United States
Environmental Protection Agency

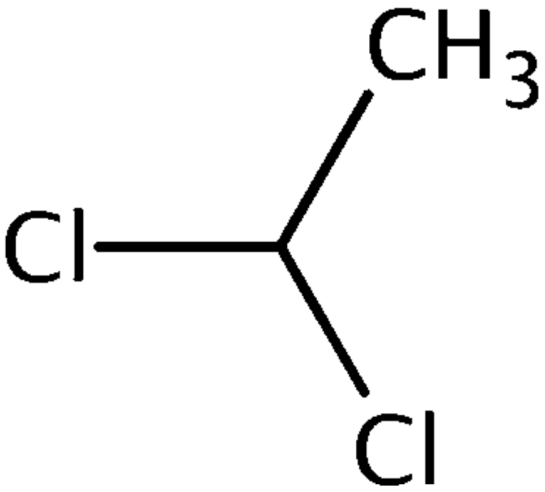
July 2024
Office of Chemical Safety and
Pollution Prevention

Draft Risk Evaluation for 1,1-Dichloroethane

Systematic Review Supplemental File:

Data Quality Evaluation Information for Environmental Hazard

CASRN: 75-34-3



July 2024

This supplemental file contains information regarding the data quality evaluation results relevant to the characterization of environmental hazard for the *Draft Risk Evaluation for 1,1-Dichloroethane*. Due to data gaps identified for 1,1-dichloroethane, analogue data from 1,2-dichloropropane and 1,1,2-trichloroethane were included for read-across in the Draft Risk Evaluation for 1,1-Dichloroethane. EPA conducted data quality evaluation based on author-reported descriptions and results; additional analyses (*e.g.*, statistical analyses performed during data integration into the risk evaluation) potentially conducted by EPA are not contained in this supplemental file. EPA used the TSCA systematic review process described in the *Draft Systematic Review Protocol Supporting TSCA Risk Evaluations for Chemical Substances* (also referred to as '2021 Draft Systematic Review Protocol'). Any updated steps in the systematic review process since the publication of the 2021 Draft Systematic Review Protocol are described in the *Draft Risk Evaluation for 1,1-Dichloroethane - Systematic Review Protocol*.

Different data quality evaluation forms were used depending on the organism as described in the PECO statement in Appendix H.5.7 of the 2021 Draft Systematic Review Protocol. Each health outcome was evaluated independently within a given reference, therefore each reference may have more than one overall quality determination (OQD) to more appropriately reflect the quality of each health outcome and the respective hazard endpoints as described by the study authors. Some data evaluation forms have general additional comments presented adjacent to the OQD to add further context. No OQD is determined for each reference as a whole, if it contains data from more than one evidence stream. Data quality evaluation results were organized by first presenting the data for the target compound (1,1-dichloroethane) followed by a separate section for analogue data (1,2-dichloropropane and 1,1,2-trichloroethane). The table of contents lists references based on chemical, broad habitat (*e.g.*, aquatic, terrestrial), taxa, taxonomic group, exposure duration, and health outcome (*e.g.*, mortality) categories relevant to the endpoint being evaluated. Within the contents of this document, 1,1-dichloroethane may be referred to as the acronyms 1,1-DCA and 1,1-DCE. The acronyms 1,2-DCA, 1,2-DCE, and DCE refer to the chemical 1,2-dichloroethane. The acronyms 1,1,2-TCE, 1,1,2-TCA, and TCE refer to the chemical 1,1,2-trichloroethane. The acronym trans-1,2-DCE refers to the chemical trans-1,2-dichloroethylene. The acronym 1,2-DCP refers to the chemical 1,2-dichloropropane.

Table of Contents

Habitat: Terrestrial

Taxa: Vertebrates

Rattus norvegicus

Study Citation:	Walbridge, C.T., Fiandt, J.T., Phipps, G.L., Holcombe, G.W. (1983). Acute toxicity of ten chlorinated aliphatic hydrocarbons to the fathead minnow (Pimephales promelas). Archives of Environmental Contamination and Toxicology 12(6):661-666.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Fathead minnow (Pimephales promelas)*; Juvenile
Health Outcome:	Mortality
Chemical:	1,1-Dichloroethane
HERO ID:	4259619

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Medium	The test substance was reported with accepted nomenclature as 1,2-Dichloroethane.
	Metric 2:	Test Substance Source	Low	The test substance source was not reported.
	Metric 3:	Test Substance Purity	Low	The Purity and/or grade of test substance were not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Low	Negative controls were reportedly used but there was no mention of the control response.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control group was not reported.
	Metric 6:	Randomized Allocation	Medium	"At the beginning of a flow-through test, 50 fish were randomly assigned to each of the 12 exposure tanks."
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	"Two 2-L/cycle proportional diluters with dilution factors of 0.6 (Mount and Brungs 1967) were used to deliver five toxicant concentrations and a control, in duplicate, to randomly arranged exposure chambers. These chambers were all-glass aquaria with a working volume of 41 L, 30 cm high by 30 cm by 60 cm, with a standpipe topped with a cylinder of stainless-steel screen to prevent loss of fish. Flows were greater than ten tank-volumes per day. Fluorescent lighting on a 16 hr photoperiod was used, and the light level was 48 lumens at the water surface."
	Metric 8:	Consistency of Exposure Administration	High	"At the beginning of a flow-through test, 50 fish were randomly assigned to each of the 12 exposure tanks. Dead fish were counted and removed at least twice during the first day, and twice daily after that. A saturator system was used to solubilize the chemicals (Phipps et al. 1982). This saturator uses an intermittent flow of water, delivered by a metering pump, through one or more closed chambers (19 L stainless steel soda carbonation tanks). The water is continuously mixed with the toxicant, the latter was added in a single charge before the test began. Methods not discussed here followed those specified by the U.S. Environmental Protection Agency (1975)."
	Metric 9:	Measurement of Test Substance Concentration	High	"Tracor MT-220 manual gas chromatograph with a 63Ni electron capture detector was used for analyzing 1,2-dichloroethane, 1,2-dichloropropane, 1,3-dichloropropane, and 1,1 ,2-trichloroethylene. The column was packed with 80/100 mesh Gas-Chrom Q| coated with 4% SE-30/6% OV-210. The carrier gas for all compounds was 5% methane in argon, and the column temperatures and retention times are given in Table 2."
	Metric 10:	Exposure Duration and Frequency	High	Study authors conducted 24, 48, 72, and 96 hr exposures. This information was not specified in the methods section but in the results.

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Study Citation:	Walbridge, C.T., Fiandt, J.T., Phipps, G.L., Holcombe, G.W. (1983). Acute toxicity of ten chlorinated aliphatic hydrocarbons to the fathead minnow (Pimephales promelas). Archives of Environmental Contamination and Toxicology 12(6):661-666.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Fathead minnow (Pimephales promelas)*; Juvenile
Health Outcome:	Mortality
Chemical:	1,1-Dichloroethane
HERO ID:	4259619

Domain	Metric		Rating	Comments
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	No information is provided on the number of exposure groups and spacing of exposure levels. "Two 2-L/cycle proportional diluters with dilution factors of 0.6 (Mount and Brungs 1967) were used to deliver five toxicant concentrations and a control, in duplicate, to randomly arranged exposure chambers."
	Metric 12:	Testing at or Below Solubility Limit	Low	There is no information regarding the use of a solvent, other than most of the chemicals sampled were solvents for their intended use.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	No animal source was identified other than, "Laboratory-reared fathead minnows (Pimephales promelas), 30 to 35 days old, were used in these experiments."
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	"The rearing water was the same as the diluent water, with the temperature held at a temperature of 25 degrees C plus or minus 2 degrees. Fish in the rearing tanks were fed live brine shrimp nauplii in excess until 12 to 24 hr before testing, then not fed during the exposure period."
	Metric 15:	Number of Organisms and Replicates per Group	Medium	"At the beginning of a flow-through test, 50 fish were randomly assigned to each of the 12 exposure tanks. Dead fish were counted and removed at least twice during the first day, and twice daily after that."
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	"The laboratory lake water supply (Lake Superior) was the source of the dilution water. This was heated to maintain a mean of 25 degrees with a standard deviation of 0.7~ in the test tanks. At least once during each 4-day test, pH, dissolved oxygen (DO), hardness (as CaCO3), and alkalinity (as CaCO3) were determined for control, an intermediate, and the high tanks. The pH ranged from 6.7 to 7.6. Means and ranges for DO, hardness, and alkalinity, were 8.0 mg/L (7.6-9.2), 45.1 mg/L as CaCO3 (45.0-45.5), and 41.8 mg/L as CaCO3 (35.6-43.4), respectively, for all tests. Values obtained from high exposure concentrations did not deviate significantly from those observed in the controls. Water chemistry methods were those recommended by the American Public Health Association (APHA et al. 1980) and the U.S. Environmental Protection Agency (USEPA 1974)."
	Metric 17:	Outcome Assessment Methodology	High	The 96 hr LC50 and 95% confidence intervals were established from the study.
	Metric 18:	Consistency of Outcome Assessment	High	No inconsistencies were identified.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	No confounding variables were reported by the study authors.

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Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Fathead minnow (Pimephales promelas)*; Juvenile
Health Outcome:	Mortality
Chemical:	1,1-Dichloroethane
HERO ID:	4259619

Domain	Metric		Rating	Comments
	Metric 20:	Outcomes Unrelated to Exposure	Medium	Study authors did not identify and outcomes unrelated to the exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	"The LC50 concentrations were calculated by using the Trimmed Spearman-Karber method for estimating median lethal concentrations (Hamilton et al. 1977). This method is not subject to the deficiencies of the more common normal or logistic methods and it is not as sensitive to anomalous responses on the conventional Spearman-Karber technique."
	Metric 22:	Reporting of Data	High	"The 24-, 48-, 72-, and 96-hr LC50 values and 95% confidence intervals of the chlorinated aliphatic compounds are given in Table 3."
	Metric 23:	Explanation of Unexpected Outcomes	High	Study authors did not identify any unexpected outcomes.

Additional Comments: None

Overall Quality Determination Medium

Study Citation:	Walbridge, C.T., Fiandt, J.T., Phipps, G.L., Holcombe, G.W. (1983). Acute toxicity of ten chlorinated aliphatic hydrocarbons to the fathead minnow (Pimephales promelas). Archives of Environmental Contamination and Toxicology 12(6):661-666.
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Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Fathead minnow (Pimephales promelas)*; Juvenile
Health Outcome:	Behavioral
Chemical:	1,1-Dichloroethane
HERO ID:	4259619

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Medium	The test substance was reported with accepted nomenclature as 1,2-Dichloroethane.
	Metric 2:	Test Substance Source	Low	The test substance source was not reported.
	Metric 3:	Test Substance Purity	Low	The purity and/or grade of the test substance was not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Low	Negative controls were reportedly used, but there was no mention of the control response.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control group was not reported.
	Metric 6:	Randomized Allocation	Medium	"At the beginning of a flow-through test, 50 fish were randomly assigned to each of the 12 exposure tanks."
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	"Two 2-L/cycle proportional diluters with dilution factors of 0.6 (Mount and Brungs 1967) were used to deliver five toxicant concentrations and a control, in duplicate, to randomly arranged exposure chambers. These chambers were all-glass aquaria with a working volume of 41 L, 30 cm high by 30 cm by 60 cm, with a standpipe topped with a cylinder of stainless-steel screen to prevent loss of fish. Flows were greater than ten tank-volumes per day. Fluorescent lighting on a 16 hr photoperiod was used, and the light level was 48 lumens at the water
	Metric 8:	Consistency of Exposure Administration	High	"At the beginning of a flow-through test, 50 fish were randomly assigned to each of the 12 exposure tanks. Dead fish were counted and removed at least twice during the first day, and twice daily after that. A saturator system was used to solubilize the chemicals (Phipps et al. 1982). This saturator uses an intermittent flow of water, delivered by a metering pump, through one or more closed chambers (19 L stainless steel soda carbonation tanks). The water is continuously mixed with the toxicant, the latter was added in a single charge before the test began. Methods not discussed here followed those specified by the U.S. Environmental Protection Agency (1975)."
	Metric 9:	Measurement of Test Substance Concentration	High	"Tracor MT-220 manual gas chromatograph with a 63Ni electron capture detector was used for analyzing 1,2-dichloroethane, 1,2-dichloropropane, 1,3-dichloropropane, and 1,1 ,2-trichloroethylene. The column was packed with 80/100 mesh Gas-Chrom Q| coated with 4% SE-30/6% OV-210. The carrier gas for all compounds was 5% methane in argon, and the column temperatures and retention times are given in Table 2."
	Metric 10:	Exposure Duration and Frequency	High	Study authors conducted 24, 48, 72, and 96hr exposures This information was not specified in the methods section but in the results.

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Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Fathead minnow (Pimephales promelas)*; Juvenile
Health Outcome:	Behavioral
Chemical:	1,1-Dichloroethane
HERO ID:	4259619

Domain	Metric		Rating	Comments
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	No information is provided on the number of exposure groups and spacing of exposure levels. "Two 2-L/cycle proportional diluters with dilution factors of 0.6 (Mount and Brungs 1967) were used to deliver five toxicant concentrations and a control, in duplicate, to randomly arranged exposure chambers."
	Metric 12:	Testing at or Below Solubility Limit	Low	There is no information regarding the use of a solvent, other than most of the chemicals sampled were solvents for their intended use.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	No animal source was identified other than, "Laboratory-reared fathead minnows (Pimephales promelas), 30 to 35 days old, were used in these experiments."
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	"The rearing water was the same as the diluent water, with the temperature held at a temperature of 25 degrees C plus or minus 2 degrees. Fish in the rearing tanks were fed live brine shrimp nauplii in excess until 12 to 24 hr before testing, then not fed during the exposure period."
	Metric 15:	Number of Organisms and Replicates per Group	Medium	"At the beginning of a flow-through test, 50 fish were randomly assigned to each of the 12 exposure tanks. Dead fish were counted and removed at least twice during the first day, and twice daily after that."
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	"The laboratory lake water supply (Lake Superior) was the source of the dilution water. This was heated to maintain a mean of 25 degrees with a standard deviation of 0.7~ in the test tanks. At least once during each 4-day test, pH, dissolved oxygen (DO), hardness (as CaCO3), and alkalinity (as CaCO3) were determined for control, an intermediate, and the high tanks. The pH ranged from 6.7 to 7.6. Means and ranges for DO, hardness, and alkalinity, were 8.0 mg/L (7.6-9.2), 45.1 mg/L as CaCO3 (45.0-45.5), and 41.8 mg/L as CaCO3 (35.6-43.4), respectively, for all tests. Values obtained from high exposure concentrations did not deviate significantly from those observed in the controls. Water chemistry methods were those recommended by the American Public Health Association (APHA et al. 1980) and the U.S. Environmental Protection Agency (USEPA 1974)."
	Metric 17:	Outcome Assessment Methodology	Uninformative	The recording of lethargy and anesthesia were not recorded for treatment groups and are subjective observations.
	Metric 18:	Consistency of Outcome Assessment	High	No inconsistencies were identified.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	No confounding variables were reported by the study authors.

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Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Fathead minnow (Pimephales promelas)*; Juvenile
Health Outcome:	Behavioral
Chemical:	1,1-Dichloroethane
HERO ID:	4259619

Domain	Metric		Rating	Comments
	Metric 20:	Outcomes Unrelated to Exposure	Medium	No outcomes unrelated to the exposure were identified by the study authors.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	No statistics were applied to observations of lethargy and anesthesia.
	Metric 22:	Reporting of Data	Low	The behavioral observations were not presented by treatment groups.
	Metric 23:	Explanation of Unexpected Outcomes	High	Study authors did not report any unexpected outcomes.

Additional Comments: This form represents the observations of lethargy and anesthesia that were recorded within the results section on page 5/6.

Overall Quality Determination Uninformative

Study Citation:	Mitsubishi Chemical Medience Corporation, (2009). Acute toxicity test on killifish (Oryzias latipes) exposed to 1,1-dichloroethane (translation).
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Oryzias latipes*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,1-Dichloroethane
HERO ID:	11328276

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The 1,1-dichloroethane was identified by CASRN.
	Metric 2:	Test Substance Source	High	IR spectrum obtained at start and conclusion of test, shown in Appendix Figure A-1-1.
	Metric 3:	Test Substance Purity	High	The purity was reported to be 99.8%
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported the use of a concurrent negative control in which dechlorinated tap water only was used.
	Metric 5:	Negative Control Response	High	The negative control response was reported in Table 6 and was adequate for the outcomes of interest.
	Metric 6:	Randomized Allocation	Medium	It was reported that the medaka were randomly distributed to test groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The test media preparation was reported in Appendix 3. 2230uL of 1,1–DCE was added to dechlorinated tap water. The volume was brought to 525mL in a 500mL volumetric flask. This was the stock solution preparation. The test concentrations were prepared by diluting the stock solution in dechlorinated stock solution and mixing with a glass stick. The final volume was 5L. The test system was reported to be semi-static with water renewal every 24h. The test chambers were covered, but it was reported that mean measured test concentrations were quite a bit lower than nominal concentrations. It is believed this was due to volatilization of the test substance.
	Metric 8:	Consistency of Exposure Administration	Medium	Test conditions such as water quality, temperature, and photoperiod were consistent across study groups. Measured test concentrations were reported to be quite a bit lower than the nominal concentrations. This was reported to be due to volatilization of the test substance.
	Metric 9:	Measurement of Test Substance Concentration	High	Study authors reported GC-MS was used for analytical methods. Samples were taken at 0, 24, 72, and 96h. Measured concentrations are presented in Table 5, and the 96h LC50 value was reported in terms of mean measured values.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was reported to be 96h, appropriate for fish acute toxicity testing.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	There were 5 exposure levels plus a control. The spacing was appropriate and by a factor of 1.8.
	Metric 12:	Testing at or Below Solubility Limit	High	The test concentrations were below the water solubility limit according to solubility testing done by the performing laboratory.
Domain 4: Test Organism				

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Study Citation:	Mitsubishi Chemical Medience Corporation, (2009). Acute toxicity test on killifish (Oryzias latipes) exposed to 1,1-dichloroethane (translation).
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Oryzias latipes*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,1-Dichloroethane
HERO ID:	11328276

Domain	Metric		Rating	Comments
	Metric 13:	Test Organism Characteristics	High	The medaka used in testing were reported to be cultured in the performing laboratory. Medaka used in the test were reported to be less than 6 months post hatch.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	It was reported that test organisms were acclimated to test conditions from May 11, 2009 to June 8, 2009.
	Metric 15:	Number of Organisms and Replicates per Group	Low	There were 10 test organisms per test concentration. There were no replicate vessels per test concentration.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	The medaka were reported to be fed Tetramin at approximately 2% of their body weight a day. They were not fed for the duration of the study. They were kept at 24C with a photoperiod of 16L:8D. Water quality was presented in Tables 1-4 and in Appendix 2.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest–mortality in the form of the 96h LC50 value.
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups. Fish were assessed at 3, 24, 48, 72, and 96h for mortality by gently touching the tail peduncle and observing for movement.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	High	It was reported in section 3.1 that there were no environmental factors that may have affected the reliability of the test results.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Methods for calculating the 96h LC50 value were reported in section 2.2.1. In the case of this data, the value would have been determined by the concentration area.
	Metric 22:	Reporting of Data	High	Control and exposure responses are reported in Table 6 and were appropriate for the outcome of interest.
	Metric 23:	Explanation of Unexpected Outcomes	High	Study authors did not report any unexpected outcomes.

Additional Comments: This evaluation was for the definitive acute toxicity test of 1,1-dichloroethane on Japanese medaka. The outcome of interest was mortality. It was reported in terms of the 96h LC50 value, which was >112mg/L.

