Linking LRI AMBIT Chemoinformatic system with the IUCLID Substance database to Support Read-across of Substance endpoint data and Category formation

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Introduction

Read-across and category formation are indispensable techniques in safety assessments of chemicals. The read-across approach is used on average in 20% of the Endpoint Study Records, while QSAR is used in less than 1% of the dossiers, according to European Chemical Agency reports. Although many tools are available, only a limited number is capable to provide easily accessible data on substance identity, composition together with chemical structures and high quality endpoint data.

http://ambitlri.ideaconsult.net

Chemical substances and endpoint data in AMBIT

The AMBIT software, funded initially within the CEFIC LRI programme, provides a web service and user friendly web interface to a chemical database, various chemical structure search facilities and toxicity prediction models. AMBIT data model enables representation of chemical substances in real industry conditions by supporting complex compositions (including impurities, additives, UVCB). AMBIT is designed to enable data import from several databases, including the International Uniform Chemical Information Database (IUCLID). Currently AMBIT supports manual upload of i5z/i6z files exported from IUCLID or semi-automatic import via IUCLID5 or IUCLID6 Web services. The chemical structures already contained in AMBIT are automatically linked to constituents/impurities/additives of the imported substances. The flexible data storage and visualization allows for user friendly presentation of study data (physicochemical properties, fate and hazard information) and composition.

Workflow for read across and category formation

Assessment identifier	Collect structures	Endpoint data used	Assessment details	Report

- *Define assessment parameters*

Assessment identifier	Collect structures	Endpoint data used	Assessment details	Report
	Collect structures	List of collected structures		

- *Use exact structure and similarity search to collect the structures for read-across/category formation`*

Assessment identifier	Collect structures	Endpoint data used	Assessment details	Report
		Search substance(s)	Selection of endpoints	

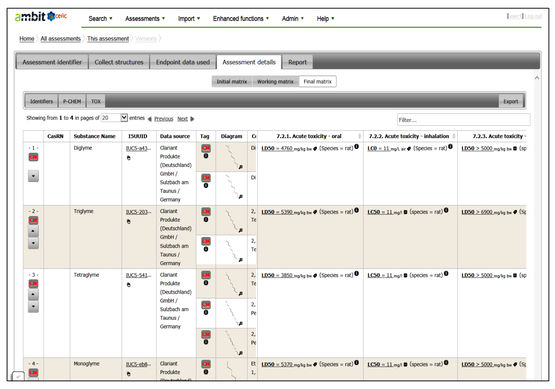
- *Search for substances having the collected structures as constituent*
- *Select all relevant endpoints which have to be displayed in the Data Matrix*

Assessment identifier	Collect structures	Endpoint data used	Assessment details	Report
			Initial matrix / Working matrix / Final matrix	

- *The working matrix displays all selected endpoint data of the substances and allows gap filling*
- *Data gaps can be filled by opening data input pop up window*
- *Justification has to be given as well*

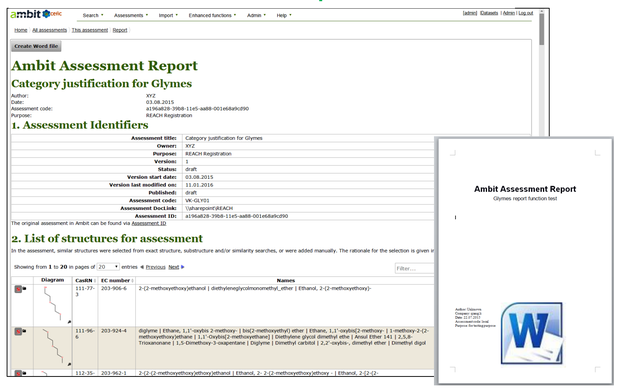
Assessment identifier	Collect structures	Endpoint data used	Assessment details	Report

Final matrix



- *After gap filling and removal of inappropriate data, the final data matrix can be established*

