in June 2016.

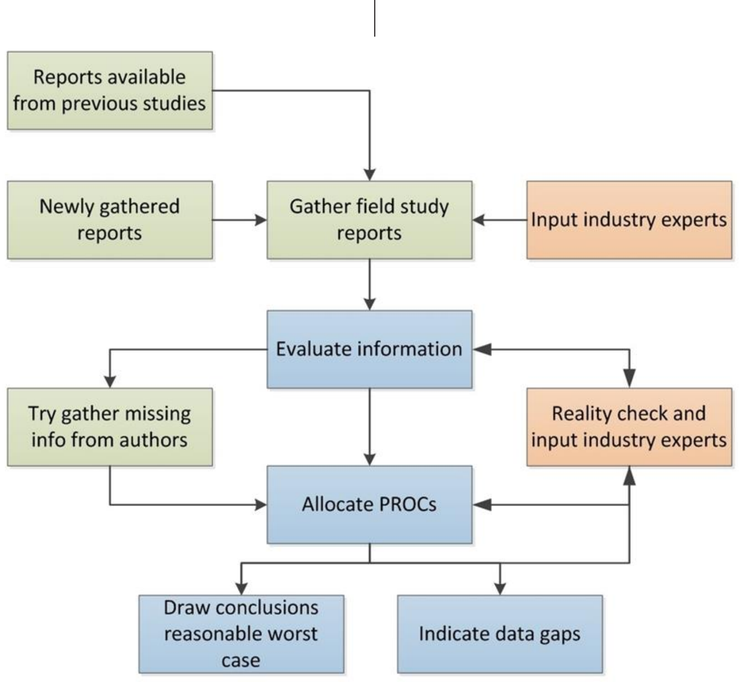

Fig.1. Green fields: TNO. Blue fields: Combined activities TNO and TNO Triskelion. Orange fields: Industry experts.

WORKPACKAGES

WP1: Gather relevant field study reports and fill database, in summary:

- Gather relevant field study reports from peer reviewed literature and other reports from grey literature and industry. Solvay and BASF are included in the projectteam.;
- Store the dermal exposure data that meet the inclusion criteria and its contextual information in a comprehensive MS Excel database.

WP2: Evaluate gathered information and collection of additional information and data, in summary:

- Systematically evaluate the collected measured dermal exposure data and its contextual information / determinants and report the gaps of information. These gaps could be on the level of contextual information or missing exposure measurement data for specific PROCs;
- Based on the results of the evaluation, collect additional information on the data.

WP3: Assign ECETOC TRA estimates to exposure situations, in summary:

- Design and prepare an online survey for experts to perform an exercise where ECETOC TRA exposure estimates are assigned to all the exposure situations described in the database;
- Evaluate, summarize and report individual results of the survey in a MS Powerpoint presentation;
- Derive exposure estimates per exposure situation after consensus between partners.

WP4: Validation of the ECETOC TRA dermal module, in summary:

Validate each PROC with a three-step approach, taking account of differences in operational conditions and risk management measures by:

- Method 1: Comparing the ECETOC TRA consensus exposure estimates with the measured exposure in the identified exposure situations. If this is not possible apply method 2;
- Method 2: Filling data gaps by extrapolation from one dataset to the other by using information about the effect of different exposure determinants. If this is not possible apply method 3;
- Method 3: Perform a qualitative validation by comparing exposure estimates with measured exposure estimates in other PROCs when quantitative validation is not possible.

WP5. Final reporting and dissemination of the results.

IN SUMMARY

To validate the ECETOC TRA tier 1 model for dermal exposure a desktop survey will be conducted. Data collected by available literature and from industrial partners will be used for the validation of the dermal module of the ECETOC TRA tool. The project will produce a transparent, objective and reliable set of dermal exposure estimates aligned with PROCs suitable for Tier-1 chemical safety estimates.

This work is performed in close collaboration with TNO Triskelion, BASF and Solvay