Overall Quality Determination High

Study Citation:	Mitsubishi Chemical Medience Corporation, (2009). Acute toxicity test on killifish (Oryzias latipes) exposed to 1,1-dichloroethane (translation).
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Taxa, Species, Age:	Vertebrate; Fish; *Oryzias latipes*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Behavioral
Chemical:	1,1-Dichloroethane
HERO ID:	11328276

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The 1,1-dichloroethane was identified by CASRN.
	Metric 2:	Test Substance Source	High	IR spectrum obtained at start and conclusion of test, shown in Appendix Figure A-1-1.
	Metric 3:	Test Substance Purity	High	The purity was reported to be 99.8%
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported the use of a concurrent negative control in which dechlorinated tap water only was used.
	Metric 5:	Negative Control Response	High	The negative control response was reported in Table 6 and was adequate for the outcomes of interest.
	Metric 6:	Randomized Allocation	Medium	It was reported that the medaka were randomly distributed to test groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The test media preparation was reported in Appendix 3. 2230uL of 1,1–DCE was added to dechlorinated tap water. The volume was brought to 525mL in a 500mL volumetric flask. This was the stock solution preparation. The test concentrations were prepared by diluting the stock solution in dechlorinated stock solution and mixing with a glass stick. The final volume was 5L. The test system was reported to be semi-static with water renewal every 24h. The test chambers were covered, but it was reported that mean measured test concentrations were quite a bit lower than nominal concentrations. It is believed this was due to volatilization of the test substance.
	Metric 8:	Consistency of Exposure Administration	Medium	Test conditions such as water quality, temperature, and photoperiod were consistent across study groups. Measured test concentrations were reported to be quite a bit lower than the nominal concentrations. This was reported to be due to volatilization of the test substance.
	Metric 9:	Measurement of Test Substance Concentration	High	Study authors reported GC-MS was used for analytical methods. Samples were taken at 0, 24, 72, and 96h. Measured concentrations are presented in Table 5, and the 96h LC50 value was reported in terms of mean measured values.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was reported to be 96h, appropriate for fish acute toxicity testing.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	There were 5 exposure levels plus a control. The spacing was appropriate and by a factor of 1.8.
	Metric 12:	Testing at or Below Solubility Limit	High	The test concentrations were below the water solubility limit according to solubility testing done by the performing laboratory.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The medaka used in testing were reported to be cultured in the performing laboratory. Medaka used in the test were reported to be less than 6 months post hatch.

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Taxa, Species, Age:	Vertebrate; Fish; *Oryzias latipes*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Behavioral
Chemical:	1,1-Dichloroethane
HERO ID:	11328276

Domain	Metric		Rating	Comments
	Metric 14:	Acclimatization and Pretreatment Conditions	High	It was reported that test organisms were acclimated to test conditions from May 11, 2009 to June 8, 2009.
	Metric 15:	Number of Organisms and Replicates per Group	Low	There were 10 test organisms per test concentration. There were no replicate vessels per test concentration.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	The medaka were reported to be fed Tetramin at approximately 2% of their body weight a day. They were not fed for the duration of the study. They were kept at 24C with a photoperiod of 16L:8D. Water quality was presented in Tables 1-4 and in Appendix 2.
	Metric 17:	Outcome Assessment Methodology	Medium	The outcome assessment methodology did not specify length of time of observation or how the behavior was tracked.
	Metric 18:	Consistency of Outcome Assessment	Medium	Fish were assessed at 3, 24, 48, 72, and 96h for abnormal swimming behavior and respiration, however details of observation periods not described.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	High	It was reported in section 3.1 that there were no environmental factors that may have affected the reliability of the test results.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Behavioral outcomes were reported in Table 6. The number of test organisms exhibiting abnormal swimming were noted here. It may be possible to conduct statistical analysis based off these numbers, but none was reported for the behavioral outcome.
	Metric 22:	Reporting of Data	Medium	The type(s) of abnormal swimming observed was not described in the text. Control and exposure responses are reported in Table 6 and were appropriate for the outcome of interest.
	Metric 23:	Explanation of Unexpected Outcomes	High	Study authors did not report any unexpected outcomes.

Additional Comments: This evaluation was for the definitive acute toxicity test of 1,1-dichloroethane on Japanese medaka. The outcome reported in this form was behavior. The medaka were observed for abnormalities in their swimming behavior and respiration behavior. These were recorded in Table 6 by indicating the number of fish exhibiting abnormal behavior.

Overall Quality Determination — High

Study Citation:	Mitsubishi Chemical Medience Corporation, (2009). Acute toxicity test on killifish (Oryzias latipes) exposed to 1,1-dichloroethane (translation).
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Oryzias latipes*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,1-Dichloroethane
HERO ID:	11328276

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The 1,1-dichloroethane was identified by CASRN.
	Metric 2:	Test Substance Source	High	IR spectrum obtained at start and conclusion of test, shown in Appendix Figure A-1-1.
	Metric 3:	Test Substance Purity	High	The purity was reported to be 99.8%
Domain 2: Test Design				
	Metric 4:	Negative Controls	Uninformative	The preliminary test did not report the use of a negative control.
	Metric 5:	Negative Control Response	Uninformative	Negative control results were not reported because study authors did not report using a negative control in the preliminary test.
	Metric 6:	Randomized Allocation	Low	It was not reported how the fish were allocated in the preliminary test.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	The test system and conditions were not described in detail for the preliminary test.
	Metric 8:	Consistency of Exposure Administration	Low	The test conditions for the preliminary study were not reported in detail, so consistency is uncertain.
	Metric 9:	Measurement of Test Substance Concentration	High	Measured concentrations for preliminary tests are shown in Table in Section 2.1.2.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was reported to be 96h, appropriate for fish acute toxicity testing.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Medium	There were 3 exposure groups in the original preliminary test and then 1 in an additional preliminary test. This is lower than is typical, but appropriate for a preliminary study. Spacing was appropriate for a preliminary test.
	Metric 12:	Testing at or Below Solubility Limit	High	The test concentrations were below the water solubility limit according to solubility testing done by the performing laboratory.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The medaka used in testing were reported to be cultured in the performing laboratory. Medaka used in the test were reported to be less than 6 months post hatch.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	It was reported that test organisms were acclimated to test conditions from May 11, 2009 to June 8, 2009.
	Metric 15:	Number of Organisms and Replicates per Group	Low	There were 5 test organisms per test concentration. There were no replicates. This is a lower number than is typical.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Medium	Presumedly fish in preliminary experiments followed the same housing experiments as fish in the definitive experiment, water quality parameters not reported for preliminary experiments.

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Study Citation:	Mitsubishi Chemical Medience Corporation, (2009). Acute toxicity test on killifish (Oryzias latipes) exposed to 1,1-dichloroethane (translation).
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Oryzias latipes*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,1-Dichloroethane
HERO ID:	11328276

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest–mortality in the form of the 96h LC50 value.
	Metric 18:	Consistency of Outcome Assessment	Low	Details of the outcome assessment were limited for the preliminary study. Only 96h mortality was reported. It was unclear if this was observed a different time points in the test period.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Mortality percentages are presented in section 2.1.2. There were 5 fish per test group, so it may be possible to conduct independent statistical analysis, but none was reported for the preliminary study.
	Metric 22:	Reporting of Data	Low	Data for the exposure response was reported in section 2.1.2. However, the control response was not reported.
	Metric 23:	Explanation of Unexpected Outcomes	High	Study authors did not report any unexpected outcomes.

Additional Comments: This evaluation was for the preliminary acute toxicity test of 1,1-dichloroethane on Japanese medaka. The outcome of interest was mortality. Results for this are reported in section 2.1.2 as percent mortality. This evaluation received an unacceptable rating due to the lack of a concurrent negative control.

Overall Quality Determination Uninformative

Study Citation:	Könemann, H. (1981). Quantitative structure-activity relationships in fish toxicity studies. Part 1: Relationship for 50 industrial pollutants. Toxicology 19(3):209-221.
Duration:	Overall Duration: 4 - 10 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Poecilia reticulata*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,1-Dichloroethane
HERO ID:	3684127

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	The test substance was identified by name only.
	Metric 2:	Test Substance Source	Low	The test substance source was not reported nor was the test substance analytically verified.
	Metric 3:	Test Substance Purity	Low	The purity and grade were not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Uninformative	A concurrent negative control group was not included or reported.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control groups was not reported.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how the organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Medium	Alabaster and Abram were cited for water preparation. Glass covers were placed over test vessels with daily renewals. Details were fairly limited otherwise.
	Metric 8:	Consistency of Exposure Administration	Medium	There were 7 day exposures with a geometrical progression ratio of 3.2. There was no mention of irregularities in the exposure administration.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured or measurements were not reported.
	Metric 10:	Exposure Duration and Frequency	High	The duration of the exposure was reported and suitable for the study type–7 day exposure
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Uninformative	Concentrations were reported to have a geometrical progression with a ration of 3.2. The number of concentrations was not reported nor was the concentration of each treatment.
	Metric 12:	Testing at or Below Solubility Limit	Low	Reporting omissions prevented determination of whether exposure concentrations exceeded the water solubility limit, but a solvent was used to aid in solubility.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	The test organisms were adequately described, but there was no mention of the source of the organisms.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized or whether pretreatment conditions were the same for control and exposed groups
	Metric 15:	Number of Organisms and Replicates per Group	Low	Only eight guppies were tested in each concentration. There was no mention of replicates.
Domain 5: Outcome Assessment				

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Study Citation:	Könemann, H. (1981). Quantitative structure-activity relationships in fish toxicity studies. Part 1: Relationship for 50 industrial pollutants. Toxicology 19(3):209-221.
Duration:	Overall Duration: 4 - 10 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Poecilia reticulata*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,1-Dichloroethane
HERO ID:	3684127

Domain	Metric		Rating	Comments
	Metric 16:	Adequacy of Test Conditions	Medium	Food, water, temperature, and D.O. were adequately described. The loading rate was not described.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome (mortality).
	Metric 18:	Consistency of Outcome Assessment	Medium	The study duration was 7 days, and the fish were checked for mortalities. Fish were determined to be dead if there was no gill movement when prodded. It was unclear as to how often the fish were assessed. Was it every 24hr? Or was it just at the end of the exposure?
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	LC50 calculations were determined by using methods citing Litchfield and Wilcoxon or by log/probit-plot if the concentration effect relationships were too steep. QSAR calculations were demonstrated in the paper.
	Metric 22:	Reporting of Data	Medium	Data in the form of LC50s was reported, but there was no mention of control performance.
	Metric 23:	Explanation of Unexpected Outcomes	Low	The study did not report any measures of variability.

Additional Comments: A concurrent negative control was not included or reported. The number of exposure concentrations and spacing of levels were not provided. Only LC 50 values (without confidence limits) were reported.

Overall Quality Determination Uninformative

Study Citation:	K, L.E., Mckinnon, M.B., Stendahl, D.H., Pett, W.B. (1995). Response threshold levels of selected organic compounds for rainbow trout (Oncorhynchus mykiss). Environmental Toxicology and Chemistry 14(12):2107-2113.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Rainbow Trout (Oncorhynchus Mykiss)*; Juvenile
Health Outcome:	Behavioral
Chemical:	1,1-Dichloroethane
HERO ID:	4840530

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified using proper IUPAC nomenclature as 1,1-Dichloroethane.
	Metric 2:	Test Substance Source	Low	No information was provided regarding the source of the chemicals used in the study, and the test substance identity was not analytically verified.
	Metric 3:	Test Substance Purity	Low	The purity and grade were not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Water was reported as a control. Two concentrations of a solvent control (methanol) were also used. The study authors indicated that, "Because of the natural biological variance between fish, each of the test fish was used as its own control. For 1 h prior to exposure and for 1 h during exposure, the average amplitude and frequency, measured as an average in 1-min intervals, were calculated for the three test fish."
	Metric 5:	Negative Control Response	High	Water control response was nominal.
	Metric 6:	Randomized Allocation	Medium	It was not entirely clear, but the study authors reported "For 1 h prior to exposure and for 1 h during exposure, the average amplitude and frequency, measured as an average in 1-min intervals, were calculated for the three test fish. A two-tail t test, 01 = 0.05, was used to evaluate any difference in the means of frequency and amplitude prior to and during exposure."
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	"The tank was filled in steps of approximately 20 L by diverting part of the biosensor unit supply water to it. Water entered the tank through a fixed stainless steel tube extended to the bottom. This allowed the tank to fill without disturbing the surface of the water. After each addition of stock solution, the water was manually mixed by a smooth repeated up-down movement with a stainless steel plunger of approximately 10-cm diameter. Care was given not to extend the plunger beyond the surface of the water while mixing to minimize any volatilization of the contaminant. When filled to capacity, the stainless steel tank was immediately sealed with a stainless steel lid, allowing only a minimal air layer above the water in the tank."

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Study Citation:	K, L.E., Mckinnon, M.B., Stendahl, D.H., Pett, W.B. (1995). Response threshold levels of selected organic compounds for rainbow trout (Oncorhynchus mykiss). Environmental Toxicology and Chemistry 14(12):2107-2113.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Rainbow Trout (Oncorhynchus Mykiss)*; Juvenile
Health Outcome:	Behavioral
Chemical:	1,1-Dichloroethane
HERO ID:	4840530

Domain	Metric		Rating	Comments
	Metric 8:	Consistency of Exposure Administration	High	”At the start of an experiment, the water normally flowing through the upper set of the four test cells in the biosensor unit (250 to 300 ml/min for each cell) was diverted with a three-way valve to flow into the bottom of the stainless steel tank. The in-flowing water entered the bottom of the tank and displaced an equal volume of the test solution through an outlet at the top of the tank. The test water was routed to the biosensor unit via Teflon@ tubing. At the slow filling/exchange rate of 1 .O to 1.2 L/min for the tank, any vertical mixing of the incoming clean water with the overlying solution was expected to be minimal. This was confirmed with a separate test using 500 pg/L of 2,4-dichlorophenol, where the observed effects lasted for very close to 1 h and disappeared quickly thereafter.”
	Metric 9:	Measurement of Test Substance Concentration	Medium	It was not reported if the test substance was measured; however, care was taken to minimalize loss to volatilization – ”After each addition of stock solution, the water was manually mixed by a smooth repeated up-down movement with a stainless steel plunger of approximately 10-cm diameter. Care was given not to extend the plunger beyond the surface of the water while mixing to minimize any volatilization of the contaminant. When filled to capacity, the stainless steel tank was immediately sealed with a stainless steel lid, allowing only a minimal air layer above the water in the tank.”
	Metric 10:	Exposure Duration and Frequency	High	”Fish were normally placed into the biosensor cells at least 12 h before beginning an experiment. The fish displayed little signs of stress and usually settled down after transfer from the aquarium in less than 1 h, beginning to ventilate and swim in a regular and steady fashion. Review of the electrical signals recorded together with video recordings of the same tests, taken under low-level red light, confirmed the interpretation of most of the signals from the strip charts, such as coughing, positioning perpendicular to the water current, turning, rapid and hectic movement about the cell, and facing downstream. In most experiments where a stress response was noted, the fish when exposed to clean water calmed down and returned to a normal behavior within 2 h or less afterending the exposure.”
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	N/A	The objective was to evaluate fish response thresholds after 1,1-DCA.
	Metric 12:	Testing at or Below Solubility Limit	Low	No information was reported regarding the solubility of the chemical.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	The only information that was reported was, ”Rainbow trout fingerlings of approximately 4 cm in length (weight 2 to 4 g) were purchased from a local southern Ontario fish hatchery and were held in an aquarium for several days prior to testing.”

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Study Citation:	K, L.E., Mckinnon, M.B., Stendahl, D.H., Pett, W.B. (1995). Response threshold levels of selected organic compounds for rainbow trout (Oncorhynchus mykiss). Environmental Toxicology and Chemistry 14(12):2107-2113.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Rainbow Trout (Oncorhynchus Mykiss)*; Juvenile
Health Outcome:	Behavioral
Chemical:	1,1-Dichloroethane
HERO ID:	4840530

Domain	Metric		Rating	Comments
	Metric 14:	Acclimatization and Pretreatment Conditions	High	"Fish were normally placed into the biosensor cells at least 12 h before beginning an experiment. The fish displayed little signs of stress and usually settled down after transfer from the aquarium in less than 1 h, beginning to ventilate and swim in a regular and steady fashion. Review of the electrical signals recorded together with video recordings of the same tests, taken under low-level red light, confirmed the interpretation of most of the signals from the strip charts, such as coughing, positioning perpendicular to the water current, turning, rapid and hectic movement about the cell, and facing downstream. In most experiments where a stress response was noted, the fish when exposed to clean water calmed down and returned to a normal behavior within 2 h or less after ending the exposure."
	Metric 15:	Number of Organisms and Replicates per Group	Low	It was not entirely clear how many fish were studied per treatment. Each fish served as its own control. The study authors reported, "The testing unit used was the Bio-Sensor@, model 6008A, electronic biomonitoring unit (Biomonitoring Inc., Blacksburg, VA), which contains a total of eight fish-monitoring chambers or cells with a volume of 250 ml water each. Of these, four cells were used for routine water quality monitoring of the water authority's raw water supply, and three cells were used simultaneously for the experiments (one cell was inoperative). Each cell contained one fish that was individually monitored by electronic capture of the ventilation amplitude and frequency, averaged over 1-min periods, by recording visual observations, by video recording, and by strip-chart recording of the computer-enhanced electrical signals from the cell electrodes."
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Testing conditions were adequate.
	Metric 17:	Outcome Assessment Methodology	High	Behavior responses to 1,1-DCA were determined.
	Metric 18:	Consistency of Outcome Assessment	High	No inconsistencies were identified.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	No confounding variables were identified.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There were no outcomes unrelated to the exposure identified by the study authors.
Domain 7: Data Presentation and Analysis				

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Study Citation:	K, L.E., Mckinnon, M.B., Stendahl, D.H., Pett, W.B. (1995). Response threshold levels of selected organic compounds for rainbow trout (Oncorhynchus mykiss). Environmental Toxicology and Chemistry 14(12):2107-2113.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Rainbow Trout (Oncorhynchus Mykiss)*; Juvenile
Health Outcome:	Behavioral
Chemical:	1,1-Dichloroethane
HERO ID:	4840530

Domain	Metric		Rating	Comments
	Metric 21:	Statistical Methods	High	"Because of the natural biological variance between fish, each of the test fish was used as its own control. For 1 h prior to exposure and for 1 h during exposure, the average amplitude and frequency, measured as an average in 1-min intervals, were calculated for the three test fish. A two-tail t test, 01 = 0.05, was used to evaluate any difference in the means of frequency and amplitude prior to and during exposure."
	Metric 22:	Reporting of Data	High	Data were reported for 1,1-DCA at one test concentration.
	Metric 23:	Explanation of Unexpected Outcomes	High	No unexpected outcomes were identified.