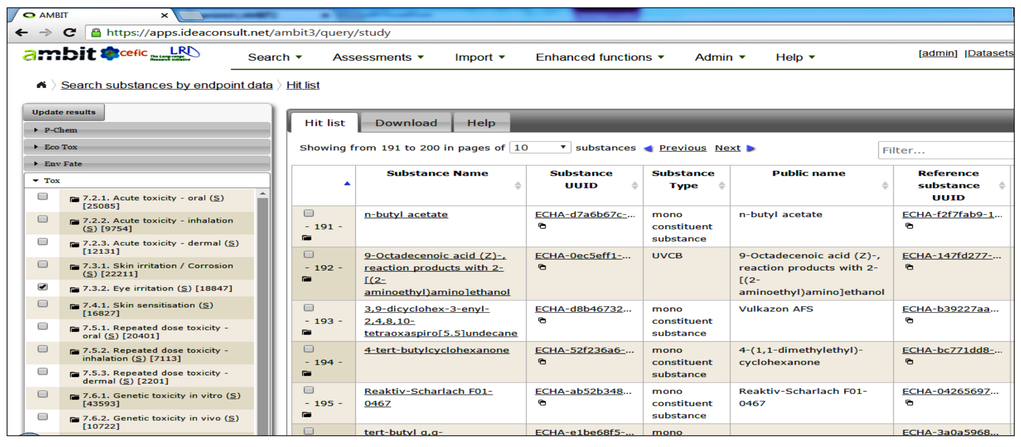
Assessment report

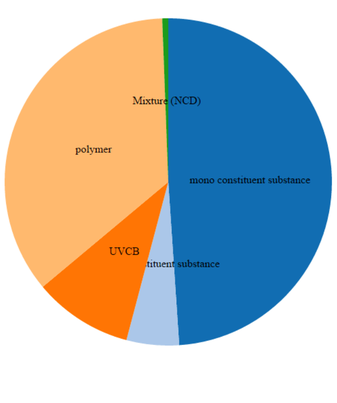


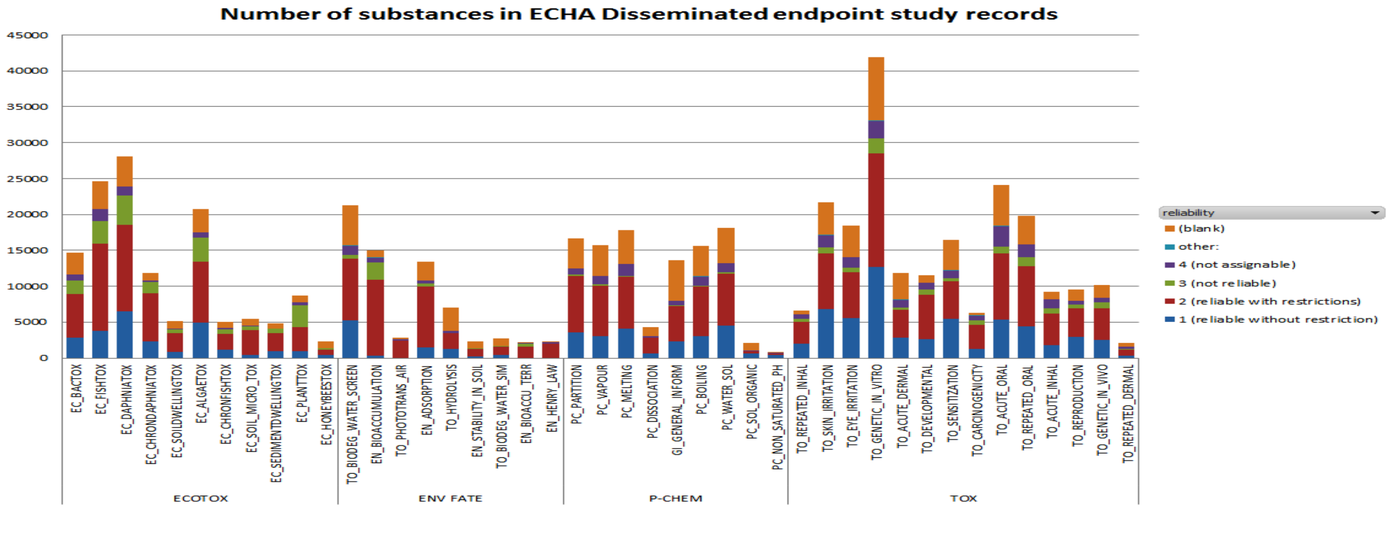
- *An assessment report can be established as soon as the final data matrix has been created*
- *The report can be exported into MS Word*

