“Good practices and resources to improve the utility of research data in regulatory assessments” Webinar 2024-01-31

Experience and contributions from the SciRAP initiative

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Science in Risk Assessment and Policy (SciRAP) – a research initiative

- **Promote structure and transparency** in the evaluation of toxicity and ecotoxicity data for hazard and risk assessment.
- **Bridge the gap** between academic research and regulatory assessment of chemicals.
- **User-friendly**, facilitate structured qualitative data evaluation

Selected SciRAP publications:
Molander et al. 2014. https://doi.org/10.1080/10807039.2014.928104
Moermond et al. 2015. https://doi.org/10.1002/etc.3259
Beronius et al. 2018. https://doi.org/10.1002/jat.3648
Roth et al. 2021. https://doi.org/10.3389/ftox.2021.746430

See www.scirap.org for more related publications

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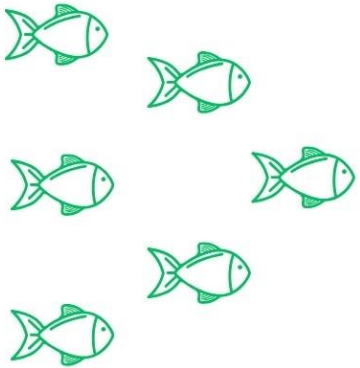
SciRAP tools
Study evaluation | Reporting



SciRAP ecotoxicity
the CRED criteria
2014 - 2018
nanoCRED 2017

SciRAP in vivo
2014 - 2018

SciRAP in vitro
2018 - 2021
SciRAPnano 2023

SciRAPepi
2023 - 2025

Web-based platform: www.scirap.org

SciRAP: criteria-based study evaluation

Based on requirements and recommendations in OECD test guidelines.

Reliability

Reporting quality* — Completeness of the reporting of study design, conduct and results

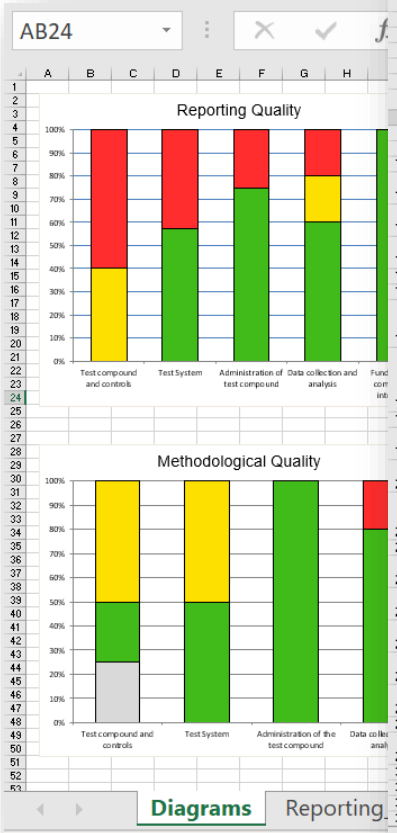
Methodological quality* — Appropriateness of study design and conduct, sensitivity of the model, validation, repeatability

Relevance

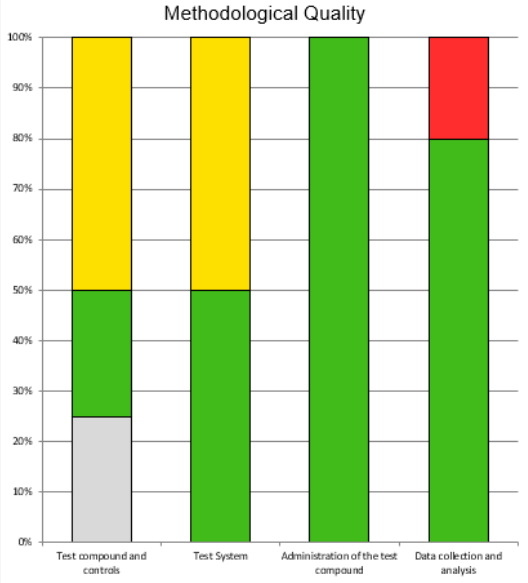
The extent to which a study or dataset contributes appropriate information to answer a specific problem formulation or assessment question.

