
ONLINE UPDATES:
A COLUMN FOR SEARCH ANALYSTS

Roberta Bronson Fitzpatrick and Patricia Tomasulo,
Column Editors

ITER—
International Toxicity Estimates for Risk,
New TOXNET® Database

Patricia Tomasulo

ABSTRACT. ITER, the International Toxicity Estimates for Risk database, joined the TOXNET® system in the winter of 2004. ITER features international comparisons of environmental health risk assessment information and contains over 620 chemical records. ITER includes data from the EPA, Health Canada, the National Institute of Public Health and the Environment of the Netherlands, and other organizations that provide risk values that have been peer-reviewed. [Article copies available for a fee from The Haworth Document Delivery Service: 1-800-HAWORTH. E-mail address: <docdelivery@haworthpress.com> Website: <<http://www.HaworthPress.com>> © 2005 by The Haworth Press, Inc. All rights reserved.]

Patricia Tomasulo (tomasulo@library.med.nyu.edu) is Coordinator of Graduate Medical Education, Ehrman Medical Library, New York University School of Medicine, 550 First Avenue, New York, NY 10016.

Comments and suggestions should be sent to the Column Editors: Roberta Bronson Fitzpatrick (fitzparb@umdnj.edu) and Patricia Tomasulo (tomasulo@library.med.nyu.edu).

Medical Reference Services Quarterly, Vol. 24(1), Spring 2005
<http://www.haworthpress.com/web/MRSQ>

© 2005 by The Haworth Press, Inc. All rights reserved.
Digital Object Identifier: 10.1300/J115v24n01_05

KEYWORDS. ITER, TOXNET, NLM Specialized Information Services, Health Risk Assessment Database, TERA, Toxicology Excellence for Risk Assessment

INTRODUCTION

ITER, International Toxicity Estimates for Risk <<http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?iter.htm>>, is a toxicology database that was made available on the National Library of Medicine's Division of Specialized Information Services (SIS) TOXNET® system, the Toxicology Data Network, in January 2004. TOXNET is the amazing suite of toxicology and environmental health databases that is in turn maintained by TEHIP, the Toxicology and Environmental Health Program of SIS. TOXNET includes the well-known TOXLINE database, along with many other useful databases such as the previously reviewed ChemIDplus®.

ITER is a free database devoted to human health risk values. This database is produced by TERA, Toxicology Excellence for Risk Assessment, a Cincinnati-based non-profit corporation organized "to protect public health by developing and communicating risk assessment values, sponsoring peer reviews and consultations, improving risk methods through research, and educating the public on risk assessment issues," as stated in the mission statement on the TERA Web site at <<http://www.tera.org>>. As part of TERA's outreach activities in support of public health, this group compiles and makes available peer reviewed risk value data to the international community via their ITER database. This data comes from international groups, including the U.S. Environmental Protection Agency (EPA), the U.S. Agency for Toxic Substances and Disease Registry (ATSDR), Health Canada, the Dutch National Institute of Public Health and the Environment, the International Agency for Research on Cancer, NSF International, as well as independent parties whose risk values have undergone peer review. TERA offers the ITER database via their own Web site, but ITER will be reviewed here using the NLM TOXNET system.

SEARCHING ITER via TOXNET

As of July 1, 2004, ITER provides over 620 chemical records of substances of environmental concern. ITER may be searched by using free text such as subject terms, chemical names or name fragments, or by the CAS Chemical Abstracts Service Registry Number.

Basic Search Mode

To search for records in this database on chemicals that are hepatotoxic, for example, the term hepatotoxic can be truncated by using the asterisk symbol, and so “hepatotoxic*” is typed into the search box on the main ITER page under “Search ITER” (see Appendix, Figure 1). In this “Basic Search” mode, a list of the eight chemical records in the database is displayed that contain the truncated form of the term hepatotoxic (see Appendix, Figure 2).