Additional Comments: None

Overall Quality Determination High

Study Citation:	K, L.E., Mckinnon, M.B., Stendahl, D.H., Pett, W.B. (1995). Response threshold levels of selected organic compounds for rainbow trout (Oncorhynchus mykiss). Environmental Toxicology and Chemistry 14(12):2107-2113.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Rainbow Trout (Oncorhynchus Mykiss)*; Juvenile
Health Outcome:	Respiratory
Chemical:	1,1-Dichloroethane
HERO ID:	4840530

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified using proper IUPAC nomenclature as 1,1-Dichloroethane.
	Metric 2:	Test Substance Source	Low	No information was provided regarding the source of the chemicals used in the study, and the test substance identity was not analytically verified.
	Metric 3:	Test Substance Purity	Low	The purity and grade were not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Methanol, carrier solvent, was used as a control (results shown in figure 1 – "Recorded response traces of four representative I-min time slices for the exposure of rainbow trout to 4,000 pg/L methanol. The rhythmic ventilation was sustained for 60 min, indicating no response to the methanol."
	Metric 5:	Negative Control Response	High	Normal ventilation sustained in response to methanol exposure – "Figure 1 shows examples of four 1-min time slices of a 1-h test run with a methanol (solvent carrier) control at 4,000 pg/L. There was no response by the fish; both ventilatory frequency and amplitude remained normal over the 1-h period."
	Metric 6:	Randomized Allocation	Medium	Not entirely clear but the study authors reported "For 1 h prior to exposure and for 1 h during exposure, the average amplitude and frequency, measured as an average in 1-min intervals, were calculated for the three test fish. A two-tail t test, 01 = 0.05, was used to evaluate any difference in the means of frequency and amplitude prior to and during exposure."
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	"The tank was filled in steps of approximately 20 L by diverting part of the biosensor unit supply water to it. Water entered the tank through a fixed stainless steel tube extended to the bottom. This allowed the tank to fill without disturbing the surface of the water. After each addition of stock solution, the water was manually mixed by a smooth repeated up-down movement with a stainless steel plunger of approximately 10-cm diameter. Care was given not to extend the plunger beyond the surface of the water while mixing to minimize any volatilization of the contaminant. When filled to capacity, the stainless steel tank was immediately sealed with a stainless steel lid, allowing only a minimal air layer above the water in the tank."

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Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Rainbow Trout (Oncorhynchus Mykiss)*; Juvenile
Health Outcome:	Respiratory
Chemical:	1,1-Dichloroethane
HERO ID:	4840530

Domain	Metric		Rating	Comments
	Metric 8:	Consistency of Exposure Administration	High	”At the start of an experiment, the water normally flowing through the upper set of the four test cells in the biosensor unit (250 to 300 ml/min for each cell) was diverted with a three-way valve to flow into the bottom of the stainless steel tank. The in-flowing water entered the bottom of the tank and displaced an equal volume of the test solution through an outlet at the top of the tank. The test water was routed to the biosensor unit via Teflon@ tubing. At the slow filling/exchange rate of 1 .O to 1.2 L/min for the tank, any vertical mixing of the incoming clean water with the overlying solution was expected to be minimal. This was confirmed with a separate test using 500 pg/L of 2,4-dichlorophenol, where the observed effects lasted for very close to 1 h and disappeared quickly thereafter.”
	Metric 9:	Measurement of Test Substance Concentration	Medium	It was not reported if the test substance was measured; however, care was taken to minimalize loss to volatilization – ”After each addition of stock solution, the water was manually mixed by a smooth repeated up-down movement with a stainless steel plunger of approximately 10-cm diameter. Care was given not to extend the plunger beyond the surface of the water while mixing to minimize any volatilization of the contaminant. When filled to capacity, the stainless steel tank was immediately sealed with a stainless steel lid, allowing only a minimal air layer above the water in the tank.”
	Metric 10:	Exposure Duration and Frequency	High	”Fish were normally placed into the biosensor cells at least 12 h before beginning an experiment. The fish displayed little signs of stress and usually settled down after transfer from the aquarium in less than 1 h, beginning to ventilate and swim in a regular and steady fashion. Review of the electrical signals recorded together with video recordings of the same tests, taken under low-level red light, confirmed the interpretation of most of the signals from the strip charts, such as coughing, positioning perpendicular to the water current, turning, rapid and hectic movement about the cell, and facing downstream. In most experiments where a stress response was noted, the fish when exposed to clean water calmed down and returned to a normal behavior within 2 h or less afterending the exposure.”
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	N/A	The objective was to evaluate fish response thresholds after low-dose 1,1-DCA exposure; only one dose was tested.
	Metric 12:	Testing at or Below Solubility Limit	Low	No information was reported regarding the solubility of the chemical.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	The only information that was reported was, ”Rainbow trout fingerlings of approximately 4 cm in length (weight 2 to 4 g) were purchased from a local southern Ontario fish hatchery and were held in an aquarium for several days prior to testing.”

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Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Rainbow Trout (Oncorhynchus Mykiss)*; Juvenile
Health Outcome:	Respiratory
Chemical:	1,1-Dichloroethane
HERO ID:	4840530

Domain	Metric		Rating	Comments
	Metric 14:	Acclimatization and Pretreatment Conditions	High	"Fish were normally placed into the biosensor cells at least 12 h before beginning an experiment. The fish displayed little signs of stress and usually settled down after transfer from the aquarium in less than 1 h, beginning to ventilate and swim in a regular and steady fashion. Review of the electrical signals recorded together with video recordings of the same tests, taken under low-level red light, confirmed the interpretation of most of the signals from the strip charts, such as coughing, positioning perpendicular to the water current, turning, rapid and hectic movement about the cell, and facing downstream. In most experiments where a stress response was noted, the fish when exposed to clean water calmed down and returned to a normal behavior within 2 h or less after ending the exposure."
	Metric 15:	Number of Organisms and Replicates per Group	Low	It was not entirely clear how many fish were studied per treatment. Each fish served as its own control. The study authors reported, "The testing unit used was the BioSensor@, model 6008A, electronic biomonitoring unit (Biomonitoring Inc., Blacksburg, VA), which contains a total of eight fish-monitoring chambers or cells with a volume of 250 ml water each. Of these, four cells were used for routine water quality monitoring of the water authority's raw water supply, and three cells were used simultaneously for the experiments (one cell was inoperative). Each cell contained one fish that was individually monitored by electronic capture of the ventilation amplitude and frequency, averaged over 1-min periods, by recording visual observations, by video recording, and by strip-chart recording of the computer-enhanced electrical signals from the cell electrodes."
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Testing conditions were adequate.
	Metric 17:	Outcome Assessment Methodology	Medium	Ventilation response is described graphically in figures, and numerically in tables. Coughing response is only described qualitatively in text.
	Metric 18:	Consistency of Outcome Assessment	High	No inconsistencies were identified.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	No confounding variables were identified.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	No differences unrelated to the exposure were identified by study authors.
Domain 7: Data Presentation and Analysis				

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Study Citation:	K, L.E., Mckinnon, M.B., Stendahl, D.H., Pett, W.B. (1995). Response threshold levels of selected organic compounds for rainbow trout (Oncorhynchus mykiss). Environmental Toxicology and Chemistry 14(12):2107-2113.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Rainbow Trout (Oncorhynchus Mykiss)*; Juvenile
Health Outcome:	Respiratory
Chemical:	1,1-Dichloroethane
HERO ID:	4840530

Domain	Metric		Rating	Comments
	Metric 21:	Statistical Methods	High	"Because of the natural biological variance between fish, each of the test fish was used as its own control. For 1 h prior to exposure and for 1 h during exposure, the average amplitude and frequency, measured as an average in 1-min intervals, were calculated for the three test fish. A two-tail t test, 01 = 0.05, was used to evaluate any difference in the means of frequency and amplitude prior to and during exposure."
	Metric 22:	Reporting of Data	Medium	Data were reported for 1,1-DCA at one test concentration, only for the ventilation results. Increased coughing was reported in the text.
	Metric 23:	Explanation of Unexpected Outcomes	High	No unexpected outcomes were identified.

Additional Comments: None

Overall Quality Determination High

Study Citation:	Mitsubishi Chemical Medience Corporation, (2009). Acute immobilization test on Daphnia magna exposed to 1,1-dichloroethane (translation).
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Immobilization
Chemical:	1,1-Dichloroethane
HERO ID:	11328280

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified as 1,1-dichloroethane by name, CASRN, and structural formula.
	Metric 2:	Test Substance Source	Low	The source of the test substance was redacted, and it did not appear as though it was analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	The purity of the 1,1-DCA was reported to be 99.8%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported the use of a concurrent negative control in which only water was used.
	Metric 5:	Negative Control Response	High	The negative control response was reported in the table in section 2.1.2 and was appropriate for the outcome of interest.
	Metric 6:	Randomized Allocation	Low	It was not reported how the daphnia were allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Uninformative	Preparation of the test substance was not reported for the preliminary study. It was not reported if test concentrations were measured at any point for the preliminary study.
	Metric 8:	Consistency of Exposure Administration	Low	It was reported that there was some volatilization of the the test substance over time as the test progressed in the definitive test. Measured concentrations for the preliminary test were not reported, so this creates concerns about exposure consistency.
	Metric 9:	Measurement of Test Substance Concentration	Low	Analytical measurement of concentrations was not reported for the preliminary study.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was reported to be 48h. This is typical of an acute toxicity test with daphnids.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Medium	There were four exposure groups for the preliminary study. There was a 10x spacing between groups, resulting in 100% immobilization at the highest concentration tested, and 0% immobilization at all lower levels. However, this still provided enough information to select appropriate levels for the definitive test.
	Metric 12:	Testing at or Below Solubility Limit	High	The test concentrations were all below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The Daphnia magna colony were originally obtained from the National Institute for Environmental Studies, Environmental Agency in July of 1995. The colony was subsequently maintained at the performing laboratory. <24h old females were used for the study initiation.

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Study Citation:	Mitsubishi Chemical Medience Corporation, (2009). Acute immobilization test on Daphnia magna exposed to 1,1-dichloroethane (translation).
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Immobilization
Chemical:	1,1-Dichloroethane
HERO ID:	11328280

Domain	Metric		Rating	Comments
	Metric 14:	Acclimatization and Pretreatment Conditions	High	Organisms were cultured in-house and were kept in similar conditions to the testing conditions.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	It was reported there were 10 organisms per test group. There were 2 replicates with 5 daphnia each for each test concentration. This was adequate for a preliminary test.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	During culture, the daphnia were kept at 20C with a 16L:8D photoperiod and they were fed Chlorella vulgaris daily. They were cultured in 2L glass beakers with 1 organism per 80mL. They were reared and tested in Elendt M4 medium, and the characteristics of the medium are described in Appendix 2. Test conditions described in the Test Methods section (2.1) are appropriate.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest–immobilization of D. magna due to 1,1-DCA exposure.
	Metric 18:	Consistency of Outcome Assessment	Low	It is unclear if the outcome assessment reported for the definitive test was the same used for the preliminary test. Observations were conducted every 24h for the definitive test. Only 48h immobilization is reported for the preliminary test.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	Environmental conditions for each study group were not reported for the preliminary test.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure in the preliminary test.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	This was a preliminary range finding test. Results were reported in section 2.1.2. Statistical analysis was not reported for the preliminary test, but it may be possible with the available data. Preliminary test results are presented in the form of percentages, but the total number of organisms for each test concentration is known.
	Metric 22:	Reporting of Data	High	Exposure and control responses were reported in section 2.1.2 and were appropriate for a preliminary test.
	Metric 23:	Explanation of Unexpected Outcomes	High	Study authors did not report any unexpected outcomes.

Additional Comments: This evaluation is for the preliminary test for the acute toxicity of 1,1-dichloroethane to Daphnia magna. The preliminary test was conducted for 48h, and the results are presented in the table in section 2.1.2.

Overall Quality Determination — Uninformative

Study Citation:	Mitsubishi Chemical Medience Corporation, (2009). Acute immobilization test on Daphnia magna exposed to 1,1-dichloroethane (translation).
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Immobilization
Chemical:	1,1-Dichloroethane
HERO ID:	11328280

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified as 1,1-dichloroethane by name, CASRN, and structural formula.
	Metric 2:	Test Substance Source	Low	The source of the test substance was redacted, and it did not appear as though it was analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	The purity of the 1,1-DCA was reported to be 99.8%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported the use of a concurrent negative control in which only water was used.
	Metric 5:	Negative Control Response	High	The negative control response was reported in the text and in Table 6 and was appropriate for the study.
	Metric 6:	Randomized Allocation	Low	It was not reported how the daphnia were allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Medium	The preparation of the test substance was reported in Appendix 3. The stock solution was prepared with 275mg of test substance mixed to 50mL in a volumetric flask with the material water. It was mixed with an ultrasonic mixer for 1 minute and prepared 24h prior to the start of the exposure. To achieve the correct concentration for each test level, the appropriate amounts of stock solution were added to the material water to reach a final volume of 1.1L. Study authors reported covering test vessels with Teflon sheets, but it was reported that mean measured values in all concentration groups were lower than nominal. It was reported that the concentrations decreased over time, indicating volatilization. The test vessel material was glass.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	It was reported that analytical measurements were conducted using GC-MS. Samples were taken at the time of test solution preparation, prior to water change, and at the end of the exposure.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was reported to be 48h. This is typical of an acute toxicity test with daphnids.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	There were five exposure groups, and the spacing was adequate to observe a dose response.
	Metric 12:	Testing at or Below Solubility Limit	High	The test concentrations were all below the water solubility limit.
Domain 4: Test Organism				

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Study Citation:	Mitsubishi Chemical Medience Corporation, (2009). Acute immobilization test on Daphnia magna exposed to 1,1-dichloroethane (translation).
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Immobilization
Chemical:	1,1-Dichloroethane
HERO ID:	11328280

Domain	Metric		Rating	Comments
	Metric 13:	Test Organism Characteristics	High	The Daphnia magna colony were originally obtained from the National Institute for Environmental Studies, Environmental Agency in July of 1995. The colony was subsequently maintained at the performing laboratory. <24h old females were used for the study initiation.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	Organisms were cultured in-house and were kept in similar conditions to the testing conditions.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	It was reported there were 20 organisms per test group. There were 4 replicates with 5 daphnia each for each test concentration.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	The daphnia were kept at 20C with a 16L:8D photoperiod. During culture, they were fed Chlorella vulgaris daily. They were not fed during the testing period. They were cultured in 2L glass beakers with 1 organism per 80mL. They were reared and tested in Elendt M4 medium, and the characteristics of the medium are described in Appendix 2. During exposure, they were housed in 100 mL glass beakers with 1 organism per 20 mL.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest–immobilization of D. magna due to 1,1-DCA exposure.
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups. The D. magna were assessed for immobilization every 24h. They were deemed immobilized if they were unable to move for 15s after the test vessel was gently moved.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	High	Study authors reported in section 3.1 that there were no environmental factors that may have affected the reliability of the test results.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Study authors reported probit analysis was used to determine EC50 values for each time period in the text and Table 7.
	Metric 22:	Reporting of Data	High	Exposure and control responses were reported in Table 6 and were appropriate for the outcome of interest. EC50 values were reported in Table 7. EC0 and EC100 values were reported in Table 8. Figure 1 provides the concentration-immobility response curve.
	Metric 23:	Explanation of Unexpected Outcomes	High	Study authors did not report any unexpected outcomes.

Additional Comments: This evaluation is for the definitive acute toxicity test using 1,1-dichloroethane. This was a 48h exposure using Daphnia magna. EC50 immobilization values for 24h and 48h were obtained. EC0 and EC100 immobilization values were also reported.

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Study Citation:	Mitsubishi Chemical Medience Corporation, (2009). Acute immobilization test on Daphnia magna exposed to 1,1-dichloroethane (translation).
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Immobilization
Chemical:	1,1-Dichloroethane
HERO ID:	11328280

Domain	Metric	Rating	Comments
Overall Quality Determination		**High**	

Study Citation:	Mitsubishi Chemical Medience Corporation, (2009). Reproduction test on Daphnia magna exposed to 1,1-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,1-Dichloroethane
HERO ID:	11328278

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	1,1-DCA was identified by both structural formula and CAS number in the report.
	Metric 2:	Test Substance Source	High	The test substance was analytically verified by Fourier Transform Infrared Spectroscopy before start of test and after conclusion of test.
	Metric 3:	Test Substance Purity	High	The test substance purity was 99.8%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	A control group was included in the test.
	Metric 5:	Negative Control Response	High	Parent Daphnia behavior was normal in the control group.
	Metric 6:	Randomized Allocation	Low	Study authors did not report if test organisms were randomly distributed to test groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	Test conditions were thoroughly described on page 12. Preparation of the test solution was also adequately described on page 13 as well as in Appendix-3.
	Metric 8:	Consistency of Exposure Administration	High	Exposures were administered consistently across test groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Test concentrations were measured throughout the test on days 0, 1, 7, 8, 12, 13, 20, and 21 using GC/MS. Details of the analysis method are shown in Appendix-4.
	Metric 10:	Exposure Duration and Frequency	High	The exposure ran for 21 days, which is appropriate for Daphnia magna reproduction tests. The report stated that the test was conducted in accordance with OECD Guideline 211.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The exposure concentrations used were appropriate and included five concentrations and a control. They were based off a 48-hour acute immobilization test that was conducted.
	Metric 12:	Testing at or Below Solubility Limit	High	Test concentrations were below the solubility limit for 1,1-DCA.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The Daphnia magna used in the test were adequately described in Section 1.3 as female offspring less than 24 hours old. They were obtained from the National Institute for Environmental Studies.
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	Offspring was less than 24 hours old at start of exposure and produced on exposure start date.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	There were 10 Daphnia magna per test concentration (1 organism/vessel). There were 10 vessels per test concentration. This follows the appropriate methods outlined in OECD Guideline 211.

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Study Citation:	Mitsubishi Chemical Medience Corporation, (2009). Reproduction test on Daphnia magna exposed to 1,1-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,1-Dichloroethane
HERO ID:	11328278

Domain	Metric		Rating	Comments
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Water quality conditions were appropriate throughout the test. Temperature, DO, pH, total hardness, and appearance of the test water were all assessed periodically throughout the exposure. These values are shown in Tables 1-5.
	Metric 17:	Outcome Assessment Methodology	High	Behavior of the parent Daphnia was assessed daily. Swimming condition and abnormalities in appearance were assessed.
	Metric 18:	Consistency of Outcome Assessment	High	Behavior was assessed consistently across treatment groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment. There are no limitations that would result in a substantial impact on results.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no mention of differences in organisms among test concentrations that would influence the behavior outcome.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	N/A	The behavior assessment was qualitative. There were only abnormal behaviors observed in the highest concentration. Daphnia in all other test concentrations were normal.
	Metric 22:	Reporting of Data	High	Behavior data for all treatment groups was shown in Appendix-5.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes mentioned that would of affected the test results. Measures of variability were included when possible.

Additional Comments: This evaluation is for the behavioral outcome of the parent Daphnia in the 21-day exposure.

Overall Quality Determination High

Study Citation:	Mitsubishi Chemical Medience Corporation, (2009). Reproduction test on Daphnia magna exposed to 1,1-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,1-Dichloroethane
HERO ID:	11328278

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	1,1-DCA was identified by both structural formula and CAS number in the report.
	Metric 2:	Test Substance Source	High	The test substance was analytically verified by Fourier Transform Infrared Spectroscopy before start of test and after conclusion of test.
	Metric 3:	Test Substance Purity	High	The test substance purity was 99.8%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	A control group was included in the test.
	Metric 5:	Negative Control Response	High	The mean cumulative number of offspring produced per parent Daphnia alive in the control group at the end of the exposure was 60 or more, which meets the validity criteria for the test.
	Metric 6:	Randomized Allocation	Low	Study authors did not report if test organisms were randomly distributed to test groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	Test conditions were thoroughly described on page 12. Preparation of the test solution was also adequately described on page 13 as well as in Appendix-3.
	Metric 8:	Consistency of Exposure Administration	High	Exposures were administered consistently across test groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Test concentrations were measured throughout the test on days 0, 1, 7, 8, 12, 13, 20, and 21 using GC/MS. Details of the analysis method are shown in Appendix-4.
	Metric 10:	Exposure Duration and Frequency	High	The exposure ran for 21 days, which is appropriate for Daphnia magna reproduction tests. The report stated that the test was conducted in accordance with OECD Guideline 211.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The exposure concentrations used were appropriate and included five concentrations and a control. They were based off a 48-hour acute immobilization test that was conducted.
	Metric 12:	Testing at or Below Solubility Limit	High	Test concentrations were below the solubility limit for 1,1-DCA.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The Daphnia magna used in the test were adequately described in Section 1.3 as female offspring less than 24 hours old. They were obtained from the National Institute for Environmental Studies.
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	Offspring was less than 24 hours old at start of exposure and produced on exposure start date.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	There were 10 Daphnia magna per test concentration (1 organism/vessel). There were 10 vessels per test concentration. This follows the appropriate methods outlined in OECD Guideline 211.