*this distinction not made in CRED

Qualitative output from the SciRAP tool



	A	B	C	D
1	**Evaluation**	**Total, accounting for weight**	**%, accounting for weight**	
2	Not determined	1	7,14%	
3	Fulfilled	9	64,29%	
4	Partially fulfilled	3	21,43%	
5	Not fulfilled	1	7,14%	
6	Scirap Score		75.00 (method)	
7				
8	**Weight/Removed**	**Evaluation criteria**	**Selection**	**Comment**
9				
10		**Test compound and controls**		
11	1	impurities that may significantly have affected the results of the study.	Not determined	not sufficient information to judge
12	1	2. It was likely that the test compound was soluble at the concentrations used.	Partially fulfilled	no information on solubility provided but likely solu
13	1	3. An appropriate vehicle was used that is not expected to interfere with the results of the study at the concentration used.	Partially fulfilled	
14	1	4. An untreated or vehicle control was included.	Fulfilled	
15		**Test System**		
16	1	5. A reliable and sensitive test system (cell line / cells / tissue / organ /embryo) with metabolic competence, if relevant, was used for investigating the test compound and endpoints.	Partially fulfilled	
17	1	6. Conditions for cultivation and/or maintenance of the cell line / cells / tissue / organ /embryo (incubation temperature, humidity, CO2 concentration, media used, number of cell passages, control of contamination) were appropriate.	Fulfilled	
18		**Administration of the test compound**		
19	1	7. The duration of exposure was suitable for the test system and investigated endpoints.	Fulfilled	
20	1	8. The concentrations used were suitable for the test system and investigated endpoints.	Fulfilled	
21	1	9. The test conditions during and after exposure to the test compound were suitable (media and serum used, cell density, incubation temperature, humidity, CO2 concentration).	Fulfilled	
22		**Data collection and analysis**		
23	1	10. Reliable and sensitive tests and/or analytical methods were used for investigating the endpoints.	Fulfilled	
24	1	11. Sufficient numbers of replicates or repetitions of the experiment were used to generate reliable and valid results.	Fulfilled	
25	1	12. Measurements were collected at suitable time points in order to generate sensitive, valid and reliable data.	Fulfilled	
26	1	13. Cytotoxicity was measured and the test compound did not cause cytotoxicity that significantly affected the results.	Not fulfilled	
27	1	14. The statistical methods were clearly described and do not seem inappropriate, unusual or unfamiliar.	Fulfilled	
28		**Other**		
29	1	15. Are there any other aspects of study design, performance or reporting that influence reliability?		Mechanisitic methodologies are standa
30				
31				
32				
33				



	Not deter	Fulfilled	Partially f	Not fulfilled
Test com	1	1	2	0
Test Syst	0	1	1	0
Administr	0	3	0	0
Data coll	0	4	0	1

Diagrams | Reporting_Quality | **Methodological_Quality** | Relevance

Applying SciRAP – examples

HUMAN AND ECOLOGICAL RISK ASSESSMENT
https://doi.org/10.1080/10807039.2018.1504275

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Improving structure and transparency in reliability evaluations of data under REACH: suggestions for a systematic method

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Table 3. Principles for categorizing studies into reliability categories 1–4 based on the SciRAP evaluation.