Browse Search Mode

An added bonus in searching ITER is the ability to scan what is available in the database for any search term by first clicking on the “Browse the Index” button. This will take you into the “Browse” mode, and you will see the rubric “Browse ITER” in the center of the search screen. An alphabetical list of the search terms used, along with the number of records available in the database for each term, will display. “Up” and “Down” buttons show other terms that are alphabetically above or below the original search term when either button is clicked on (see Appendix, Figure 3). To return to the basic search mode, click on “Return to Basic Search.”

Synonym Searching

When searching for chemicals, the TOXNET system default is to expand the search by adding synonyms and also the CAS Registry Numbers. This feature may be switched off, if so desired, by checking the radio button “NO” found in the central search box directly under the description, “For chemicals, add synonyms and CAS numbers to search.” So that means, for example, a search for the simple chemical name “toluene” results in four different records. The first record is for toluene along with its CAS RN, plus three other records that contain one or more of the requested chemical names in a list that appears like this:

1. **TOLUENE** 108-88-3
2. **TOLUENE DIISOCYANATE** 26471-62-5
3. **DIMETHYLFORMAMIDE, N,N-** 68-12-2
4. **XYLENES** 1330-20-7

Limits Features

ITER allows for Boolean searching using the operators AND, OR, NOT. ITER, as do most TOXNET databases, includes a LIMITS button on the main

search screen. The choice of adding synonyms and CAS numbers is also available here, along with the ability to specify the fields to be searched, and to specify the precision of the search, for example, by exact words, word variants, etc. (see Appendix, Figure 4).

The unique limit in ITER is to specify the particular type of risk data to focus the search on: Noncancer Oral, Cancer Oral, Noncancer Inhalation, and/or Cancer Inhalation. The default is to include all fields if no box is checked off.

Multi-File Searching

A single search query may be run against these four other TOXNET databases, at the same time as searching ITER:

1. Hazardous Substances Data Bank (HSDB)
2. Integrated Risk Information System (IRIS)
3. Chemical Carcinogenesis Research Information (CCRIS)
4. Genetic Toxicology (GENE-TOX)

Click on the button “Multi-Databases” under the Databases list on the left-hand side column of the ITER main search page to initiate a simultaneous database search of all five databases. Another option is to check off only those databases out of these five that you want to search (see Appendix, Figure 5).

Of course, the option is also always available to simultaneously search all of the TOXNET databases by clicking on the TOXNET button under that left-hand Databases column. However, the *Multi-Databases search function available in ITER* allows for the grouping of more similar types of hazardous substance factual data, risk data, and test results, and does not include bibliographic citations as does TOXLINE.

The search results first display what is called the “primary record” when the query is for a chemical. This is the main chemical record with substance identification information and risk data in ITER. The records, which come after this primary record, contain the search term somewhere in the record and are ranked according to relevancy (see Appendix, Figure 6). This relevancy ranking is based on the number of times the search term is found in the record, the rarity of the term in the database, and the adjacency of the search terms.

ITER CONTENT

ITER is composed of more than 620 chemical records with information on toxic risk levels and risk values, carcinogen classifications, and dose-related information. The ITER database presents a comparison of the international

risk assessment data via summary tables with the information from each parent organization listed next to each other. The data is broken down into four groups of risk type:

1. Noncancer Oral
2. Cancer Oral
3. Noncancer Inhalation
4. Cancer Inhalation

There are separate tables for each of these risk factors, and the full ITER record opens with a summary table of the data that is available for a given chemical (see Appendix, Figure 7).

There is a green check when data is available from one of the listed organizations, and links are provided to each organization's Web home page. A well-written synopsis summarizing the results for each of the four types of risk data appears after each table. There are links to additional data, for example, such as the details on a chemical's assessment from the EPA, with a direct link to that information in TOXNET's IRIS database.

CONCLUSION

The National Library of Medicine has again made scientific information of major importance freely available to the public on the Internet. This time, NLM has added a previously available database, ITER, which is produced by the private TERA organization, to the comprehensive TOXNET system of toxicology and environmental health databases. NLM has fully integrated ITER into TOXNET, included ITER in TOXNET's multi-file database searching, and greatly enhanced ITER's original search capabilities.

