ACC Science & Research Highlights June 4, 2019
New Web App (beta version)
Quickly Access Threshold of Toxicological Concern (TTC) Values
for Over 40,000 Chemicals
Click here to access the beta version of the TTC Look Up App

ACC's Long Range Research Initiative (LRI) is pioneering 21st century chemical safety determination technologies through innovative and collaborative research. Risk-based decision making requires integration of quantitative exposure values with relevant hazard information. In many cases a Threshold of Toxicological Concern (TTC) value can be used in lieu of chemical-specific data for substances that lack toxicology test data. However, it can take time, effort and specific skill sets to derive a TTC value.

The TTC is a health protective human oral exposure guidance value for daily exposure over a lifetime below which there is no appreciable risk to human health (similar to a reference dose or an allowable daily intake). TTCs have been derived using a 100-fold safety factor (10X to account for species differences and 10X to account for human variability).

TTC values are based upon accumulated empirical data & knowledge regarding the distribution of potencies of relevant classes of chemicals. For more information on TTCs, see the EFSA TTC FAQs, the WHO/EFSA TTC Review, and Munro et al. (2008) The Threshold of Toxicological Concern (TTC) in risk assessment.

$$\frac{\text{Human Exposure}}{\text{TTC}} = \text{Hazard Quotient (Margin of Safety)}$$

TTC values for thousands of substances are now just a few clicks away

Development of the beta version of the TTC Look Up App

The ACC LRI has supported scientists at ScitoVation to develop TTCs for a broad set of chemicals (approximately 45,000 substances described in Mansouri et al 2016). TTC class and Kroes Decision for each chemical in the table was determined using Toxtree v2.6.13.

Using the TTC App (https://scitovation.shinyapps.io/TTCApplet/)

- To search for the TTC value for a specific compound, just enter its name into the search bar.
- Drop down menus & checkboxes can be used to sort and filter the table to interact with the data.
- Results can be downloaded to a spreadsheet by clicking on the “Download Table” button on the lower left of the web page
- As noted, this is a beta version and additional improvements are envisaged.

Published Examples Using TTC Values

Hyperlinked below are a few published case examples:

- Utilizing Threshold of Toxicological Concern (TTC) with high throughput exposure predictions (HTE) as a risk-based prioritization approach for thousands of chemicals.
- Threshold of Toxicological Concern (TTC)-Based Approach for Certain Substances (Health Canada).
- Correlation of chemical structure with reproductive and developmental toxicity as it relates to the use of the threshold of toxicological concern.
- For certain applications, use of the TTC approach may be suitable to address provisions of TSCA, particularly sections added in 2016 that speak to the use of computational methods, new approach methodologies, categories, pre-prioritization & prioritization, etc. EPA’s future approach for TSCA risk-based pre-prioritization specifically highlights the potential use of TTCs

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To learn more about the ACC LRI visit our website.