Reliability category	Criteria
1. Reliable without restrictions	Well designed and performed study. All key reporting and methodology criteria are judged as fulfilled and there are no deficiencies in the other non-key criteria that are considered to affect the reliability of the study or make the study not assignable.
2. Reliable with restrictions	Generally well designed and performed study. All key reporting and methodology criteria are judged as fulfilled or partially fulfilled. Minor deficiencies in the other non-key criteria may be present.
3. Not reliable	The study has serious flaws in the study design or conduct affecting its reliability, i.e. one or several of the key methodology criteria are judged as not fulfilled, or there are serious deficiencies in the other non-key criteria that have considerable impact on study reliability,
4. Not assignable	The study is insufficiently reported for evaluating reliability. The study is either published as an abstract or in secondary literature (books, reviews), or important information for assessing reliability in the study is missing, i.e. one or several key reporting criteria have been judged as not fulfilled.

wake of the controversies regarding potential harm of widely used chemicals, the need for a more systematic and transparent approach in identifying, selecting,

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Color versions of one or more of the figures in the article can be found online at www.tandfonline.com/bher.

https://doi.org/10.1080/10807039.2018.1504275

Toxicology 476 (2022) 153255

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journal homepage: www.elsevier.com/locate/toxicol

Systematic evaluation of the evidence for identification of endocrine disrupting properties of Bisphenol F

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Table 2
Principles for translating SciRAP evaluations for methodological quality into the four Klimisch categories. Based on the approach applied by Ingre-Khans et al.

Table 3
Criteria for the categorization of lines of evidence in the WoE assessment.

Category	Principle for Categorization
Strong	Effects were observed in one or more studies judged as reliable without restriction; there are no conflicting results.
Moderate	Effects were observed in one or more studies judged as reliable with restriction; there are no conflicting results. Or effects were observed in one or more studies judged as reliable without restriction or reliable with restriction but with conflicting results, i.e., no or opposite effects were observed in other studies. However, conflicts of results can be explained by differences in study design, for example different exposure periods, doses or animal species or cell models.
Weak	Effects were observed in one or more studies judged as reliable without restriction or reliable with restriction but with conflicting results, i.e., no or opposite effects were observed in other studies. Conflicts of results cannot be explained by differences in study design, for example different exposure periods, doses or animal species or cell models. Or effects were only observed in one or more studies judged as not reliable or not assignable.

https://doi.org/10.1016/j.tox.2022.153255

Applying SciRAP – examples

Archives of Toxicology
https://doi.org/10.1007/s00204-022-03255-9

REGULATORY TOXICOLOGY

New aspects in deriving health-based guidance values for bromate in swimming pool water