CONTACT INFORMATION

ITER Representative
Specialized Information Services
National Library of Medicine
Two Democracy Plaza, Suite 510
6707 Democracy Boulevard, MSC 5467
Bethesda, MD 20892-5467
FAX: (301) 480-3537
Telephone: (301) 496-1131
e-mail: tehip@teh.nlm.nih.gov

APPENDIX

FIGURE 1. Search for Records Concerning Hepatotoxicity by Using the Truncation Symbol and Entering "Hepatotoxic*"

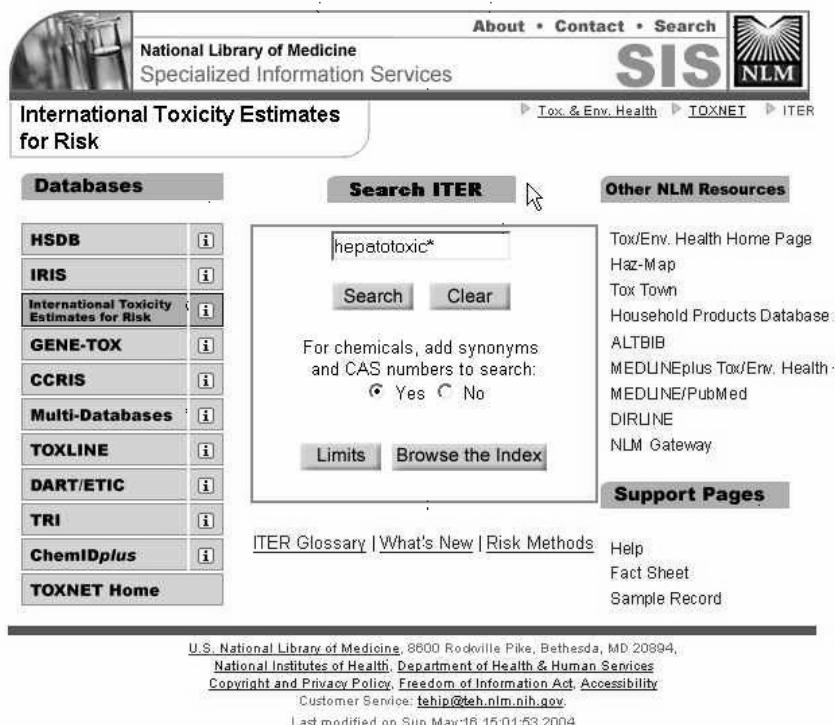


FIGURE 2. ITER Search Results for "Hepatotoxic*"

The screenshot shows the ITER Search Results page from the National Library of Medicine's Specialized Information Services (SIS) website. The search term 'hepatotoxic*' is entered in the search bar. The results are sorted by relevancy and numbered 1 through 8. Each result includes the substance name and its CAS number.

Rank	Substance Name	CAS Number
1	TETRACHLOROETHYLENE	127-18-4
2	CARBON TETRACHLORIDE	56-23-5
3	ACETALDEHYDE	75-07-0
4	DICHLOROPROPANOL, 2,3-	616-23-9
5	ENDOSULFAN	115-29-7
6	DIMETHYLFORMAMIDE, N,N-	68-12-2
7	ENDRIN	72-20-8
8	PYRIDINE	110-86-1

APPENDIX (continued)

FIGURE 3. Browse ITER for Textword "Hepatotoxic"

The screenshot shows a web interface for the National Library of Medicine's Specialized Information Services (SIS). At the top, there is a navigation bar with links for 'About', 'Contact', 'Search', 'SIS', and 'NLM'. Below the navigation bar, the text 'National Library of Medicine Specialized Information Services' is displayed. A banner at the top says 'ITER Browse Results' and includes links for 'Tox. & Env. Health', 'TOXNET', and 'ITER'. The main search area has a text input field containing 'hepatotoxic', a 'Search' button, a 'Clear' button, and a 'Return to Basic Search' button. Below the search area, there are three radio buttons: 'All Words' (selected), 'CAS Registry Number', and 'Chemical Name'. A note below the radio buttons says 'Check one or more text words. Then click on SELECT.' Below this, the text 'Start of Text Word Browse: hepatotoxic' is shown. There are 'Up' and 'Down' navigation buttons and a 'Select' button. A table follows, listing index terms and their record counts:

Check to Select	Number of Records	Index Term
<input type="checkbox"/>	3	hepatotoxic
<input type="checkbox"/>	6	hepatotoxicity
<input type="checkbox"/>	1	hepatotoxicity
<input type="checkbox"/>	3	heptachlor
<input type="checkbox"/>	1	heptane
<input type="checkbox"/>	1	hercules
<input type="checkbox"/>	1	hereditary
<input type="checkbox"/>	3	heritable

FIGURE 4. Options in ITER Limits Feature

The screenshot shows the International Toxicity Estimates for Risk (ITER) website interface. At the top, there's a navigation bar with links for About, Contact, Search, SIS (Specialized Information Services), NLM logo, and menu items for Tox. & Env. Health, TOXNET, ITER, and Limits. Below the navigation is the title "International Toxicity Estimates for Risk". On the left, there's a sidebar titled "Databases" containing links to HSDB, IRIS, International Toxicity Estimates for Risk, GENE-TOX, CCRIS, Multi-Databases, TOXLINE, DART/ETIC, TRI, ChemIDplus, and TOXNET Home. Another sidebar titled "Other NLM Resources" includes links to Tox/Env. Health Home Page, Haz-Map, Tox Town, Household Products Database, ALTBIB, and MEDLINEplus Tox/Env. Health. The main content area is titled "Search ITER" and contains a search input field, a "Search" button, and a "Clear" button. It also includes instructions for searching chemical synonyms and CAS numbers, with radio buttons for "Yes" and "No". Below this are sections for "Search: exact words, singular & plural forms, word variants" and "Search records with: the phrase, all words, any words". A "Search in fields:" section allows users to contract or expand categories for Substance Identification and Risk Data. At the bottom of the search form are "Search" and "Browse the index" buttons.

APPENDIX (continued)

FIGURE 5. Search for Multi-Databases for "Malathion" with Option to Check Off Up to Five TOXNET® Databases

The screenshot shows the SIS website interface. At the top, there is a navigation bar with links for About, Contact, Search, and SIS/NLM logo. Below the navigation bar, there is a banner for "Multi-Databases". The main content area has three sections: "Databases" (listing HSDB, IRIS, ITER, GENE-TOX, CCRIS, and TOXLINE), "Search Multiple Databases" (with a search input field containing "malathion", a "Search" button, and a "Clear" button), and "Other NLM Resources" (listing various resources like Tox/Env. Health Home Page, Haz-Map, Tox Town, Household Products Database, ALTBIB, MEDLINEplus Tox/Env. Health, MEDLINE/PubMed, DIRLINE, and NLM Gateway). There is also a "Support Pages" section with a "Help" link. At the bottom, there is a footer with copyright information and a last modified date.

Databases

- HSDB
- IRIS
- ITER
- GENE-TOX
- CCRIS
- Search HSDB, IRIS, ITER
CCRIS & GENE-TOX
- TOXLINE
- DART/ETIC
- TRI
- ChemIDplus
- TOXNET Home

Search Multiple Databases

malathion

Search Clear

For chemicals, add synonyms and CAS numbers to search:
 Yes No

Search in:

<input checked="" type="checkbox"/> HSDB	<input checked="" type="checkbox"/> IRIS
<input checked="" type="checkbox"/> CCRIS	<input checked="" type="checkbox"/> GENE-TOX
<input checked="" type="checkbox"/> ITER	

Browse the Index

Other NLM Resources

- Tox/Env. Health Home Page
- Haz-Map
- Tox Town
- Household Products Database
- ALTBIB
- MEDLINEplus Tox/Env. Health
- MEDLINE/PubMed
- DIRLINE
- NLM Gateway

Support Pages

Help

U.S. National Library of Medicine, 8800 Rockville Pike, Bethesda, MD 20894,
National Institutes of Health, Department of Health & Human Services
Copyright and Privacy Policy, Freedom of Information Act, Accessibility
Customer Service: tehip@teh.nlm.nih.gov
Last modified on Sun May 16 10:42:01 2004

FIGURE 6. Search Results in Multi-Databases Option for "Malathion"

The screenshot shows the TOXNET Multi-Databases Search Results page. The search term 'malathion' is entered in the search field. The results table displays 5 records, each with a checkbox, database name, substance name, and CAS number. The results are sorted by relevancy.