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Study Citation:	Mitsubishi Chemical Medience Corporation, (2009). Reproduction test on Daphnia magna exposed to 1,1-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,1-Dichloroethane
HERO ID:	11328278

Domain	Metric		Rating	Comments
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Water quality conditions were appropriate throughout the test. Temperature, DO, pH, total hardness, and appearance of the test water were all assessed periodically throughout the exposure. These values are shown in Tables 1-5.
	Metric 17:	Outcome Assessment Methodology	High	Daily observation from the start of the first offspring included first brood; counting and removal of surviving offspring; checking for and removing dead offspring; aborted eggs; resting eggs; etc. From these results a median effective concentration (EC50) was calculated as the concentration at which the reproduction rate of a test organism is inhibited by 50% during the exposure period. At the end of the exposure, the mean cumulative number of offspring produced per parent Daphnia alive was determined for each test group. This was used to determine the reproduction rate of each test group and the reproductive inhibition rate.
	Metric 18:	Consistency of Outcome Assessment	High	The reproductive endpoints were assessed consistently across treatment groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment. There are no limitations that would result in a substantial impact on results.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no mention of differences in organisms among test concentrations that would influence the reproductive/teratogenic outcome.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	The statistical methods used for assessment of the reproductive endpoints are described on page 16, and they are appropriate to assess these endpoints. Statistical analyzes run and results obtained are shown in Appendix-6.
	Metric 22:	Reporting of Data	High	Section 3 of the report (pages 18-20) gives a general overview of the reproductive endpoint results. Tables 8-10, tables 12-13, and Figure 2 show reproductive endpoint data. Appendix-5 shows the daily observation data for all treatment groups.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes mentioned that would of affected the test results. Measures of variability were reported.

Additional Comments: This evaluation is for the reproductive/teratogenic outcome. A NOEC and LOEC were determined at the end of the exposure taking into account the reproductive inhibition rate and the mortality of the parent Daphnia, by looking at the cumulative number of offspring produced in each test group.

Overall Quality Determination High

Study Citation:	Mitsubishi Chemical Medience Corporation, (2009). Reproduction test on Daphnia magna exposed to 1,1-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,1-Dichloroethane
HERO ID:	11328278

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	1,1-DCA was identified by both structural formula and CAS number in the report.
	Metric 2:	Test Substance Source	High	The test substance was analytically verified by Fourier Transform Infrared Spectroscopy before start of test and after conclusion of test.
	Metric 3:	Test Substance Purity	High	The test substance purity was 99.8%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	A control group was included in the test.
	Metric 5:	Negative Control Response	High	Parent Daphnia size and pigmentation was normal in the control group.
	Metric 6:	Randomized Allocation	Low	Study authors did not report if test organisms were randomly distributed to test groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	Test conditions were thoroughly described on page 12. Preparation of the test solution was also adequately described on page 13 as well as in Appendix-3.
	Metric 8:	Consistency of Exposure Administration	High	Exposures were administered consistently across test groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Test concentrations were measured throughout the test on days 0, 1, 7, 8, 12, 13, 20, and 21 using GC/MS. Details of the analysis method are shown in Appendix-4.
	Metric 10:	Exposure Duration and Frequency	High	The exposure ran for 21 days, which is appropriate for Daphnia magna reproduction tests. The report stated that the test was conducted in accordance with OECD Guideline 211.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The exposure concentrations used were appropriate and included five concentrations and a control. They were based off a 48-hour acute immobilization test that was conducted.
	Metric 12:	Testing at or Below Solubility Limit	High	Test concentrations were below the solubility limit for 1,1-DCA.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The Daphnia magna used in the test were adequately described in Section 1.3 as female offspring less than 24 hours old. They were obtained from the National Institute for Environmental Studies.
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	Offspring was less than 24 hours old at start of exposure and produced on exposure start date.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	There were 10 Daphnia magna per test concentration (1 organism/vessel). There were 10 vessels per test concentration. This follows the appropriate methods outlined in OECD Guideline 211.
Domain 5: Outcome Assessment				

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Study Citation:	Mitsubishi Chemical Medience Corporation, (2009). Reproduction test on Daphnia magna exposed to 1,1-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,1-Dichloroethane
HERO ID:	11328278

Domain	Metric		Rating	Comments
	Metric 16:	Adequacy of Test Conditions	High	Water quality conditions were appropriate throughout the test. Temperature, DO, pH, total hardness, and appearance of the test water were all assessed periodically throughout the exposure. These values are shown in Tables 1-5.
	Metric 17:	Outcome Assessment Methodology	Medium	Size and color of the parent Daphnia were assessed daily. However no measure provided of what determines small vs normal size.
	Metric 18:	Consistency of Outcome Assessment	High	Size and color were assessed consistently across treatment groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment. There are no limitations that would result in a substantial impact on results.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no mention of differences in organisms among test concentrations that would influence the behavior outcome.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	N/A	The size and pigmentation assessment were qualitative.
	Metric 22:	Reporting of Data	High	Size observation and pigment observation for all treatment groups shown in Appendix-5.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes mentioned that would of affected the test results. Measures of variability were included when possible.

Additional Comments: This evaluation is for the size and pigmentation outcome of the parent Daphnia in the 21-day exposure.

Overall Quality Determination High

Study Citation:	Mitsubishi Chemical Medience Corporation, (2009). Reproduction test on Daphnia magna exposed to 1,1-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,1-Dichloroethane
HERO ID:	11328278

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	1,1-DCA was identified by both structural formula and CAS number in the report.
	Metric 2:	Test Substance Source	High	The test substance was analytically verified by Fourier Transform Infrared Spectroscopy before start of test and after conclusion of test.
	Metric 3:	Test Substance Purity	High	The test substance purity was 99.8%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	A control group was included in the test.
	Metric 5:	Negative Control Response	High	The mortality of parent Daphnia in the control group was 10% at the end of the exposure.
	Metric 6:	Randomized Allocation	Low	Study authors did not report if test organisms were randomly distributed to test groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	Test conditions were thoroughly described on page 12. Preparation of the test solution was also adequately described on page 13 as well as in Appendix-3.
	Metric 8:	Consistency of Exposure Administration	High	Exposures were administered consistently across test groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Test concentrations were measured throughout the test on days 0, 1, 7, 8, 12, 13, 20, and 21 using GC/MS. Details of the analysis method are shown in Appendix-4.
	Metric 10:	Exposure Duration and Frequency	High	The exposure ran for 21 days, which is appropriate for Daphnia magna reproduction tests. The report stated that the test was conducted in accordance with OECD Guideline 211.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The exposure concentrations used were appropriate and included five concentrations and a control. They were based off a 48-hour acute immobilization test that was conducted.
	Metric 12:	Testing at or Below Solubility Limit	High	Test concentrations were below the solubility limit for 1,1-DCA.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The Daphnia magna used in the test were adequately described in Section 1.3 as female offspring less than 24 hours old. They were obtained from the National Institute for Environmental Studies.
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	Offspring was less than 24 hours old at start of exposure and produced on exposure start date.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	There were 10 Daphnia magna per test concentration (1 organism/vessel). There were 10 vessels per test concentration. This follows the appropriate methods outlined in OECD Guideline 211.
Domain 5: Outcome Assessment				

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Study Citation:	Mitsubishi Chemical Medience Corporation, (2009). Reproduction test on Daphnia magna exposed to 1,1-dichloroethane (translation).
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,1-Dichloroethane
HERO ID:	11328278

Domain	Metric		Rating	Comments
	Metric 16:	Adequacy of Test Conditions	High	Water quality conditions were appropriate throughout the test. Temperature, DO, pH, total hardness, and appearance of the test water were all assessed periodically throughout the exposure. These values are shown in Tables 1-5.
	Metric 17:	Outcome Assessment Methodology	High	Mortality of the parent Daphnia was assessed daily. This was sufficient to determine an LC50 for the exposure.
	Metric 18:	Consistency of Outcome Assessment	High	Mortality was assessed consistently across treatment groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment. There are no limitations that would result in a substantial impact on results.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no mention of differences in organisms among test concentrations that would influence the mortality outcome.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	The statistical methods used for the mortality assessment and LC50 determination were described on page 15. Probit, moving average, and binomial models were used.
	Metric 22:	Reporting of Data	High	Mortality data was shown for all test groups in Table 7 and Figure 1. The LC50 value for the parent Daphnia can be found in the results table on page 8 and in Table 11.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes mentioned that would of affected the test results. Measures of variability were included when possible.

Additional Comments: This evaluation is for the mortality outcome of the parent Daphnia in the 21-day exposure.

Overall Quality Determination High

Study Citation:	Wu, S., Zhang, H., Yu, X., Qiu, L. (2014). Toxicological responses of Chlorella vulgaris to dichloromethane and dichloroethane. Environmental Engineering Science 31(1):9-17.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Cell Culture Media; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Chlorella vulgaris*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,1-Dichloroethane
HERO ID:	3493045

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	The test substance in this study was stated as ”dichloroethane” and no information regarding specific form, or isomer was provided. No CASRN or any other identifying information was reported. Therefore, I am unable to confirm exact form used for exposure (e.g., 1,2-Dichloroethane vs. 1,1-Dichloroethane).
	Metric 2:	Test Substance Source	Low	No information regarding test substance source was reported for this study.
	Metric 3:	Test Substance Purity	Low	No information regarding test substance purity and/or grade was reported for this study.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Appropriate negative controls containing no pollutant were included in each experiment. Negative controls and treated cultures were grown under the same temperature, photoperiod, and rate of agitation as the stock cultures.
	Metric 5:	Negative Control Response	High	Measured biological responses from negative control cells were adequate. There are no limitations that would result in a substantial impact on results.
	Metric 6:	Randomized Allocation	Low	This study was an algal study in which aliquots of medium containing green algal cells were distributed into flasks. Following guidance, this algal study was reported as ”Low”.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	Study conducts exposure to VOC and did not report information regarding the capping of flask. No measurements of exposure media were reported, and no details on exposure renewal or static nature of exposures were provided.
	Metric 8:	Consistency of Exposure Administration	Low	Details of the exposure administration were not reported.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured. Based on professional judgment, actual concentrations cannot be expected to be similar to nominal concentrations due to compound volatility and the lack of experimental details regarding capping of exposure flasks.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure was appropriate for the study type (algal toxicity test, 96-h, OPPTS 850.5400).
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The number of exposure groups and spacing of exposure levels were adequate to address the purpose of the study and identify endpoint values.
	Metric 12:	Testing at or Below Solubility Limit	Low	Because no solubility information was reported, reporting omissions prevented determination of whether exposure concentrations exceeded the water solubility limit.
Domain 4: Test Organism				

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Study Citation:	Wu, S., Zhang, H., Yu, X., Qiu, L. (2014). Toxicological responses of Chlorella vulgaris to dichloromethane and dichloroethane. Environmental Engineering Science 31(1):9-17.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Cell Culture Media; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Chlorella vulgaris*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,1-Dichloroethane
HERO ID:	3493045

Domain	Metric		Rating	Comments
	Metric 13:	Test Organism Characteristics	High	The choice of the algal species was appropriate, and it was obtained through a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized and/or whether pretreatment conditions were the same for control and exposed groups.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Medium	Organism housing, food, water, and nutrients were conducive to maintenance of health and biomass loading was appropriate. However, environmental conditions (e.g. pH, dissolved oxygen, hardness, and salinity) were not reported.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome(s) of interest, and the assessment methodology was sensitive and appropriate for the outcomes(s) of interest.
	Metric 18:	Consistency of Outcome Assessment	High	Details were reported, and outcomes were assessed consistently across study groups (after 96-h exposure).
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Uninformative	The concentrations tested were listed as 0, 192, 260, 351, 472, 639, and 863 mg/; however, the given EC50 for growth inhibition is 0.38 mg/L. Calculating such an EC50 from the given concentrations is clearly impossible. Furthermore, in the paper text, the EC50 is given as a percentage (0.38%) which does not make sense, while in the table referenced by said text (Table 1), the same value is given in units of mg/L. These shortcomings raise serious doubts about the rigor of this study.
	Metric 22:	Reporting of Data	High	Data were presented for each treatment and control group.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes, or unexpected outcomes were satisfactorily explained.

Additional Comments: None

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Study Citation:	Wu, S., Zhang, H., Yu, X., Qiu, L. (2014). Toxicological responses of Chlorella vulgaris to dichloromethane and dichloroethane. Environmental Engineering Science 31(1):9-17.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Cell Culture Media; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Chlorella vulgaris*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,1-Dichloroethane
HERO ID:	3493045

Domain	Metric	Rating	Comments
Overall Quality Determination		**Uninformative**	

Study Citation:	Wu, S., Zhang, H., Yu, X., Qiu, L. (2014). Toxicological responses of Chlorella vulgaris to dichloromethane and dichloroethane. Environmental Engineering Science 31(1):9-17.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Cell Culture Media; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Chlorella vulgaris*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mechanistic-Biomarkers (exposure and effect)-Oxidative stress (including redox biology)-Photosynthesis
Chemical:	1,1-Dichloroethane
HERO ID:	3493045

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	The test substance in this study was stated as ”dichloroethane” and no information regarding specific form, or isomer was provided. No CASRN or any other identifying information was reported. As per PECO, I have selected 1,1dichloroethane as the parent compound.
	Metric 2:	Test Substance Source	Low	No information regarding test substance source was reported for this study.
	Metric 3:	Test Substance Purity	Low	No information regarding test substance purity and/or grade was reported for this study.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Low	Appropriate negative controls containing no pollutant were included in each experiment as per the methods section. However, the figure captions for figures 1& 4 mention about a control without pollutant glufosinate exposure. Glufosinate is not the chemical of interest and is not mentioned anywhere else in the paper, which calls into question the quality and rigor of this study.
	Metric 5:	Negative Control Response	Low	Biological responses from negative control cells were provided in figures 1 & 4. However, the figure captions for figures 1 & 4 mention about a control without pollutant glufosinate exposure. Glufosinate is not the chemical of interest and is not mentioned anywhere else in the paper, which calls into question the quality and rigor of this study.
	Metric 6:	Randomized Allocation	Low	This study was an algal study in which aliquots of medium containing green algal cells were distributed into flasks. Following guidance, this algal study was reported as ”Low”.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	Study conducted exposure to VOC and did not report information regarding flask capping. No measurements of exposure media were reported, and no details on exposure renewal or the static nature of exposures were provided.
	Metric 8:	Consistency of Exposure Administration	Low	Details of exposure administration were not reported.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured. Based on professional judgment, actual concentrations cannot be expected to be similar to nominal concentrations due to compound volatility and the lack of experimental details regarding capping of exposure flasks.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure was appropriate for the study type (algal toxicity test, 96-h, OPPTS 850.5400).
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The number of exposure groups and the spacing of exposure levels were adequate to address the purpose of the study and identify endpoint values.
	Metric 12:	Testing at or Below Solubility Limit	Low	Because no solubility information was reported, reporting omissions prevented determination of whether exposure concentrations exceeded the water solubility limit.

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Study Citation:	Wu, S., Zhang, H., Yu, X., Qiu, L. (2014). Toxicological responses of Chlorella vulgaris to dichloromethane and dichloroethane. Environmental Engineering Science 31(1):9-17.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Cell Culture Media; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Chlorella vulgaris*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mechanistic-Biomarkers (exposure and effect)-Oxidative stress (including redox biology)-Photosynthesis
Chemical:	1,1-Dichloroethane
HERO ID:	3493045

Domain	Metric		Rating	Comments
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The choice of algal species was appropriate and obtained through a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized and/or whether pretreatment conditions were the same for control and exposed groups.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Medium	Organism housing, food, water, and nutrients were conducive to maintenance of health, and biomass loading was appropriate. However, environmental conditions (e.g. pH, dissolved oxygen, hardness, and salinity) were not reported.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome(s) of interest, and the assessment methodology was sensitive and appropriate for the outcomes(s) of interest. The methods for chlorophyll assays, malondialdehyde and protein concentrations, and enzyme extractions and assays were provided.
	Metric 18:	Consistency of Outcome Assessment	High	Details were reported, and outcomes were assessed consistently across study groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Uninformative	Statistical methods, analyses, and data transformations were described. However, the figure captions mention that mechanistic data were compared against the control without glufosinate. Glufosinate is not the chemical of interest and is not mentioned anywhere else in the paper, which calls into question the quality and rigor of this study. Figure caption for Fig 1: "The y-axis represents cell number and enzyme activity (or the content of MDA), which are expressed as mean +– standard error of the mean (S.E.M.) of three replicate cultures * and ** represent statistically significant differences when compared with the control without pollutant glufosinate exposure at $p < 0.05$ and $p < 0.01$ levels, respectively."

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Study Citation:	Wu, S., Zhang, H., Yu, X., Qiu, L. (2014). Toxicological responses of Chlorella vulgaris to dichloromethane and dichloroethane. Environmental Engineering Science 31(1):9-17.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Cell Culture Media; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Chlorella vulgaris*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mechanistic-Biomarkers (exposure and effect)-Oxidative stress (including redox biology)-Photosynthesis
Chemical:	1,1-Dichloroethane
HERO ID:	3493045

Domain	Metric		Rating	Comments
	Metric 22:	Reporting of Data	Low	Mechanistic data were presented for each treatment and control group in figures 1 & 4. Two controls (0 (open cul) and 0) were shown in the figures but not described. X-axis labels were off, and data were compared against the control without glufosinate. Glufosinate is not the chemical of interest and is not mentioned anywhere else in the paper, which calls into question the quality and rigor of this study.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes, or unexpected outcomes were satisfactorily explained.

Additional Comments: Mechanistic data (chlorophyll a , malondialdehyde and protein concentrations, and enzyme activities) were compared against the control without glufosinate. Glufosinate is not the chemical of interest and is not mentioned anywhere else in the paper, which calls into question the quality and rigor of this study.

Overall Quality Determination Uninformative

Study Citation:	Wu, S., Zhang, H., Yu, X., Qiu, L. (2014). Toxicological responses of Chlorella vulgaris to dichloromethane and dichloroethane. Environmental Engineering Science 31(1):9-17.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Cell Culture Media; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Chlorella vulgaris*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mechanistic-Cell signaling/function
Chemical:	1,1-Dichloroethane
HERO ID:	3493045

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	The test substance in this study was stated as ”dichloroethane” and no information regarding specific form, or isomer was provided. No CASRN or any other identifying information was reported. Therefore, I am unable to confirm exact form used for exposure (e.g., 1,2-Dichloroethane vs. 1,1-Dichloroethane).
	Metric 2:	Test Substance Source	Low	No information regarding test substance source was reported for this study.
	Metric 3:	Test Substance Purity	Low	No information regarding test substance purity and/or grade was reported for this study.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Low	Appropriate negative controls containing no pollutant were included in each experiment as per the methods section. However, the figure captions for figures 1 & 4 mention about a control without pollutant glufosinate exposure. Glufosinate is not the chemical of interest and is not mentioned anywhere else in the paper, which calls into question the rigor of this study.
	Metric 5:	Negative Control Response	Low	Biological responses from negative control cells were provided in figures 1 & 4. However, the figure captions for figures 1 & 4 mention about a control without pollutant glufosinate exposure. Glufosinate is not mentioned anywhere else in the paper and calls into question the rigor of this study.
	Metric 6:	Randomized Allocation	Low	This study was an algal study in which aliquots of medium containing green algal cells were distributed into flasks. Following guidance, this algal study was reported as ”Low”.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	Study conducted exposure to VOC and did not report information regarding flask capping. No measurements of exposure media were reported, and no details on exposure renewal or the static nature of exposures were provided.
	Metric 8:	Consistency of Exposure Administration	Low	Details of exposure administration were not reported.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured. Based on professional judgment, actual concentrations cannot be expected to be similar to nominal concentrations due to compound volatility and the lack of experimental details regarding capping of exposure flasks.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure was appropriate for the study type (algal toxicity test, 96-h, OPPTS 850.5400).
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Uninformative	The gene transcription study was conducted in C. vulgaris cells exposed to dichloroethane at EC 50. The calculated EC 50 value from the algal toxicity assay is deemed incorrect (see the development/growth evaluation form), which in turn discredits this experiment too.