The LRI AMBIT- IUCLID tool is loaded with non-confidential REACH data supplied by ECHA

http://echa.europa.eu/view-article/-/journal_content/title/echa-gives-out-registration-data-to-support-development-of-non-test-methods

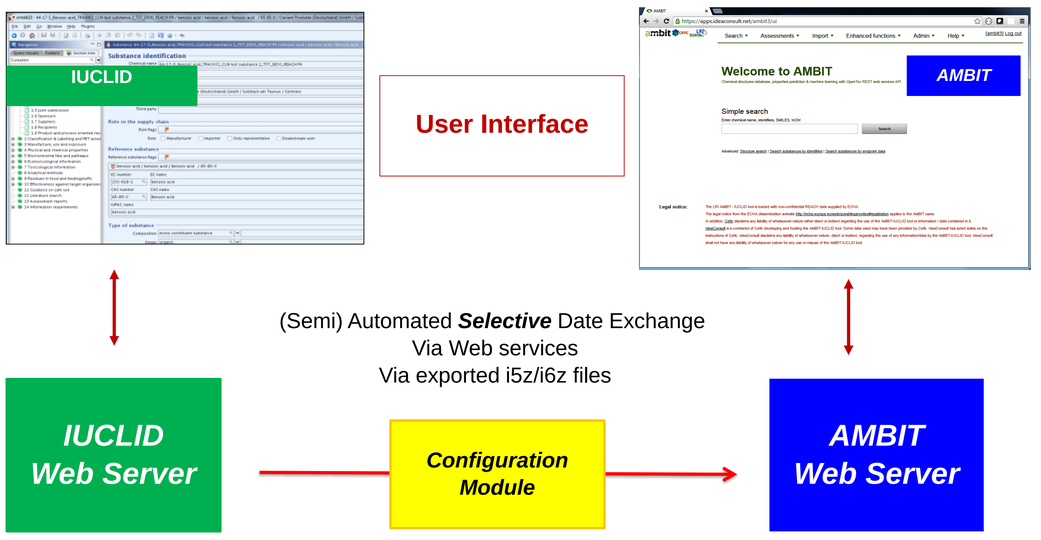


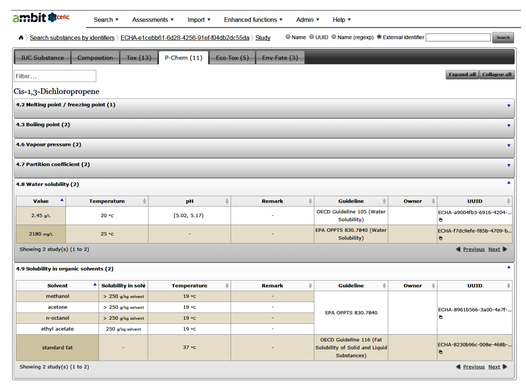




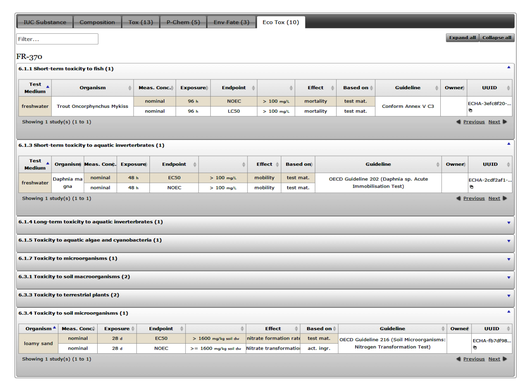
The legal notice from the ECHA dissemination website http://echa.europa.eu/web/guest/legal-notice#registration applies to the AMBIT users. In addition, Cefic disclaims any liability of whatsoever nature either direct or indirect regarding the use of the AMBIT-IUCLID tool or information / data contained in it.