Select Record	Database	Substance Name	CAS Number
1	CCRIS	MALATHION	121-75-5
2	HSDB	MALATHION	121-75-5
3	GENETOX	MALATHION	121-75-5
4	ITER	MALATHION	121-75-5
5	IRIS	Malathion	121-75-5

APPENDIX (continued)

FIGURE 7. Summary Table for Risk Data on Chemical "Malathion"

TOXNET
Home
Item 1 of 1

<p>Contents</p> <p style="text-align: right;"> <input type="button" value="Contract all categories"/> <input type="button" value="Expand all categories"/> <input type="button" value="Select"/> <input type="button" value="Clear"/> </p> <ul style="list-style-type: none"> <input type="checkbox"/> <input checked="" type="radio"/> FULL RECORD <input type="checkbox"/> <input checked="" type="radio"/> Substance Identification/Summary Table <ul style="list-style-type: none"> <input checked="" type="radio"/> Substance Name <input type="radio"/> CAS Registry Number <input type="radio"/> Risk Values - Summary Table <input type="checkbox"/> <input checked="" type="radio"/> Risk Data <ul style="list-style-type: none"> <input type="radio"/> Risk Data - Noncancer Oral <input type="radio"/> Risk Data - Cancer Oral <input type="radio"/> Risk Data - Noncancer Inhalation <input type="radio"/> Risk Data - Cancer Inhalation <hr/>	<p>MALATHION CASRN: 121-75-5 <i>For other data, click on the Table of Contents</i></p> <p>Substance Identification/Summary Table:</p> <p>Substance Name: MALATHION</p> <p>CAS Registry Number: 121-75-5</p> <p>Risk Values - Summary Table:</p> <p style="text-align: center;">Summary Risk Table for: MALATHION</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Risk Value Type \ Organization</th> <th style="text-align: center;">ATSDR^f</th> <th style="text-align: center;">Health Canada^f</th> <th style="text-align: center;">IARC^f</th> <th style="text-align: center;">ITER^f</th> <th style="text-align: center;">NSF Int'l^f</th> <th style="text-align: center;">RIVM^f</th> <th style="text-align: center;">U.S. EPA^f</th> </tr> </thead> <tbody> <tr> <td>Noncancer Oral</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">--</td> <td style="text-align: center;">✓</td> </tr> <tr> <td>Cancer Oral</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">--</td> </tr> <tr> <td>Noncancer Inhalation</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">--</td> </tr> <tr> <td>Cancer Inhalation</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">--</td> </tr> </tbody> </table> <p style="text-align: center;"><small>✓ = Chemical evaluated and ITER data online.</small></p>	Risk Value Type \ Organization	ATSDR ^f	Health Canada ^f	IARC ^f	ITER ^f	NSF Int'l ^f	RIVM ^f	U.S. EPA ^f	Noncancer Oral	✓	--	--	--	--	--	✓	Cancer Oral	✓	--	--	--	--	--	--	Noncancer Inhalation	✓	--	--	--	--	--	--	Cancer Inhalation	✓	--	--	--	--	--	--
Risk Value Type \ Organization	ATSDR ^f	Health Canada ^f	IARC ^f	ITER ^f	NSF Int'l ^f	RIVM ^f	U.S. EPA ^f																																		
Noncancer Oral	✓	--	--	--	--	--	✓																																		
Cancer Oral	✓	--	--	--	--	--	--																																		
Noncancer Inhalation	✓	--	--	--	--	--	--																																		
Cancer Inhalation	✓	--	--	--	--	--	--																																		