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Study Citation:	Wu, S., Zhang, H., Yu, X., Qiu, L. (2014). Toxicological responses of Chlorella vulgaris to dichloromethane and dichloroethane. Environmental Engineering Science 31(1):9-17.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Cell Culture Media; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Chlorella vulgaris*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mechanistic-Cell signaling/function
Chemical:	1,1-Dichloroethane
HERO ID:	3493045

Domain	Metric		Rating	Comments
	Metric 12:	Testing at or Below Solubility Limit	Low	Because no solubility information was reported, reporting omissions prevented determination of whether exposure concentrations exceeded the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The choice of algal species was appropriate and obtained through a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized and/or whether pretreatment conditions were the same for control and exposed groups.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Medium	Organism housing, food, water, and nutrients were conducive to maintenance of health, and biomass loading was appropriate. However, environmental conditions (e.g. pH, dissolved oxygen, hardness, and salinity) were not reported.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome(s) of interest, and the assessment methodology was sensitive and appropriate for the outcomes(s) of interest. The methods for chlorophyll assays, malondialdehyde and protein concentrations, and enzyme extractions and assays were provided.
	Metric 18:	Consistency of Outcome Assessment	High	Details were reported, and outcomes were assessed consistently across study groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				

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Study Citation:	Wu, S., Zhang, H., Yu, X., Qiu, L. (2014). Toxicological responses of Chlorella vulgaris to dichloromethane and dichloroethane. Environmental Engineering Science 31(1):9-17.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Cell Culture Media; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Chlorella vulgaris*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mechanistic-Cell signaling/function
Chemical:	1,1-Dichloroethane
HERO ID:	3493045

Domain	Metric		Rating	Comments
	Metric 21:	Statistical Methods	Uninformative	Statistical methods, analyses, and data transformations were described. However, the figure captions mention that mechanistic data were compared against the control without glufosinate. Glufosinate is not the chemical of interest and is not mentioned anywhere else in the paper, which calls into question the quality and rigor of this study. Figure caption for Fig 1: "The y-axis represents cell number and enzyme activity (or the content of MDA), which are expressed as mean +– standard error of the mean (S.E.M.) of three replicate cultures * and ** represent statistically significant differences when compared with the control without pollutant glufosinate exposure at $p < 0.05$ and $p < 0.01$ levels, respectively."
	Metric 22:	Reporting of Data	Low	Mechanistic data were presented for each treatment and control group in figures 1 & 4. Two controls (0 (open cul) and 0) were shown in the figures but not described. X- axis labels were off, and treatment effects were compared to control without glufosinate. Glufosinate is not the chemical of interest in this paper.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes, or unexpected outcomes were satisfactorily explained.

Additional Comments: Mechanistic data (gene transcription) were compared against the control without glufosinate. Glufosinate is not the chemical of interest and is not mentioned anywhere else in the paper, which calls into question the quality and rigor of this study. The gene transcription and histology studies were conducted in C. vulgaris cells exposed to dichloroethane at EC 50. The calculated EC 50 value from the algal toxicity assay was deemed incorrect (see the development/growth evaluation form), which in turn raises questions about the gene transcription results and histological changes.

Overall Quality Determination — Uninformative

Study Citation:	Hsieh, S. H., Hsu, C. H., Tsai, D., Chen, C. Y. (2006). Quantitative structure-activity relationships for toxicity of nonpolar narcotic chemicals to Pseudokirchneriella subcapitata. Environmental Toxicology and Chemistry 25(11):2920-2926.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Cell Culture Media; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Pseudokirchneriella subcapitata*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,1-Dichloroethane
HERO ID:	4141189

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	The chemical was identified by name only.
	Metric 2:	Test Substance Source	Low	The test substance identity was not analytically verified by the performing laboratory. The source was not reported.
	Metric 3:	Test Substance Purity	High	The chemical purity was reported as >= 98%, reagent grade.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Authors referred to comparing 48 hour results with the initial cell number or the change in D.O. production (baseline values). The cited reference (Chen et al 2005) mentions the use of a control.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control groups was not reported.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	A closed system with no headspace was described. Authors performed QC checks on treatments with algae to ensure no greater than 8% difference between nominal and measured values.
	Metric 8:	Consistency of Exposure Administration	High	Exposures appeared to be administered consistently among treatment groups.
	Metric 9:	Measurement of Test Substance Concentration	Medium	Concentration controls were conducted without algae to ensure the measured concentration was no greater than 8% different than nominal concentration. HPLC was utilized for analysis, and frequency or timing of the measurement was not reported.
	Metric 10:	Exposure Duration and Frequency	Medium	The 48 hour test was sufficient to observe results.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Uninformative	No information is provided on the number of exposure groups and spacing of exposure levels.
	Metric 12:	Testing at or Below Solubility Limit	Low	Reporting omissions prevented determination of whether exposure concentrations exceeded the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	The algal source was not reported, but cited methods described the strain as UTEX 1648.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report acclimatization to the 300 mL bottles.

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Study Citation:	Hsieh, S. H., Hsu, C. H., Tsai, D., Chen, C. Y. (2006). Quantitative structure-activity relationships for toxicity of nonpolar narcotic chemicals to Pseudokirchneriella subcapitata. Environmental Toxicology and Chemistry 25(11):2920-2926.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Cell Culture Media; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Pseudokirchneriella subcapitata*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,1-Dichloroethane
HERO ID:	4141189

Domain	Metric		Rating	Comments
	Metric 15:	Number of Organisms and Replicates per Group	Low	Tests were run in triplicate.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Environmental conditions were adequately described.
	Metric 17:	Outcome Assessment Methodology	Low	The outcome assessment methodologies for dissolved oxygen and cell density were not clearly reported.
	Metric 18:	Consistency of Outcome Assessment	High	Outcomes were determined at 48 h of the exposure.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	EC50 values were obtained using probit analysis.
	Metric 22:	Reporting of Data	Medium	Data for exposure-related findings were not shown for each treatment and control group, but results were described in the tables as EC50s with CIs.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes, or none were indicated.

Additional Comments: This evaluation was for algal growth rate. Growth rate data was later recalculated and presented in HERO ID 3617867.

Overall Quality Determination — Uninformative

Study Citation:	Hsieh, S. H., Hsu, C. H., Tsai, D., Chen, C. Y. (2006). Quantitative structure-activity relationships for toxicity of nonpolar narcotic chemicals to Pseudokirchneriella subcapitata. Environmental Toxicology and Chemistry 25(11):2920-2926.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Cell Culture Media; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Pseudokirchneriella subcapitata*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Respiratory
Chemical:	1,1-Dichloroethane
HERO ID:	4141189

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	The chemical was identified by name only.
	Metric 2:	Test Substance Source	Low	The test substance identity was not analytically verified by the performing laboratory. The source not reported.
	Metric 3:	Test Substance Purity	High	Chemical purity was reported as >= 98%, reagent grade.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Authors referred to comparing 48 hour results with initial cell number or the change in D.O. production (baseline values). The cited reference (Chen et al 2005) mentions the use of a control.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control groups was not reported.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	A Closed system with no headspace was described. Authors performed QC checks on treatments with algae to ensure no greater than 8% difference between nominal and measured values.
	Metric 8:	Consistency of Exposure Administration	High	Exposures appeared to be administered consistently among treatment groups.
	Metric 9:	Measurement of Test Substance Concentration	Medium	Concentration controls were conducted without algae to ensure the measured concentration was no greater than 8% different than the nominal concentration. HPLC was utilized for analysis, and frequency or timing of the measurements were not reported.
	Metric 10:	Exposure Duration and Frequency	Medium	The 48 hour test was sufficient to observe results.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Uninformative	No information is provided on the number of exposure groups and spacing of exposure levels.
	Metric 12:	Testing at or Below Solubility Limit	Low	Reporting omissions prevented determination of whether exposure concentrations exceeded the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	The algal source was not reported, but cited methods describe the strain as UTEX 1648.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report acclimatization to the 300 mL bottles.
	Metric 15:	Number of Organisms and Replicates per Group	Low	Tests were run in triplicate.
Domain 5: Outcome Assessment				

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Study Citation:	Hsieh, S. H., Hsu, C. H., Tsai, D., Chen, C. Y. (2006). Quantitative structure-activity relationships for toxicity of nonpolar narcotic chemicals to Pseudokirchneriella subcapitata. Environmental Toxicology and Chemistry 25(11):2920-2926.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Cell Culture Media; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Pseudokirchneriella subcapitata*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Respiratory
Chemical:	1,1-Dichloroethane
HERO ID:	4141189

Domain	Metric		Rating	Comments
	Metric 16:	Adequacy of Test Conditions	High	Environmental conditions were adequately described.
	Metric 17:	Outcome Assessment Methodology	Low	The outcome assessment methodologies for dissolved oxygen and cell density were not clearly reported.
	Metric 18:	Consistency of Outcome Assessment	High	Outcomes were determined at 48 h of the exposure.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	EC50 values were obtained using probit analysis.
	Metric 22:	Reporting of Data	Medium	Data for exposure-related findings were not shown for each treatment and control group, but results were described in the tables as EC50s with CIs.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes or none were indicated.

Additional Comments: This evaluation was for dissolved oxygen production.

Overall Quality Determination Uninformative

Study Citation:	Mitsubishi Chemical Medience Corporation, (2009). Algal growth inhibition test of Pseudokirchneriella subcapitata exposed to 1,1-dichloroethane (translation).
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Pseudokirchneriella subcapitata*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,1-Dichloroethane
HERO ID:	11328283

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified as 1,1-dichloroethane by name, CASRN, and structural formula.
	Metric 2:	Test Substance Source	Low	The 1,1-DCA source was redacted in this reference. It was not reported to be analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	The purity of the 1,1-DCA was reported to be 99.8%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported the use of a concurrent negative control in which only the material water was used.
	Metric 5:	Negative Control Response	High	The negative control response was reported in Table 5 and table 6 and was appropriate. Control growth rates were reported in Table 8. The control response growth curve was reported in Figure 1. It was reported the negative control biomass increased by greater than 16x the original biomass, which met the validity requirements of the test.
	Metric 6:	Randomized Allocation	Low	It was not reported how the algae were allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Medium	It was reported the system was a static closed system. Algae were incubated with shaking at 100rpm for 72h in 100mL vessels. The test solution preparation was reported in Appendix 3. The stock solution was prepared by adding 200uL of test solution to a volumetric flask and bringing the volume to 1000mL. This was agitated with a stirrer for 1 minute. The test concentration was prepared by adding the appropriate amount of stock solution to material water to get a final volume of 0.10L. The test concentrations were reported to decrease as the test progressed over time. This was speculated to be due to volatilization. To account for volatility, nominal concentrations were set higher than required by the guideline.
	Metric 8:	Consistency of Exposure Administration	High	Only one exposure group was tested. Methods were consistent between the exposure group and the control group, with the exception of addition of the test substance.
	Metric 9:	Measurement of Test Substance Concentration	High	The test concentrations were analyzed using GC-MS at 0, 24, 48, and 72h.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was reported to be 72h, which is typical for an acute algal toxicity test.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	N/A	There was only one test concentration for this study as this was a limit test.
	Metric 12:	Testing at or Below Solubility Limit	High	The test concentration was reported to be below the water solubility limit.

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Study Citation:	Mitsubishi Chemical Medience Corporation, (2009). Algal growth inhibition test of Pseudokirchneriella subcapitata exposed to 1,1-dichloroethane (translation).
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Pseudokirchneriella subcapitata*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,1-Dichloroethane
HERO ID:	11328283

Domain	Metric		Rating	Comments
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The algae were reported to be from the American Type Culture Collection. The colony was originally obtained in June of 1996 and then was cultured in house at the performing laboratory from that point onward. The algae were cultured using Gorham medium.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The test organisms were cultured at the performing laboratory and were cultured under similar conditions to the test conditions.
	Metric 15:	Number of Organisms and Replicates per Group	N/A	This was reported to be a limit test with only one test concentration.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	The algae were cultured in Gorham medium at 22C. The colony was precultured starting on August 21 - Aug 24, 2009 to obtain algae during the exponential growth phase for the start of the study. The composition of the test medium is reported in Appendix 2. Conditions during exposure were reported in Tables 1 and 2 and were appropriate.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest- algal growth over time during exposure. Growth rate and growth inhibition were determined from algal biomass.
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups. A particle counter was used to measure biomass at 24, 48, and 72h.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	High	It was reported in section 3.1 that there were no environmental factors that may have affected the reliability of the test.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	N/A	This was reported to be a limit test, and the EC50 value was determined to be be > test concentration, and the test concentration was greater than the upper limit of the test guideline concentration. The NOEC was determined using the Student's t-test.
	Metric 22:	Reporting of Data	High	Biomass was reported in Table 5, growth inhibition was reported in Table 6, EC50 and NOEC values were reported in Table 7. Figure 1 displays the growth curve. Figure 2 is labeled as the concentration-inhibition curve, but only a single point is represented in the figure as this was a limit test.
	Metric 23:	Explanation of Unexpected Outcomes	High	Study authors did not report any unexpected outcomes.

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Study Citation:	Mitsubishi Chemical Medience Corporation, (2009). Algal growth inhibition test of Pseudokirchneriella subcapitata exposed to 1,1-dichloroethane (translation).
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Pseudokirchneriella subcapitata*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,1-Dichloroethane
HERO ID:	11328283

Domain	Metric	Rating	Comments

Additional Comments: This was a limit test exposing the single cell algae Pseudokirchneriella subcapitata to 1,1-dichloroethane. This was a 72h exposure. Development/growth was selected as the outcome of interest. This evaluation was for the definitive test.

Overall Quality Determination High

Study Citation:	Mitsubishi Chemical Medience Corporation, (2009). Algal growth inhibition test of Pseudokirchneriella subcapitata exposed to 1,1-dichloroethane (translation).
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Pseudokirchneriella subcapitata*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mechanistic-Cytotoxicity
Chemical:	1,1-Dichloroethane
HERO ID:	11328283

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified as 1,1-dichloroethane by name, CASRN, and structural formula.
	Metric 2:	Test Substance Source	Low	The 1,1-DCA source was redacted in this reference. It was not reported to be analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	The purity of the 1,1-DCA was reported to be 99.8%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported the use of a concurrent negative control in which only the material water was used.
	Metric 5:	Negative Control Response	Low	The results of cell morphology observation are only reported as there being no difference between the concentration groups and the control.
	Metric 6:	Randomized Allocation	Low	It was not reported how the algae were allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Medium	It was reported the system was a static closed system. Algae were incubated with shaking at 100rpm for 72h in 100mL vessels. The test solution preparation was reported in Appendix 3. The stock solution was prepared by adding 200uL of test solution to a volumetric flask and bringing the volume to 1000mL. This was agitated with a stirrer for 1 minute. The test concentration was prepared by adding the appropriate amount of stock solution to material water to get a final volume of 0.10L. The test concentrations were reported to decrease as the test progressed over time. This was speculated to be due to volatilization. To account for volatility, nominal concentrations were set higher than required by the guideline.
	Metric 8:	Consistency of Exposure Administration	High	Only one exposure group was tested. Methods were consistent between the exposure group and the control group, with the exception of addition of the test substance.
	Metric 9:	Measurement of Test Substance Concentration	High	The test concentrations were analyzed using GC-MS at 0, 24, 48, and 72h.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was reported to be 72h, which is typical for an acute algal toxicity test.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	N/A	There was only one test concentration for this study as this was a limit test.
	Metric 12:	Testing at or Below Solubility Limit	High	The test concentration was reported to be below the water solubility limit.
Domain 4: Test Organism				

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Study Citation:	Mitsubishi Chemical Medience Corporation, (2009). Algal growth inhibition test of Pseudokirchneriella subcapitata exposed to 1,1-dichloroethane (translation).
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Pseudokirchneriella subcapitata*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mechanistic-Cytotoxicity
Chemical:	1,1-Dichloroethane
HERO ID:	11328283

Domain	Metric		Rating	Comments
	Metric 13:	Test Organism Characteristics	High	The algae were reported to be from the American Type Culture Collection. The colony was originally obtained in June of 1996 and then was cultured in house at the performing laboratory from that point onward. The algae were cultured using Gorham medium.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The test organisms were cultured at the performing laboratory and were cultured under similar conditions to the test conditions.
	Metric 15:	Number of Organisms and Replicates per Group	N/A	This was reported to be a limit test with only one test concentration.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	The algae were cultured in Gorham medium at 22C. The colony was precultured starting on August 21 - Aug 24, 2009 to obtain algae during the exponential growth phase for the start of the study. The composition of the test medium is reported in Appendix 2. Conditions during exposure were reported in Tables 1 and 2 and were appropriate.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest- effects on cell morphology.
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups. Cell morphology was observed with a microscope at 72h.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	High	It was reported in section 3.1 that there were no environmental factors that may have affected the reliability of the test.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	N/A	This was reported to be a limit test, and it was reported that there were no changes in cell morphology or cell agglutination, and there were no differences observed compared to the control group.
	Metric 22:	Reporting of Data	Low	Results for cell morphology observations were only described in the text, in section 3.5.
	Metric 23:	Explanation of Unexpected Outcomes	High	Study authors did not report any unexpected outcomes.

Additional Comments: This was a limit test exposing the single cell algae Pseudokirchneriella subcapitata to 1,1-dichloroethane. This was a 72h exposure. Mechanistic cytotoxicity was selected as the outcome of interest. This evaluation was for the definitive test.

Overall Quality Determination High

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Study Citation:	Mitsubishi Chemical Medience Corporation, (2009). Algal growth inhibition test of Pseudokirchneriella subcapitata exposed to 1,1-dichloroethane (translation).
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Pseudokirchneriella subcapitata*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mechanistic-Cytotoxicity
Chemical:	1,1-Dichloroethane
HERO ID:	11328283

Domain	Metric	Rating	Comments

Study Citation:	Mitsubishi Chemical Medience Corporation, (2009). Algal growth inhibition test of Pseudokirchneriella subcapitata exposed to 1,1-dichloroethane (translation).
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Pseudokirchneriella subcapitata*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,1-Dichloroethane
HERO ID:	11328283

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified as 1,1-dichloroethane by name, CASRN, and structural formula.
	Metric 2:	Test Substance Source	Low	The 1,1-DCA source was redacted in this reference. It was not reported to be analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	The purity of the 1,1-DCA was reported to be 99.8%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported the use of a concurrent negative control in which only the material water was used.
	Metric 5:	Negative Control Response	High	The negative control response was reported in Section 2.1.2 in terms of inhibition rate for 72h.
	Metric 6:	Randomized Allocation	Low	It was not reported how the algae were allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Medium	Preparation of the test substance was not reported for the preliminary study, however, concentrations were measured and reported in section 2.1.2.
	Metric 8:	Consistency of Exposure Administration	Low	Limited exposure administration details were reported for the preliminary test.
	Metric 9:	Measurement of Test Substance Concentration	High	The test concentrations were analyzed using GC-MS at the start of the exposure and at 72h.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was reported to be 72h, which is typical for an acute algal toxicity test.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Medium	In the first preliminary trial, there were three exposure groups. In the second preliminary trial, there was one exposure group. This is lower than usual, but is acceptable for a preliminary test and was adequate for determining the appropriate definitive concentration.
	Metric 12:	Testing at or Below Solubility Limit	High	The test concentrations were all reported to be below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	It is not clear if the source reported for the definitive test was also used for the preliminary test.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	Pretreatment conditions and acclimation were not reported for the preliminary test.
	Metric 15:	Number of Organisms and Replicates per Group	Low	There was an initial biomass of 5 x 10^3cells/mL. There were 3 replicates per set concentration. This is lower than is typical, but is appropriate for a preliminary test.