Linking AMBIT with IUCLID

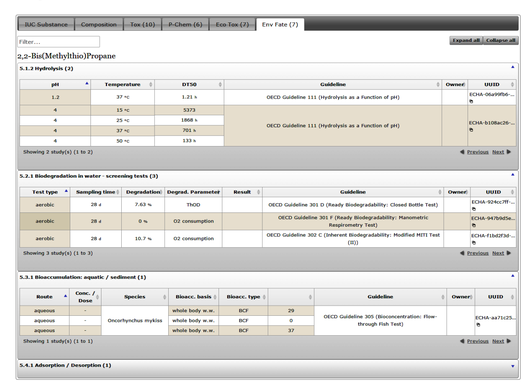




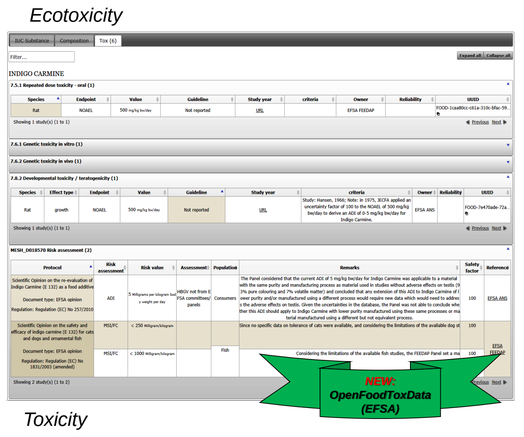
Phys-chem



Ecotoxicity



Environmental fate



Toxicity

Read-across workflows in AMBIT

Comprehensive assessment workflows are developed for read-across and category formation based on all the data available in AMBIT. The assessment workflow facilitates the search for target and source structures, generating data matrices, gap filling and generating assessment reports with predefined formats automatically. The enhanced AMBIT facilitates drafting and improves quality for read-across and category formation and will be a useful tool for experts responsible for substance assessments.

Private assessments

The assessments are only visible to the owner by default, read/write access for other users are explicitly assigned. AMBIT uses role based access control.

Summary

AMBIT is an Open Source Web Application (LGPL license). LRI AMBIT-IUCLID tool is loaded with REACH data subject to the legal notice. Substance composition and IUCLID import is supported. The comprehensive search functionality allowing structure search, substructure search, and similarity search even in databases not designed for, such as IUCLID, in order to find substances appropriate for read-across and category approaches. It also enables the inclusion of impurities (important in real industrial conditions) in substance search requests. User interface for creating read across assessment and generating reports is available in online and downloadable versions.

Download and installation options

LRI AMBIT – IUCLID tool download http://cefic-lri.org/lri-toolbox/

- Installation on a local laptop/desktop or company Intranet server
- Shared database and web server. Clients only need a web browser.

Publicly available online https://ambitlri.ideaconsult.net

New version https://ambitlri.ideaconsult.net/tool2 (IUCLID6 support, OpenFoodToxData, VEGA)

IT Technology

Server: Java 7; Tomcat 7.x; MySQL >= 5.6, REST API
Clients: Microsoft IE; Mozilla Firefox; Google Chrome , JavaScript
Libraries: open source Java library – CDK (http://cdk.sf.net); AMBIT (http://ambit.sf.net)

Technical support

contact Ideaconsult Ltd, Sofia
www.ideaconsult.net ,
email: support@ideaconsult.net

Acknowledgements

References

- ECETOC European Center for Ecotoxicology and Toxicology of Chemicals, *Technical Report 116*, **2012** *http://www.ecetoc.org/technical-reports*
- LRI Long-range Research Initiative of Chemical Industry *http://www.cefic-lri.org*
- AMBIT A Software for Cheminformatic Data Management *http://ambit.sf.net*
- Jeliazkova, N.; Jeliazkov, V., *J. Cheminform.*, 3, **2011**, 18. doi:10.1186/1758-2946-3-18.
- IUCLID The International Uniform Chemical Information Databaseh http://iuclid.eu/