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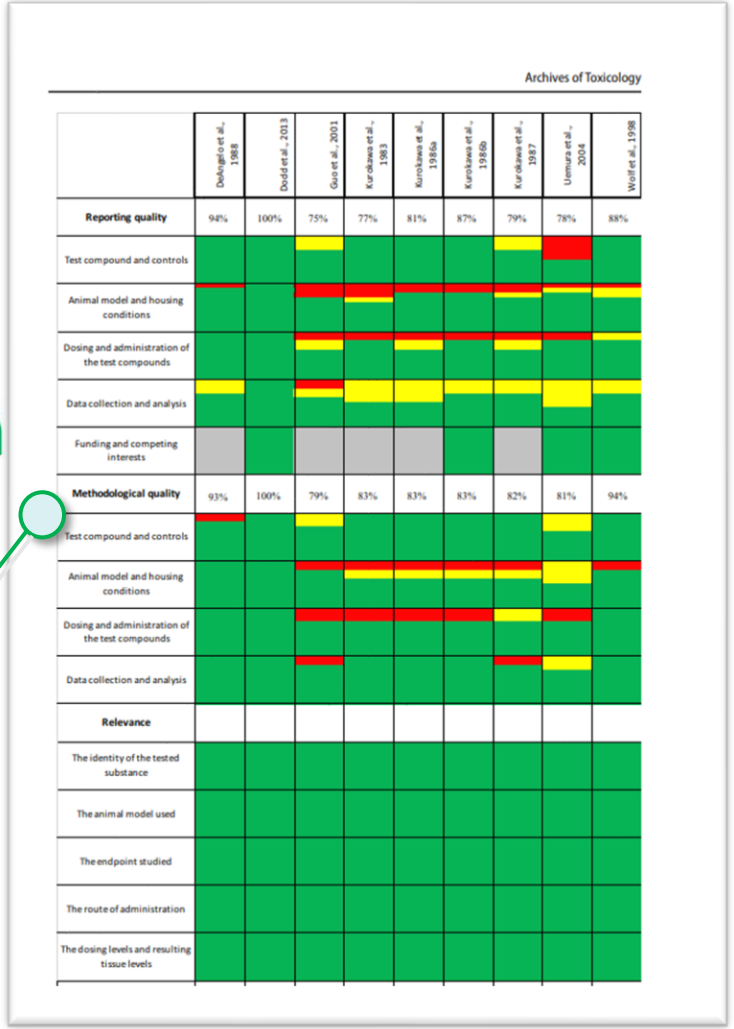
Abstract
Bromate, classified as a EU CLP 1B carcinogen, is a typical by-product of the disinfection of drinking and swimming pool water. The aim of this study was (a) to provide data on the occurrence of bromate in pool water, (b) to re-evaluate the carcinogenic MOA of bromate in the light of existing data, (c) to assess the possible exposure to bromate via swimming pool water and (d) to inform the derivation of cancer risk-related bromate concentrations in swimming pool water. Measurements from monitoring analysis of 229 samples showed bromate concentrations in seawater pools up to 34 mg/L. A non-systematic literature search was done and the quality of the studies on genotoxicity and carcinogenicity was evaluated using Klimisch criteria (Klimisch et al., Regul Toxicol Pharmacol 25:1–5, 1997) and SciRAP tool (Beronius et al., Regul Toxicol Pharmacol 38:1460–1470, 2018) respectively. Benchmark dose (BMD) modeling was performed using the software packages in BMDS 3.1 and PROAST 66.40, 67 and 69 (human cancer $BMDL_{10}$; EFSA 2017). For exposure assessment a wide range of sources were evaluated for their reliability. Different target groups (infants/toddlers, children and adults) and exposure scenarios (recreational, sport-active swimmers, top athletes) were considered for the assessment of exposure. Exposure was calculated according to the frequency of swimming events and duration. Finally, cancer risk-related bromate concentrations in pool water were calculated for different target groups and their exposure using the $hBMDL_{10}$ and a cancer risk of 1 in 100,000. Convincing evidence was obtained from studies that bromate induces oxidative DNA damage and acts as a clastogen in vitro and in vivo. The weight of the available genotoxicity data is compatible with both linear as well as non-linear dose–response. Bromate should be conservatively considered to be a non-threshold carcinogen. BMD modeling with data from rat cancer studies (Kurokawa et al., J Natl. Cancer Inst, 1983 and 1986a; DeAngelo et al., Toxicol Pathol 1998) resulted in a median $hBMDL_{10}$ of 0.65 mg bromate/kg body weight (bw) per day. Evaluation of different target groups revealed that top athletes had the highest exposure, followed by sport-active children, specifically toddlers, children and adults. The predominant route of exposure was oral (73–98%) by swallowing water, dermal route (2–27%), while the inhalation route was insignificant (<0.5%). Accepting the same risk for different groups resulted in different guidance values due to the large variation in exposure. For example, for a risk of 1 in 100,000, the bromate concentrations would range between 0.011 for top athletes, 0.015 for sport-active children and 0.11 for adults. In conclusion, the present study shows that health risks due to bromate exposure by swimming pool water can be excluded and that large differences in risk exist depending on the individual swimming habits and age.