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Study Citation:	Mitsubishi Chemical Medience Corporation, (2009). Algal growth inhibition test of Pseudokirchneriella subcapitata exposed to 1,1-dichloroethane (translation).
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Pseudokirchneriella subcapitata*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,1-Dichloroethane
HERO ID:	11328283

Domain	Metric		Rating	Comments
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Test conditions during the preliminary test were not reported.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest- algal growth inhibition.
	Metric 18:	Consistency of Outcome Assessment	Low	Few details regarding the assessment protocol were provided for the preliminary test.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	Environmental conditions for each study group were not reported for the preliminary test.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	This was a preliminary test. Only inhibition rates were provided. It may be possible to conduct independent statistical analysis based off of these values.
	Metric 22:	Reporting of Data	Medium	Inhibition rates were reported in section 2.1.2 for all test concentrations. Biomass data were not provided.
	Metric 23:	Explanation of Unexpected Outcomes	High	No unexpected outcomes were reported.

Additional Comments: This was evaluation is for the preliminary test exposing the single cell algae Pseudokirchneriella subcapitata to 1,1-dichloroethane. This was a 72h exposure. Development/growth was selected as the outcome of interest.

Overall Quality Determination Medium

Study Citation:	Tsai, K. P., Chen, C. Y. (2007). An algal toxicity database of organic toxicants derived by a closed-system technique. Environmental Toxicology and Chemistry 26(9):1931-1939.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Cell Culture Media; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Pseudokirchneriella subcapitata*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,1-Dichloroethane
HERO ID:	3617867

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	The test substance was identified by name only.
	Metric 2:	Test Substance Source	High	The chemical was analyzed using HPLC prior to conducting experiments.
	Metric 3:	Test Substance Purity	High	The purity of the 1,1-dichloroethane was stated as reagent grade.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors report the use of a negative control.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control was not reported.
	Metric 6:	Randomized Allocation	Low	It was not reported how the algae was allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental design was described adequately.
	Metric 8:	Consistency of Exposure Administration	Medium	All exposures were for 48h in closed systems to prevent volatilization. Test bottles contained no headspace and were shaken during the duration of exposure.
	Metric 9:	Measurement of Test Substance Concentration	Medium	Stock solutions and test concentrations were reported to be measured using HPLC.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was reported to be 48h, which was adequate for the outcome of interest.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Uninformative	The number of exposure levels and the spacing of the levels were not reported. Test concentrations were not reported.
	Metric 12:	Testing at or Below Solubility Limit	Low	Test concentrations were not reported, so it was uncertain if the test concentrations were below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The algae was reported to be from the University of Texas-Austin in Austin, TX, USA.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	It was not reported if the algae were acclimated.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The starting algae concentrations were reported to be 15,000cells/mL. Each concentrations was repeated in triplicate.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Algae was tested at 24C on an orbital shaker in a closed system with 65uE/m^2/s. pH and starting cell density were stated.

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Study Citation:	Tsai, K. P., Chen, C. Y. (2007). An algal toxicity database of organic toxicants derived by a closed-system technique. Environmental Toxicology and Chemistry 26(9):1931-1939.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Cell Culture Media; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Pseudokirchneriella subcapitata*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,1-Dichloroethane
HERO ID:	3617867

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest–algae density.
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups–algae density was determined using a particle counter and then inhibition was calculated.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Medium	Data on attrition and/or outcomes unrelated to controlled variables for each study group were not reported because only substantial differences among groups were noted (as indicated by study authors), and it is unlikely there were any substantial impacts on results.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	EC50 values were calculated using probit analysis.
	Metric 22:	Reporting of Data	Medium	EC50 values were reported in the Appendix.
	Metric 23:	Explanation of Unexpected Outcomes	Low	The study did not report any measures of variability.

Additional Comments: This evaluation was on the effect of 1,1-dichloroethane on density of P. subcapitata. Development/growth was selected as the outcome of interest. The study received and unacceptable ranking due to the lack of information regarding the test concentrations and the spacing of them. Primary data was generated for 1,1-dichloroethane in a previous study, however, the data was recalculated in the current study.

Overall Quality Determination — Uninformative

Study Citation:	Dietz, A.C., Schnoor, J.L. (2001). Phytotoxicity of chlorinated aliphatics to hybrid poplar (Populus deltoides x nigra DN34). Environmental Toxicology and Chemistry 20(2):389-393.
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Terrestrial; Water; Root uptake
Taxa, Species, Age:	Vegetation; Vascular Plants; *Populus deltoides x nigra*; DN34; Juvenile
Health Outcome:	Development/Growth
Chemical:	1,1-Dichloroethane
HERO ID:	42313

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance (i.e., chemical of interest) was identified.
	Metric 2:	Test Substance Source	High	The source of the test substance was reported as a manufacturer.
	Metric 3:	Test Substance Purity	High	The chemical was analytical grade (>99%).
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group (i.e. all conditions equal except chemical exposure). It was reported as one set of undosed reactors; carrier solvents were avoided.
	Metric 5:	Negative Control Response	High	The biological responses of the negative control group were reported and adequate.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups, only that n-15 cuttings were used.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Medium	The experimental system and/or test media preparation methods were adequately reported but did not completely account for physical-chemical properties.
	Metric 8:	Consistency of Exposure Administration	High	Details of the exposure administration were reported, and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Concentrations in dosing feed solutions were measured using gas chromatography.
	Metric 10:	Exposure Duration and Frequency	High	The exposure was 2 weeks.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	Concentrations were based on a preliminary concentration-response (range-finding) experiment. Groups were established for each of the 5 different chemical concentrations and were replicated 3 times.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were at or below the water solubility limit (or dispersibility limit if applicable), as reported.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The test organisms were acclimatized to test conditions and all pretreatment conditions were the same for control and exposed organisms, such that the only difference was exposure to test substance.
	Metric 15:	Number of Organisms and Replicates per Group	Low	N=1 cuttings were included in each group. Groups were established for each of the 5 different chemical concentrations and were replicated 3 times.

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Study Citation:	Dietz, A.C., Schnoor, J.L. (2001). Phytotoxicity of chlorinated aliphatics to hybrid poplar (Populus deltoides x nigra DN34). Environmental Toxicology and Chemistry 20(2):389-393.
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Terrestrial; Water; Root uptake
Taxa, Species, Age:	Vegetation; Vascular Plants; *Populus deltoides x nigra*; DN34; Juvenile
Health Outcome:	Development/Growth
Chemical:	1,1-Dichloroethane
HERO ID:	42313

Domain	Metric		Rating	Comments
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Medium	Temperature was not stated. Other conditions were described.
	Metric 17:	Outcome Assessment Methodology	High	Cuttings were weighed at the start and conclusion of the experiment, and results were presented as change in mass.
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups (e.g., at the same time after initial exposure) using the same protocol in all study groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment. There are no limitations that would result in a substantial impact on results.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	A regression was performed and presented. Regression lines shown in Figure 3 could be reconstructed from data presented in Table 2.
	Metric 22:	Reporting of Data	High	Zero growth concentrations are shown in Table 3 with standard deviation, and change in cutting mass vs exposure concentration is shown in Figure 3 and Table 2.
	Metric 23:	Explanation of Unexpected Outcomes	Medium	Standard error was reported within the graphs but not in Table 2. It is unclear if Table 3 variation represents standard error or standard deviation.

Additional Comments: None

Overall Quality Determination Medium

Study Citation:	Dietz, A.C., Schnoor, J.L. (2001). Phytotoxicity of chlorinated aliphatics to hybrid poplar (Populus deltoides x nigra DN34). Environmental Toxicology and Chemistry 20(2):389-393.
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Terrestrial; Water; Root uptake
Taxa, Species, Age:	Vegetation; Vascular Plants; *Populus deltoides x nigra*; DN34; Juvenile
Health Outcome:	Respiratory
Chemical:	1,1-Dichloroethane
HERO ID:	42313

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance (i.e., chemical of interest) was identified.
	Metric 2:	Test Substance Source	High	The source of the test substance was reported as a manufacturer.
	Metric 3:	Test Substance Purity	High	The chemical was analytical grade (>99%).
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group (i.e. all conditions equal except chemical exposure). It was reported as one set of undosed reactors; carrier solvents were avoided.
	Metric 5:	Negative Control Response	Low	The control response was not shown.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups, only that n-15 cuttings were used.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Medium	The experimental system and/or test media preparation methods were adequately reported but did not completely account for physical-chemical properties.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported, and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	Medium	Concentrations in dosing feed solutions were measured using gas chromatography; it was not clear whether nominal or measured doses were reported.
	Metric 10:	Exposure Duration and Frequency	High	The exposure was 2 weeks.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	Concentrations were based on a preliminary concentration-response (range-finding) experiment. Groups were established for each of the 5 different chemical concentrations and were replicated 3 times.
	Metric 12:	Testing at or Below Solubility Limit	High	The exposure concentrations were at or below the water solubility limit (or dispersibility limit if applicable), as reported.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The test organisms were acclimatized to test conditions, and all pretreatment conditions were the same for control and exposed organisms, such that the only difference was exposure to test substance.
	Metric 15:	Number of Organisms and Replicates per Group	Low	N=1 cuttings were included in each group. Groups were established for each of the 5 different chemical concentrations and were replicated 3 times.
Domain 5: Outcome Assessment				

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Study Citation:	Dietz, A.C., Schnoor, J.L. (2001). Phytotoxicity of chlorinated aliphatics to hybrid poplar (Populus deltoides x nigra DN34). Environmental Toxicology and Chemistry 20(2):389-393.
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Terrestrial; Water; Root uptake
Taxa, Species, Age:	Vegetation; Vascular Plants; *Populus deltoides x nigra*; DN34; Juvenile
Health Outcome:	Respiratory
Chemical:	1,1-Dichloroethane
HERO ID:	42313

Domain	Metric		Rating	Comments
	Metric 16:	Adequacy of Test Conditions	Medium	Temperature was not stated. Other conditions were described.
	Metric 17:	Outcome Assessment Methodology	Medium	"To determine transpiration rates, reactors were weighed every 2 d and water loss was calculated."
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups (e.g., at the same time after initial exposure) using the same protocol in all study groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Medium	Data on attrition and/or outcomes unrelated to controlled variables for each study group were not reported because only substantial differences among groups were noted (as indicated by study authors), and it is unlikely there were any substantial impacts on results.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Data for transpiration IC50 values are reported; no regression data are presented.
	Metric 22:	Reporting of Data	Low	IC50 values (Concn.50%T) were shown in Figure 3, but no graphs were presented nor were results discussed in the text.
	Metric 23:	Explanation of Unexpected Outcomes	Medium	Variation was shown in Table 3; it was unclear whether this is standard error or standard deviation.

Additional Comments: Authors examined change in cutting mass for a 2 week exposure to chemicals. Transpiration rates of the cuttings were also measured every 2 days over the 2 week period, and IC50 values of transpiration were calculated for both chemicals.

Overall Quality Determination Medium

Study Citation:	Walbridge, C.T., Fiandt, J.T., Phipps, G.L., Holcombe, G.W. (1983). Acute toxicity of ten chlorinated aliphatic hydrocarbons to the fathead minnow (Pimephales promelas). Archives of Environmental Contamination and Toxicology 12(6):661-666.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Fathead minnow (Pimephales promelas)*; Juvenile
Health Outcome:	Mortality
Chemical:	1,1-Dichloroethane
HERO ID:	4259619

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Medium	The test substance was reported with accepted nomenclature as 1,2-Dichloroethane.
	Metric 2:	Test Substance Source	Low	The test substance source was not reported.
	Metric 3:	Test Substance Purity	Low	The Purity and/or grade of test substance were not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Low	Negative controls were reportedly used but there was no mention of the control response.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control group was not reported.
	Metric 6:	Randomized Allocation	Medium	"At the beginning of a flow-through test, 50 fish were randomly assigned to each of the 12 exposure tanks."
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	"Two 2-L/cycle proportional diluters with dilution factors of 0.6 (Mount and Brungs 1967) were used to deliver five toxicant concentrations and a control, in duplicate, to randomly arranged exposure chambers. These chambers were all-glass aquaria with a working volume of 41 L, 30 cm high by 30 cm by 60 cm, with a standpipe topped with a cylinder of stainless-steel screen to prevent loss of fish. Flows were greater than ten tank-volumes per day. Fluorescent lighting on a 16 hr photoperiod was used, and the light level was 48 lumens at the water surface."
	Metric 8:	Consistency of Exposure Administration	High	"At the beginning of a flow-through test, 50 fish were randomly assigned to each of the 12 exposure tanks. Dead fish were counted and removed at least twice during the first day, and twice daily after that. A saturator system was used to solubilize the chemicals (Phipps et al. 1982). This saturator uses an intermittent flow of water, delivered by a metering pump, through one or more closed chambers (19 L stainless steel soda carbonation tanks). The water is continuously mixed with the toxicant, the latter was added in a single charge before the test began. Methods not discussed here followed those specified by the U.S. Environmental Protection Agency (1975)."
	Metric 9:	Measurement of Test Substance Concentration	High	"Tracor MT-220 manual gas chromatograph with a 63Ni electron capture detector was used for analyzing 1,2-dichloroethane, 1,2-dichloropropane, 1,3-dichloropropane, and 1,1 ,2-trichloroethylene. The column was packed with 80/100 mesh Gas-Chrom Q| coated with 4% SE-30/6% OV-210. The carrier gas for all compounds was 5% methane in argon, and the column temperatures and retention times are given in Table 2."
	Metric 10:	Exposure Duration and Frequency	High	Study authors conducted 24, 48, 72, and 96 hr exposures. This information was not specified in the methods section but in the results.

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Study Citation:	Walbridge, C.T., Fiandt, J.T., Phipps, G.L., Holcombe, G.W. (1983). Acute toxicity of ten chlorinated aliphatic hydrocarbons to the fathead minnow (Pimephales promelas). Archives of Environmental Contamination and Toxicology 12(6):661-666.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Fathead minnow (Pimephales promelas)*; Juvenile
Health Outcome:	Mortality
Chemical:	1,1-Dichloroethane
HERO ID:	4259619

Domain	Metric		Rating	Comments
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	No information is provided on the number of exposure groups and spacing of exposure levels. "Two 2-L/cycle proportional diluters with dilution factors of 0.6 (Mount and Brungs 1967) were used to deliver five toxicant concentrations and a control, in duplicate, to randomly arranged exposure chambers."
	Metric 12:	Testing at or Below Solubility Limit	Low	There is no information regarding the use of a solvent, other than most of the chemicals sampled were solvents for their intended use.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	No animal source was identified other than, "Laboratory-reared fathead minnows (Pimephales promelas), 30 to 35 days old, were used in these experiments."
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	"The rearing water was the same as the diluent water, with the temperature held at a temperature of 25 degrees C plus or minus 2 degrees. Fish in the rearing tanks were fed live brine shrimp nauplii in excess until 12 to 24 hr before testing, then not fed during the exposure period."
	Metric 15:	Number of Organisms and Replicates per Group	Medium	"At the beginning of a flow-through test, 50 fish were randomly assigned to each of the 12 exposure tanks. Dead fish were counted and removed at least twice during the first day, and twice daily after that."
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	"The laboratory lake water supply (Lake Superior) was the source of the dilution water. This was heated to maintain a mean of 25 degrees with a standard deviation of 0.7~ in the test tanks. At least once during each 4-day test, pH, dissolved oxygen (DO), hardness (as CaCO3), and alkalinity (as CaCO3) were determined for control, an intermediate, and the high tanks. The pH ranged from 6.7 to 7.6. Means and ranges for DO, hardness, and alkalinity, were 8.0 mg/L (7.6-9.2), 45.1 mg/L as CaCO3 (45.0-45.5), and 41.8 mg/L as CaCO3 (35.6-43.4), respectively, for all tests. Values obtained from high exposure concentrations did not deviate significantly from those observed in the controls. Water chemistry methods were those recommended by the American Public Health Association (APHA et al. 1980) and the U.S. Environmental Protection Agency (USEPA 1974)."
	Metric 17:	Outcome Assessment Methodology	High	The 96 hr LC50 and 95% confidence intervals were established from the study.
	Metric 18:	Consistency of Outcome Assessment	High	No inconsistencies were identified.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	No confounding variables were reported by the study authors.

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Study Citation:	Walbridge, C.T., Fiandt, J.T., Phipps, G.L., Holcombe, G.W. (1983). Acute toxicity of ten chlorinated aliphatic hydrocarbons to the fathead minnow (Pimephales promelas). Archives of Environmental Contamination and Toxicology 12(6):661-666.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Fathead minnow (Pimephales promelas)*; Juvenile
Health Outcome:	Mortality
Chemical:	1,1-Dichloroethane
HERO ID:	4259619

Domain	Metric		Rating	Comments
	Metric 20:	Outcomes Unrelated to Exposure	Medium	Study authors did not identify and outcomes unrelated to the exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	"The LC50 concentrations were calculated by using the Trimmed Spearman-Karber method for estimating median lethal concentrations (Hamilton et al. 1977). This method is not subject to the deficiencies of the more common normal or logistic methods and it is not as sensitive to anomalous responses on the conventional Spearman-Karber technique."
	Metric 22:	Reporting of Data	High	"The 24-, 48-, 72-, and 96-hr LC50 values and 95% confidence intervals of the chlorinated aliphatic compounds are given in Table 3."
	Metric 23:	Explanation of Unexpected Outcomes	High	Study authors did not identify any unexpected outcomes.

Additional Comments: None

Overall Quality Determination Medium

Study Citation:	Walbridge, C.T., Fiandt, J.T., Phipps, G.L., Holcombe, G.W. (1983). Acute toxicity of ten chlorinated aliphatic hydrocarbons to the fathead minnow (Pimephales promelas). Archives of Environmental Contamination and Toxicology 12(6):661-666.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Fathead minnow (Pimephales promelas)*; Juvenile
Health Outcome:	Behavioral
Chemical:	1,1-Dichloroethane
HERO ID:	4259619

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Medium	The test substance was reported with accepted nomenclature as 1,2-Dichloroethane.
	Metric 2:	Test Substance Source	Low	The test substance source was not reported.
	Metric 3:	Test Substance Purity	Low	The purity and/or grade of the test substance was not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Low	Negative controls were reportedly used, but there was no mention of the control response.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control group was not reported.
	Metric 6:	Randomized Allocation	Medium	"At the beginning of a flow-through test, 50 fish were randomly assigned to each of the 12 exposure tanks."
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	"Two 2-L/cycle proportional diluters with dilution factors of 0.6 (Mount and Brungs 1967) were used to deliver five toxicant concentrations and a control, in duplicate, to randomly arranged exposure chambers. These chambers were all-glass aquaria with a working volume of 41 L, 30 cm high by 30 cm by 60 cm, with a standpipe topped with a cylinder of stainless-steel screen to prevent loss of fish. Flows were greater than ten tank-volumes per day. Fluorescent lighting on a 16 hr photoperiod was used, and the light level was 48 lumens at the water
	Metric 8:	Consistency of Exposure Administration	High	"At the beginning of a flow-through test, 50 fish were randomly assigned to each of the 12 exposure tanks. Dead fish were counted and removed at least twice during the first day, and twice daily after that. A saturator system was used to solubilize the chemicals (Phipps et al. 1982). This saturator uses an intermittent flow of water, delivered by a metering pump, through one or more closed chambers (19 L stainless steel soda carbonation tanks). The water is continuously mixed with the toxicant, the latter was added in a single charge before the test began. Methods not discussed here followed those specified by the U.S. Environmental Protection Agency (1975)."
	Metric 9:	Measurement of Test Substance Concentration	High	"Tracor MT-220 manual gas chromatograph with a 63Ni electron capture detector was used for analyzing 1,2-dichloroethane, 1,2-dichloropropane, 1,3-dichloropropane, and 1,1 ,2-trichloroethylene. The column was packed with 80/100 mesh Gas-Chrom Q| coated with 4% SE-30/6% OV-210. The carrier gas for all compounds was 5% methane in argon, and the column temperatures and retention times are given in Table 2."
	Metric 10:	Exposure Duration and Frequency	High	Study authors conducted 24, 48, 72, and 96hr exposures This information was not specified in the methods section but in the results.

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Study Citation:	Walbridge, C.T., Fiandt, J.T., Phipps, G.L., Holcombe, G.W. (1983). Acute toxicity of ten chlorinated aliphatic hydrocarbons to the fathead minnow (Pimephales promelas). Archives of Environmental Contamination and Toxicology 12(6):661-666.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Fathead minnow (Pimephales promelas)*; Juvenile
Health Outcome:	Behavioral
Chemical:	1,1-Dichloroethane
HERO ID:	4259619

Domain	Metric		Rating	Comments
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	No information is provided on the number of exposure groups and spacing of exposure levels. "Two 2-L/cycle proportional diluters with dilution factors of 0.6 (Mount and Brungs 1967) were used to deliver five toxicant concentrations and a control, in duplicate, to randomly arranged exposure chambers."
	Metric 12:	Testing at or Below Solubility Limit	Low	There is no information regarding the use of a solvent, other than most of the chemicals sampled were solvents for their intended use.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	No animal source was identified other than, "Laboratory-reared fathead minnows (Pimephales promelas), 30 to 35 days old, were used in these experiments."
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	"The rearing water was the same as the diluent water, with the temperature held at a temperature of 25 degrees C plus or minus 2 degrees. Fish in the rearing tanks were fed live brine shrimp nauplii in excess until 12 to 24 hr before testing, then not fed during the exposure period."
	Metric 15:	Number of Organisms and Replicates per Group	Medium	"At the beginning of a flow-through test, 50 fish were randomly assigned to each of the 12 exposure tanks. Dead fish were counted and removed at least twice during the first day, and twice daily after that."
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	"The laboratory lake water supply (Lake Superior) was the source of the dilution water. This was heated to maintain a mean of 25 degrees with a standard deviation of 0.7~ in the test tanks. At least once during each 4-day test, pH, dissolved oxygen (DO), hardness (as CaCO3), and alkalinity (as CaCO3) were determined for control, an intermediate, and the high tanks. The pH ranged from 6.7 to 7.6. Means and ranges for DO, hardness, and alkalinity, were 8.0 mg/L (7.6-9.2), 45.1 mg/L as CaCO3 (45.0-45.5), and 41.8 mg/L as CaCO3 (35.6-43.4), respectively, for all tests. Values obtained from high exposure concentrations did not deviate significantly from those observed in the controls. Water chemistry methods were those recommended by the American Public Health Association (APHA et al. 1980) and the U.S. Environmental Protection Agency (USEPA 1974)."
	Metric 17:	Outcome Assessment Methodology	Uninformative	The recording of lethargy and anesthesia were not recorded for treatment groups and are subjective observations.
	Metric 18:	Consistency of Outcome Assessment	High	No inconsistencies were identified.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	No confounding variables were reported by the study authors.

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Study Citation:	Walbridge, C.T., Fiandt, J.T., Phipps, G.L., Holcombe, G.W. (1983). Acute toxicity of ten chlorinated aliphatic hydrocarbons to the fathead minnow (Pimephales promelas). Archives of Environmental Contamination and Toxicology 12(6):661-666.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Fathead minnow (Pimephales promelas)*; Juvenile
Health Outcome:	Behavioral
Chemical:	1,1-Dichloroethane
HERO ID:	4259619

Domain	Metric		Rating	Comments
	Metric 20:	Outcomes Unrelated to Exposure	Medium	No outcomes unrelated to the exposure were identified by the study authors.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	No statistics were applied to observations of lethargy and anesthesia.
	Metric 22:	Reporting of Data	Low	The behavioral observations were not presented by treatment groups.
	Metric 23:	Explanation of Unexpected Outcomes	High	Study authors did not report any unexpected outcomes.

Additional Comments: This form represents the observations of lethargy and anesthesia that were recorded within the results section on page 5/6.

Overall Quality Determination Uninformative

Study Citation:	Walbridge, C.T., Fiandt, J.T., Phipps, G.L., Holcombe, G.W. (1983). Acute toxicity of ten chlorinated aliphatic hydrocarbons to the fathead minnow (Pimephales promelas). Archives of Environmental Contamination and Toxicology 12(6):661-666.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Fathead minnow (Pimephales promelas)*; Juvenile
Health Outcome:	Behavioral
Chemical:	1,1,2-Trichloroethane
HERO ID:	4259619

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Medium	The test substance was reported with accepted nomenclature as 1,1,2-trichloroethane.
	Metric 2:	Test Substance Source	Low	The test substance source was not reported.
	Metric 3:	Test Substance Purity	Low	The purity and/or grade of the test substance were not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Low	Negative controls were reportedly used, but there was no mention of the control response.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control group was not reported.
	Metric 6:	Randomized Allocation	Medium	"At the beginning of a flow-through test, 50 fish were randomly assigned to each of the 12 exposure tanks."
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	"Two 2-L/cycle proportional diluters with dilution factors of 0.6 (Mount and Brungs 1967) were used to deliver five toxicant concentrations and a control, in duplicate, to randomly arranged exposure chambers. These chambers were all-glass aquaria with a working volume of 41 L, 30 cm high by 30 cm by 60 cm, with a standpipe topped with a cylinder of stainless-steel screen to prevent loss of fish. Flows were greater than ten tank-volumes per day. Fluorescent lighting on a 16 hr photoperiod was used, and the light level was 48 lumens at the water surface."
	Metric 8:	Consistency of Exposure Administration	High	"At the beginning of a flow-through test, 50 fish were randomly assigned to each of the 12 exposure tanks. Dead fish were counted and removed at least twice during the first day, and twice daily after that. A saturator system was used to solubilize the chemicals (Phipps et al. 1982). This saturator uses an intermittent flow of water, delivered by a metering pump, through one or more closed chambers (19 L stainless steel soda carbonation tanks). The water is continuously mixed with the toxicant, the latter was added in a single charge before the test began. Methods not discussed here followed those specified by the U.S. Environmental Protection Agency (1975)."
	Metric 9:	Measurement of Test Substance Concentration	High	"Tracor MT-220 manual gas chromatograph with a 63Ni electron capture detector was used for analyzing 1,2-dichloroethane, 1,2-dichloropropane, 1,3-dichloropropane, and 1,1,2-trichloroethylene. The column was packed with 80/100 mesh Gas-Chrom Q| coated with 4% SE-30/6% OV-210. The carrier gas for all compounds was 5% methane in argon, and the column temperatures and retention times are given in Table 2."
	Metric 10:	Exposure Duration and Frequency	High	Study authors reported 24, 48, 72, and 96 hr exposures. This information was not specified in the methods section but in the results.

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Study Citation:	Walbridge, C.T., Fiandt, J.T., Phipps, G.L., Holcombe, G.W. (1983). Acute toxicity of ten chlorinated aliphatic hydrocarbons to the fathead minnow (Pimephales promelas). Archives of Environmental Contamination and Toxicology 12(6):661-666.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Fathead minnow (Pimephales promelas)*; Juvenile
Health Outcome:	Behavioral
Chemical:	1,1,2-Trichloroethane
HERO ID:	4259619

Domain	Metric		Rating	Comments
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	No information is provided on the number of exposure groups and spacing of exposure levels. "Two 2-L/cycle proportional diluters with dilution factors of 0.6 (Mount and Brungs 1967) were used to deliver five toxicant concentrations and a control, in duplicate, to randomly arranged exposure chambers."
	Metric 12:	Testing at or Below Solubility Limit	Low	There is no information regarding the use of a solvent, other than most of the chemicals sampled were solvents for their intended use.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	No animal source was identified other than, "Laboratory-reared fathead minnows (Pimephales promelas), 30 to 35 days old, were used in these experiments."
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	"The rearing water was the same as the diluent water, with the temperature held at a temperature of 25 degrees C plus or minus 2 degrees. Fish in the rearing tanks were fed live brine shrimp nauplii in excess until 12 to 24 hr before testing, then not fed during the exposure period."
	Metric 15:	Number of Organisms and Replicates per Group	Medium	"At the beginning of a flow-through test, 50 fish were randomly assigned to each of the 12 exposure tanks. Dead fish were counted and removed at least twice during the first day, and twice daily after that."
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	"The laboratory lake water supply (Lake Superior) was the source of the dilution water. This was heated to maintain a mean of 25 degrees with a standard deviation of 0.7 degrees in the test tanks. At least once during each 4-day test, pH, dissolved oxygen (DO), hardness (as CaCO3), and alkalinity (as CaCO3) were determined for control, an intermediate, and the high tanks. The pH ranged from 6.7 to 7.6. Means and ranges for DO, hardness, and alkalinity, were 8.0 mg/L (7.6-9.2), 45.1 mg/L as CaCO3 (45.0-45.5), and 41.8 mg/L as CaCO3 (35.6-43.4), respectively, for all tests. Values obtained from high exposure concentrations did not deviate significantly from those observed in the controls. Water chemistry methods were those recommended by the American Public Health Association (APHA et al. 1980) and the U.S. Environmental Protection Agency (USEPA 1974)."
	Metric 17:	Outcome Assessment Methodology	Uninformative	The recording of lethargy and anesthesia were not recorded for treatment groups and are subjective observations.
	Metric 18:	Consistency of Outcome Assessment	High	No inconsistencies were identified.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	No confounding variables were reported by the study authors.

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Study Citation:	Walbridge, C.T., Fiandt, J.T., Phipps, G.L., Holcombe, G.W. (1983). Acute toxicity of ten chlorinated aliphatic hydrocarbons to the fathead minnow (Pimephales promelas). Archives of Environmental Contamination and Toxicology 12(6):661-666.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Fathead minnow (Pimephales promelas)*; Juvenile
Health Outcome:	Behavioral
Chemical:	1,1,2-Trichloroethane
HERO ID:	4259619

Domain	Metric		Rating	Comments
	Metric 20:	Outcomes Unrelated to Exposure	Medium	Study authors did not identify and outcomes unrelated to the exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	No statistics were applied to observations of lethargy and anesthesia.
	Metric 22:	Reporting of Data	Low	The behavioral observations were not presented by treatment groups.
	Metric 23:	Explanation of Unexpected Outcomes	High	Study authors did not identify any unexpected outcomes.

Additional Comments: This form represents the observations of lethargy and anesthesia that were recorded within the results section on page 5/6.

Overall Quality Determination Uninformative

Study Citation:	Walbridge, C.T., Fiandt, J.T., Phipps, G.L., Holcombe, G.W. (1983). Acute toxicity of ten chlorinated aliphatic hydrocarbons to the fathead minnow (Pimephales promelas). Archives of Environmental Contamination and Toxicology 12(6):661-666.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Fathead minnow (Pimephales promelas)*; Juvenile
Health Outcome:	Mortality
Chemical:	1,1,2-Trichloroethane
HERO ID:	4259619

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Medium	The test substance was reported with accepted nomenclature as 1,1,2-trichloroethane.
	Metric 2:	Test Substance Source	Low	The test substance source was not reported.
	Metric 3:	Test Substance Purity	Low	The purity and/or grade of the test substance were not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Low	Negative controls were reportedly used, but there was no mention of the control response.
	Metric 5:	Negative Control Response	Low	The biological response of the negative control group was not reported.
	Metric 6:	Randomized Allocation	Medium	"At the beginning of a flow-through test, 50 fish were randomly assigned to each of the 12 exposure tanks."
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	"Two 2-L/cycle proportional diluters with dilution factors of 0.6 (Mount and Brungs 1967) were used to deliver five toxicant concentrations and a control, in duplicate, to randomly arranged exposure chambers. These chambers were all-glass aquaria with a working volume of 41 L, 30 cm high by 30 cm by 60 cm, with a standpipe topped with a cylinder of stainless-steel screen to prevent loss of fish. Flows were greater than ten tank-volumes per day. Fluorescent lighting on a 16 hr photoperiod was used, and the light level was 48 lumens at the water surface."
	Metric 8:	Consistency of Exposure Administration	High	"At the beginning of a flow-through test, 50 fish were randomly assigned to each of the 12 exposure tanks. Dead fish were counted and removed at least twice during the first day, and twice daily after that. A saturator system was used to solubilize the chemicals (Phipps et al. 1982). This saturator uses an intermittent flow of water, delivered by a metering pump, through one or more closed chambers (19 L stainless steel soda carbonation tanks). The water is continuously mixed with the toxicant, the latter was added in a single charge before the test began. Methods not discussed here followed those specified by the U.S. Environmental Protection Agency (1975)."
	Metric 9:	Measurement of Test Substance Concentration	High	"Tracor MT-220 manual gas chromatograph with a 63Ni electron capture detector was used for analyzing 1,2-dichloroethane, 1,2-dichloropropane, 1,3-dichloropropane, and 1,1,2-trichloroethylene. The column was packed with 80/100 mesh Gas-Chrom Q coated with 4% SE-30/6% OV-210. The carrier gas for all compounds was 5% methane in argon, and the column temperatures and retention times are given in Table 2."
	Metric 10:	Exposure Duration and Frequency	High	Study authors reported 24, 48, 72, and 96 hr exposures. This information was not specified in the methods section but in the results.

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Study Citation:	Walbridge, C.T., Fiandt, J.T., Phipps, G.L., Holcombe, G.W. (1983). Acute toxicity of ten chlorinated aliphatic hydrocarbons to the fathead minnow (Pimephales promelas). Archives of Environmental Contamination and Toxicology 12(6):661-666.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Fathead minnow (Pimephales promelas)*; Juvenile
Health Outcome:	Mortality
Chemical:	1,1,2-Trichloroethane
HERO ID:	4259619

Domain	Metric		Rating	Comments
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	No information is provided on the number of exposure groups and spacing of exposure levels. "Two 2-L/cycle proportional diluters with dilution factors of 0.6 (Mount and Brungs 1967) were used to deliver five toxicant concentrations and a control, in duplicate, to randomly arranged exposure chambers."
	Metric 12:	Testing at or Below Solubility Limit	Low	There is no information regarding the use of a solvent, other than most of the chemicals sampled were solvents for their intended use.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	No animal source was identified other than, "Laboratory-reared fathead minnows (Pimephales promelas), 30 to 35 days old, were used in these experiments."
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	"The rearing water was the same as the diluent water, with the temperature held at a temperature of 25 degrees C plus or minus 2 degrees. Fish in the rearing tanks were fed live brine shrimp nauplii in excess until 12 to 24 hr before testing, then not fed during the exposure period."
	Metric 15:	Number of Organisms and Replicates per Group	Medium	"At the beginning of a flow-through test, 50 fish were randomly assigned to each of the 12 exposure tanks. Dead fish were counted and removed at least twice during the first day, and twice daily after that."
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	"The laboratory lake water supply (Lake Superior) was the source of the dilution water. This was heated to maintain a mean of 25 degrees with a standard deviation of 0.7 degrees in the test tanks. At least once during each 4-day test, pH, dissolved oxygen (DO), hardness (as CaCO3), and alkalinity (as CaCO3) were determined for control, an intermediate, and the high tanks. The pH ranged from 6.7 to 7.6. Means and ranges for DO, hardness, and alkalinity, were 8.0 mg/L (7.6-9.2), 45.1 mg/L as CaCO3 (45.0-45.5), and 41.8 mg/L as CaCO3 (35.6-43.4), respectively, for all tests. Values obtained from high exposure concentrations did not deviate significantly from those observed in the controls. Water chemistry methods were those recommended by the American Public Health Association (APHA et al. 1980) and the U.S. Environmental Protection Agency (USEPA 1974)."
	Metric 17:	Outcome Assessment Methodology	High	The 96 hr LC50 and 95% confidence intervals were established from the study.
	Metric 18:	Consistency of Outcome Assessment	High	No inconsistencies were identified.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	No confounding variables were reported by the study authors.

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Study Citation:	Walbridge, C.T., Fiandt, J.T., Phipps, G.L., Holcombe, G.W. (1983). Acute toxicity of ten chlorinated aliphatic hydrocarbons to the fathead minnow (Pimephales promelas). Archives of Environmental Contamination and Toxicology 12(6):661-666.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Fathead minnow (Pimephales promelas)*; Juvenile
Health Outcome:	Mortality
Chemical:	1,1,2-Trichloroethane
HERO ID:	4259619

Domain	Metric		Rating	Comments
	Metric 20:	Outcomes Unrelated to Exposure	Medium	Study authors did not identify and outcomes unrelated to the exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	"The LC50 concentrations were calculated by using the Trimmed Spearman-Karber method for estimating median lethal concentrations (Hamilton et al. 1977). This method is not subject to the deficiencies of the more common normal or logistic methods and it is not as sensitive to anomalous responses on the conventional Spearman-Karber technique."
	Metric 22:	Reporting of Data	High	"The 24-, 48-, 72-, and 96-hr LC50 values and 95% confidence intervals of the chlorinated aliphatic compounds are given in Table 3."
	Metric 23:	Explanation of Unexpected Outcomes	High	Study authors did not identify any unexpected outcomes.

Additional Comments: None

Overall Quality Determination Medium

Study Citation:	Benoit, D.A., Puglisi, F.A., Olson, D.L. (1982). A fathead minnow Pimephales promelas early life stage toxicity test method evaluation and exposure to four organic chemicals. Environmental Pollution - Series A: Ecological and Biological 28(3):189-197.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Pimephales promelas*; Embryo
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane
HERO ID:	18052

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The chemical was identified by name and condensed structural formula.
	Metric 2:	Test Substance Source	Low	The test substance identity was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	The purity was reported as 98-99%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Uninformative	The LC 50 data provided is not original data. No study details were provided in the paper for the derivation of LC 50 values.
	Metric 5:	Negative Control Response	Uninformative	No study details were provided.
	Metric 6:	Randomized Allocation	Uninformative	No study details were provided.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Uninformative	The type of experimental system and/or test media preparation methods were not reported.
	Metric 8:	Consistency of Exposure Administration	Uninformative	No study details were provided.
	Metric 9:	Measurement of Test Substance Concentration	Uninformative	No study details were provided.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure and/or exposure frequency were reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Uninformative	No information is provided on the number of exposure groups and spacing of exposure levels.
	Metric 12:	Testing at or Below Solubility Limit	Uninformative	No information was provided.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	The LC 50 test was conducted with 30 day old fish.
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	The study did not report whether test organisms were acclimatized and/or whether pretreatment conditions were the same for control and exposed groups.
	Metric 15:	Number of Organisms and Replicates per Group	Low	The numbers of test organisms and replicates were not reported.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Organism environmental conditions were not reported.
	Metric 17:	Outcome Assessment Methodology	Low	The outcome assessment methodology was not clearly reported.

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Study Citation:	Benoit, D.A., Puglisi, F.A., Olson, D.L. (1982). A fathead minnow Pimephales promelas early life stage toxicity test method evaluation and exposure to four organic chemicals. Environmental Pollution - Series A: Ecological and Biological 28(3):189-197.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Pimephales promelas*; Embryo
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane
HERO ID:	18052

Domain	Metric		Rating	Comments
	Metric 18:	Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol for outcome assessment were not reported.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Statistical analysis was performed but not described adequately.
	Metric 22:	Reporting of Data	Low	Data for exposure-related findings were presented for each treatment, but the control groups were not reported. Only LC 50 values were reported.
	Metric 23:	Explanation of Unexpected Outcomes	Low	The study did not report any measures of variability.