Keywords Bromate · Swimming pool water · Mode of action · Exposure · Disinfection · Risk assessment

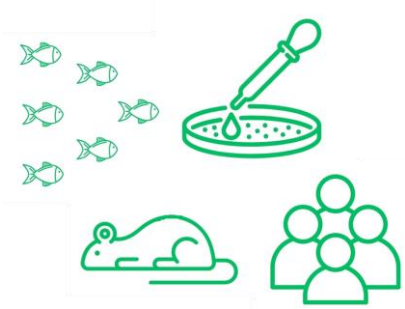
Using the colour profiles to visualize reliability and relevance across studies in a line of evidence.



Röhl et al. 2022. doi: 10.1007/s00204-022-03255-9

SciRAP reporting checklists

- To help researchers report sufficient detail of their study
- Facilitate evaluation
- Promote transparency
- Excel template may be submitted as supplemental material



Science in Risk Assessment and Policy

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Report in vitro studies

This reporting checklist was developed to help researchers report *in vitro* studies in a structured and transparent way. The checklist is based on requirements and recommendations in relevant OECD test guidelines, as well as the OECD Guidance Document for describing non-guideline in vitro test methods (No 211) and the OECD Guidance Document on Good In Vitro Method Practices (GIVIMP) (No 286). Not all items apply to all studies.

You can download the checklist as an excel file in the menu to the right.

Contact: anna.beronius@ki.se

Download the reporting checklist for *in vitro* studies here (excel).

Category	Items to be described
Purpose and aim	Purpose and/or aim of the study.
Endpoints	Endpoints included in the investigation.
Test compound	Name, ID and/or CAS-number.
	Source, i.e. manufacturer and batch/lot number.
	Purity, including information on contaminants, isomers, etc.
	Other relevant information, e.g. radiolabelled.
	Stability and homogeneity of the compound in the vehicle under the conditions of use and storage.
	Stability in the medium, i.e. sensitivity of the test compond to hydrolysis and/or photolysis.
	Solubility.

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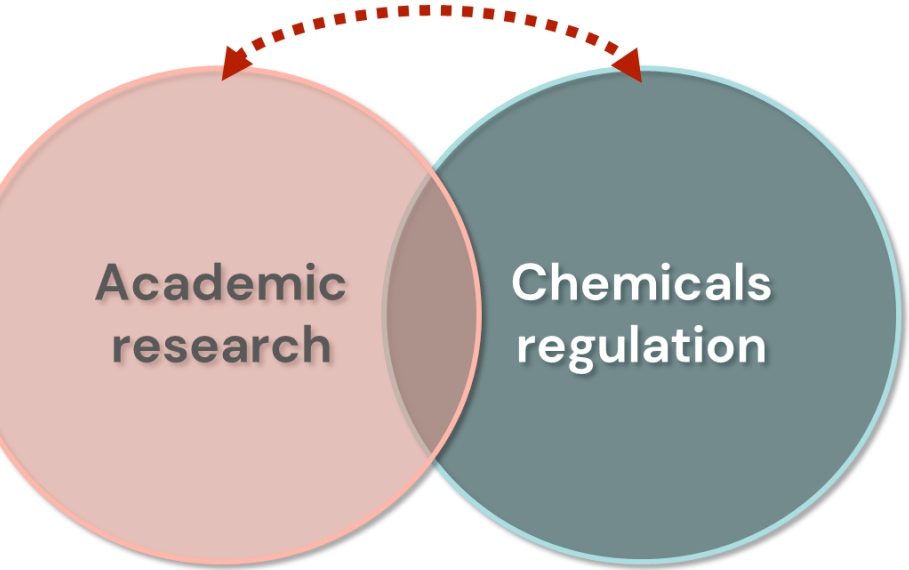
Improving the utility and use of research data in regulatory assessments



- Two-way street
- For researchers
  - → Awareness, incentive, possibility
  - → Tools and guidance; what is needed?
  - → Positive examples and communication
- For regulatory assessors
  - → Familiarity and acceptance of non-standard data
  - → Tools and guidance
- Education and training

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Thank you for your attention!

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