Additional Comments: This evaluation form is for the mortality outcome, specifically for 96-hr LC 50 reported in the study. However, this is not original data, and the acute toxicity test was conducted prior to the test in the study by different authors.

Overall Quality Determination — Uninformative

Study Citation:	Benoit, D.A., Puglisi, F.A., Olson, D.L. (1982). A fathead minnow Pimephales promelas early life stage toxicity test method evaluation and exposure to four organic chemicals. Environmental Pollution - Series A: Ecological and Biological 28(3):189-197.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Pimephales promelas*; Embryo
Health Outcome:	Mortality
Chemical:	1,2-Dichloropropane
HERO ID:	18052

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The chemicals identified by name and condensed structural formula. The test substances covered in this form are 1,2-dichloropropane and its isomer, 1,3-dichloropropane; these were tested independently.
	Metric 2:	Test Substance Source	Low	The test substance identity was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	Purity was reported as 98-99% for 1,2-dichloropropane and 1,3-dichloropropane
Domain 2: Test Design				
	Metric 4:	Negative Controls	Uninformative	The LC 50 data provided is not original data. No study details were provided in the paper for the derivation of LC 50 values.
	Metric 5:	Negative Control Response	Uninformative	No study details were provided.
	Metric 6:	Randomized Allocation	Uninformative	No study details were provided.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Uninformative	The type of experimental system and/or test media preparation methods were not reported.
	Metric 8:	Consistency of Exposure Administration	Uninformative	No study details were provided.
	Metric 9:	Measurement of Test Substance Concentration	Uninformative	No study details were provided.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure and/or exposure frequency were reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Uninformative	No information is provided on the number of exposure groups and spacing of exposure levels.
	Metric 12:	Testing at or Below Solubility Limit	Uninformative	No information was provided.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	The LC 50 test was conducted with 30 day old fish.
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	The study did not report whether test organisms were acclimatized and/or whether pretreatment conditions were the same for control and exposed groups.
	Metric 15:	Number of Organisms and Replicates per Group	Low	The numbers of test organisms and replicates were not reported.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Organism environmental conditions were not reported.
	Metric 17:	Outcome Assessment Methodology	Low	The outcome assessment methodology was not clearly reported.

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Study Citation:	Benoit, D.A., Puglisi, F.A., Olson, D.L. (1982). A fathead minnow Pimephales promelas early life stage toxicity test method evaluation and exposure to four organic chemicals. Environmental Pollution - Series A: Ecological and Biological 28(3):189-197.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Pimephales promelas*; Embryo
Health Outcome:	Mortality
Chemical:	1,2-Dichloropropane
HERO ID:	18052

Domain	Metric		Rating	Comments
	Metric 18:	Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol for outcome assessment were not reported.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Statistical analysis was performed but not described adequately.
	Metric 22:	Reporting of Data	Low	Data for exposure-related findings were presented for each treatment group, but the control groups were not reported. Only LC 50 values were reported.
	Metric 23:	Explanation of Unexpected Outcomes	Low	The study did not report any measures of variability.

Additional Comments: This evaluation form is for the mortality outcome, specifically for 96-hr LC 50 reported in the study. However, this is not original data, and the acute toxicity test was conducted prior to the test in the study by different authors.This form is relevant to both 1,2-dichloropropane and its isomer, 1,3-dichloropropane.

Overall Quality Determination — Uninformative

Study Citation:	Geiger, D. L., Northcott, C. E., Call, D. J., Brooke, L. T. (1985). Acute toxicities of organic chemicals to fathead minnows (Pimephales promelas): Volume II.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Pimephales promelas*; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloropropane
HERO ID:	32169

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance 1, 3-dichloropropane was identified by name and CAS#.
	Metric 2:	Test Substance Source	Low	The test substance was purchased from Aldrich Chemical Company (page 67/346), but the identity was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	The chemical purity reported as 99%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	The biological response of the negative control group was reported and reasonable for assessed outcomes.
	Metric 6:	Randomized Allocation	Medium	The study reported that organisms were randomly allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and methods for preparation of test media were described in adequate detail and appropriately accounted for the physical-chemical properties of the test substance.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported, and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	Medium	Exposure concentrations were measured and were similar to nominal concentrations, but analytical technologies used were less sensitive.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure was reported and suitable for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The number of exposure groups and spacing of exposure levels were justified for a dose response.
	Metric 12:	Testing at or Below Solubility Limit	High	Liquid-liquid equilibrium was used to prepare the stock solution. Exposure concentrations were at or below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The test organisms were acclimatized to test conditions, and all pretreatment conditions were the same for control and exposed organisms.
	Metric 15:	Number of Organisms and Replicates per Group	Low	The number of test organisms (50 per test vessel) was reported in the datasheet (page 68) but was tested only in duplicate.
Domain 5: Outcome Assessment				

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Study Citation:	Geiger, D. L., Northcott, C. E., Call, D. J., Brooke, L. T. (1985). Acute toxicities of organic chemicals to fathead minnows (Pimephales promelas): Volume II.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Pimephales promelas*; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloropropane
HERO ID:	32169

Domain	Metric		Rating	Comments
	Metric 16:	Adequacy of Test Conditions	High	Organism housing, environmental conditions, food, water, and nutrients were conducive to maintenance of health, and biomass loading was appropriate.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest.
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	LC50 values with corresponding confidence intervals were determined using the trimmed Spearman- Karber method.
	Metric 22:	Reporting of Data	High	Data for exposure-related findings were presented for each treatment and control group and were adequate to determine values for the endpoint.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: This evaluation form is for 1,3-dichloropropane, an isomer of 1,2-dichloropropane. The LC 50 value for 1,3-dichloropropane was 131 mg/l (CI: 125-137 mg/l), and all associated data was provided on pages 67-68/346.

Overall Quality Determination High

Study Citation:	Geiger, D. L., Northcott, C. E., Call, D. J., Brooke, L. T. (1985). Acute toxicities of organic chemicals to fathead minnows (Pimephales promelas): Volume II.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Pimephales promelas*; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloropropane
HERO ID:	32169

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The chemical was identified by name and CAS#.
	Metric 2:	Test Substance Source	Low	The test substance was purchased from Aldrich Chemical Company (page 65/346), but the identity was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	The chemical purity was reported as 99%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	The biological response of the negative control group was reported and reasonable for assessed outcomes.
	Metric 6:	Randomized Allocation	Medium	The study reported that organisms were randomly allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and methods for preparation of test media were described in adequate detail and appropriately accounted for the physical-chemical properties of the test substance.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported, and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	Medium	Exposure concentrations were measured and were similar to nominal concentrations, but analytical technologies used were less sensitive.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure was reported and suitable for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The number of exposure groups and spacing of exposure levels were justified for a dose response.
	Metric 12:	Testing at or Below Solubility Limit	High	Liquid-liquid equilibrium was used to prepare the stock solution. Exposure concentrations were at or below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The test organisms were acclimatized to test conditions, and all pretreatment conditions were the same for control and exposed organisms.
	Metric 15:	Number of Organisms and Replicates per Group	Low	The number of test organisms (50 per test vessel) was reported in the datasheet (page 66) but tested only in duplicate.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Organism housing, environmental conditions, food, water, and nutrients were conducive to maintenance of health, and biomass loading was appropriate.

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Study Citation:	Geiger, D. L., Northcott, C. E., Call, D. J., Brooke, L. T. (1985). Acute toxicities of organic chemicals to fathead minnows (Pimephales promelas): Volume II.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Pimephales promelas*; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloropropane
HERO ID:	32169

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest.
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	LC50 values with corresponding confidence intervals were determined using the trimmed Spearman- Karber method.
	Metric 22:	Reporting of Data	High	Data for exposure-related findings were presented for each treatment and control group and were adequate to determine values for the endpoint.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: The LC 50 value for 1,2-dichloropropane was 126 mg/l (CI: 119-135 mg/l), and all associated data was provided on pages 65-66/346.

Overall Quality Determination High

Study Citation:	Geiger, D. L., Northcott, C. E., Call, D. J., Brooke, L. T. (1985). Acute toxicities of organic chemicals to fathead minnows (Pimephales promelas): Volume II.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Pimephales promelas*; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane
HERO ID:	32169

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The chemical was identified by name and CAS#.
	Metric 2:	Test Substance Source	Low	The test substance was purchased from Aldrich Chemical Company (page 61/346), but the identity was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	The chemical purity was reported as 99%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	The biological response of the negative control group was reported and reasonable for assessed outcomes.
	Metric 6:	Randomized Allocation	Medium	The study reported that organisms were randomly allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and methods for preparation of test media were described in adequate detail and appropriately accounted for the physical-chemical properties of the test substance.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported, and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	Medium	Exposure concentrations were measured and were similar to nominal concentrations, but analytical technologies used were less sensitive.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure was reported and suitable for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The number of exposure groups and spacing of exposure levels were justified for a dose response.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were at or below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The test organisms were acclimatized to test conditions, and all pretreatment conditions were the same for control and exposed organisms.
	Metric 15:	Number of Organisms and Replicates per Group	Low	The number of test organisms (50 per test vessel) was reported in the datasheet (page 62) but tested only in duplicate.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Organism housing, environmental conditions, food, water, and nutrients were conducive to maintenance of health, and biomass loading was appropriate.

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Study Citation:	Geiger, D. L., Northcott, C. E., Call, D. J., Brooke, L. T. (1985). Acute toxicities of organic chemicals to fathead minnows (Pimephales promelas): Volume II.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Pimephales promelas*; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane
HERO ID:	32169

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest.
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	LC50 values with corresponding confidence intervals were determined using the trimmed Spearman- Karber method.
	Metric 22:	Reporting of Data	High	Data for exposure-related findings were presented for each treatment and control group and were adequate to determine values for the endpoint.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: The LC 50 value for 1,2-dichloroethane was 136 mg/l (CI: 129-144 mg/l), and all associated data was provided on page 61/346.

Overall Quality Determination — High

Study Citation:	Geiger, D. L., Northcott, C. E., Call, D. J., Brooke, L. T. (1985). Acute toxicities of organic chemicals to fathead minnows (Pimephales promelas): Volume II.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Pimephales promelas*; Juvenile
Health Outcome:	Mortality
Chemical:	1,1,2-Trichloroethane
HERO ID:	32169

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The chemical was identified by name and CAS#.
	Metric 2:	Test Substance Source	Low	The test substance was obtained from Aldrich Chemical Company, but the identity was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	The chemical purity was reported as 98%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	The biological response of the negative control group was reported and reasonable for assessed outcomes.
	Metric 6:	Randomized Allocation	Medium	The study reported that organisms were randomly allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and methods for preparation of test media were described in adequate detail and appropriately accounted for the physical-chemical properties of the test substance.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported, and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	Medium	Exposure concentrations were measured and were similar to nominal concentrations, but analytical technologies used were less sensitive.
	Metric 10:	Exposure Duration and Frequency	High	The duration of the exposure was reported and suitable for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The number of exposure groups and spacing of exposure levels were justified for a dose response.
	Metric 12:	Testing at or Below Solubility Limit	High	Liquid-liquid equilibrium was used to prepare the stock solution; exposure concentrations were at or below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The test organisms were acclimatized to test conditions, and all pretreatment conditions were the same for control and exposed organisms
	Metric 15:	Number of Organisms and Replicates per Group	Low	The number of test organisms (50 per test vessel) was reported in the datasheet (page 60), but they were tested only in duplicate.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Organism housing, environmental conditions, food, water, and nutrients were conducive to maintenance of health, and biomass loading was appropriate.

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Study Citation:	Geiger, D. L., Northcott, C. E., Call, D. J., Brooke, L. T. (1985). Acute toxicities of organic chemicals to fathead minnows (Pimephales promelas): Volume II.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Pimephales promelas*; Juvenile
Health Outcome:	Mortality
Chemical:	1,1,2-Trichloroethane
HERO ID:	32169

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors that could influence the outcome assessment.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	The LC50 value was determined using the trimmed Spearman- Karber method.
	Metric 22:	Reporting of Data	High	Data for exposure-related findings were presented for each treatment and control group and were adequate to determine values for the endpoint.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: The LC 50 value for 1,1,2-Trichloroethane was 81.6 mg/l, and all associated data was provided on pages 59-60/346. Confidence limits were not calculated.

Overall Quality Determination — High

Study Citation:	Benoit, D.A., Puglisi, F.A., Olson, D.L. (1982). A fathead minnow Pimephales promelas early life stage toxicity test method evaluation and exposure to four organic chemicals. Environmental Pollution - Series A: Ecological and Biological 28(3):189-197.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Pimephales promelas*; Embryo
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane
HERO ID:	18052

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The chemical identified by name.
	Metric 2:	Test Substance Source	Low	The test substance identity was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	The purity reported as 98-99%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using a concurrent negative control.
	Metric 5:	Negative Control Response	High	The biological response of the negative control group was adequate.
	Metric 6:	Randomized Allocation	Medium	The study reported that organisms were randomly allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and methods for preparation of test media were described in adequate detail.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported, and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Exposure concentrations were measured using appropriate analytical technologies and methods.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure and/or exposure frequency were reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The number of exposure groups and spacing of exposure levels were adequate to address the purpose of the study.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were at or below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	All pretreatment conditions were the same for control and exposed organisms.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Organism environmental conditions were conducive to maintenance of health, and biomass loading was appropriate.

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Study Citation:	Benoit, D.A., Puglisi, F.A., Olson, D.L. (1982). A fathead minnow Pimephales promelas early life stage toxicity test method evaluation and exposure to four organic chemicals. Environmental Pollution - Series A: Ecological and Biological 28(3):189-197.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Pimephales promelas*; Embryo
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane
HERO ID:	18052

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest.
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions.
	Metric 20:	Outcomes Unrelated to Exposure	High	There were no differences among groups that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Statistical analysis was performed but not described adequately.
	Metric 22:	Reporting of Data	High	Data for exposure-related findings were presented for each treatment and control group.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: Mortality and hatch were assessed.

Overall Quality Determination High

Study Citation:	Benoit, D.A., Puglisi, F.A., Olson, D.L. (1982). A fathead minnow Pimephales promelas early life stage toxicity test method evaluation and exposure to four organic chemicals. Environmental Pollution - Series A: Ecological and Biological 28(3):189-197.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Pimephales promelas*; Embryo
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane
HERO ID:	18052

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The chemical was identified by name and condensed structural formula.
	Metric 2:	Test Substance Source	Low	The test substance identity was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	The purity was reported as 98-99%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using a concurrent negative control.
	Metric 5:	Negative Control Response	High	The biological response of the negative control group was adequate.
	Metric 6:	Randomized Allocation	Medium	The study reported that organisms were randomly allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and methods for preparation of test media were described in adequate detail.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported, and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Exposure concentrations were measured using appropriate analytical technologies and methods.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure and/or exposure frequency were reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The number of exposure groups and spacing of exposure levels were adequate to address the purpose of the study.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were at or below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	All pretreatment conditions were the same for control and exposed organisms.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Organism environmental conditions were conducive to maintenance of health, and biomass loading was appropriate.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest.

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Study Citation:	Benoit, D.A., Puglisi, F.A., Olson, D.L. (1982). A fathead minnow Pimephales promelas early life stage toxicity test method evaluation and exposure to four organic chemicals. Environmental Pollution - Series A: Ecological and Biological 28(3):189-197.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Pimephales promelas*; Embryo
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloroethane
HERO ID:	18052

Domain	Metric		Rating	Comments
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions.
	Metric 20:	Outcomes Unrelated to Exposure	High	There were no differences among groups that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Statistical analysis was performed but not described adequately.
	Metric 22:	Reporting of Data	High	Data for exposure-related findings were presented for each treatment and control group.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: Growth and normal larvae at hatch were assessed in this form.

Overall Quality Determination High

Study Citation:	Benoit, D.A., Puglisi, F.A., Olson, D.L. (1982). A fathead minnow Pimephales promelas early life stage toxicity test method evaluation and exposure to four organic chemicals. Environmental Pollution - Series A: Ecological and Biological 28(3):189-197.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Pimephales promelas*; Embryo
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloropropane
HERO ID:	18052

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The chemicals were identified by name and condensed structural formula. The test substances covered in this form are 1,2-dichloropropane and its isomer, 1,3-dichloropropane; these were tested independently.
	Metric 2:	Test Substance Source	Low	The test substance identity was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	The purity was reported as 98-99% and is relevant for 1,2-dichloropropane and its isomer, 1,3-dichloropropane.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using a concurrent negative control.
	Metric 5:	Negative Control Response	High	The biological response of the negative control group was adequate.
	Metric 6:	Randomized Allocation	Medium	The study reported that organisms were randomly allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and methods for preparation of test media were described in adequate detail,
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported, and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Exposure concentrations were measured using appropriate analytical technologies and methods.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure and/or exposure frequency were reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The number of exposure groups and spacing of exposure levels were adequate to address the purpose of the study.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were at or below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	All pretreatment conditions were the same for control and exposed organisms.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Organism environmental conditions were conducive to maintenance of health, and biomass loading was appropriate.

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Study Citation:	Benoit, D.A., Puglisi, F.A., Olson, D.L. (1982). A fathead minnow Pimephales promelas early life stage toxicity test method evaluation and exposure to four organic chemicals. Environmental Pollution - Series A: Ecological and Biological 28(3):189-197.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Pimephales promelas*; Embryo
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloropropane
HERO ID:	18052

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest.
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions.
	Metric 20:	Outcomes Unrelated to Exposure	High	There were no differences among groups that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Statistical analysis was performed but not described adequately.
	Metric 22:	Reporting of Data	High	Data for exposure-related findings were presented for each treatment and control group.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: Growth and normal larvae at hatch were assessed in this evaluation form and is relevant to 1,2- dichloropropane and its isomer, 1,3-dichloropropane.

Overall Quality Determination — High

Study Citation:	Benoit, D.A., Puglisi, F.A., Olson, D.L. (1982). A fathead minnow Pimephales promelas early life stage toxicity test method evaluation and exposure to four organic chemicals. Environmental Pollution - Series A: Ecological and Biological 28(3):189-197.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Pimephales promelas*; Embryo
Health Outcome:	Mortality
Chemical:	1,2-Dichloropropane
HERO ID:	18052

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The chemicals were identified by name and condensed structural formula. The test substances covered in this form are 1,2-dichloropropane and its isomer, 1,3-dichloropropane; these were tested independently.
	Metric 2:	Test Substance Source	Low	The test substance identity was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	The purity was reported as 98-99% for 1,2-dichloropropane and 1,3-dichloropropane.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using a concurrent negative control.
	Metric 5:	Negative Control Response	High	The biological response of the negative control group was adequate.
	Metric 6:	Randomized Allocation	Medium	The study reported that organisms were randomly allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and methods for preparation of test media were described in adequate detail.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported, and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Exposure concentrations were measured using appropriate analytical technologies and methods.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure and/or exposure frequency were reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The number of exposure groups and spacing of exposure levels were adequate to address the purpose of the study.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were at or below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	All pretreatment conditions were the same for control and exposed organisms.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Organism environmental conditions were conducive to maintenance of health, and biomass loading was appropriate.

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Study Citation:	Benoit, D.A., Puglisi, F.A., Olson, D.L. (1982). A fathead minnow Pimephales promelas early life stage toxicity test method evaluation and exposure to four organic chemicals. Environmental Pollution - Series A: Ecological and Biological 28(3):189-197.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vertebrate; Fish; *Pimephales promelas*; Embryo
Health Outcome:	Mortality
Chemical:	1,2-Dichloropropane
HERO ID:	18052

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest.
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions.
	Metric 20:	Outcomes Unrelated to Exposure	High	There were no differences among groups that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Statistical analysis was performed but not described adequately.
	Metric 22:	Reporting of Data	High	Data for exposure-related findings were presented for each treatment and control group.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: Mortality and hatch were assessed in this evaluation form and is relevant to 1,2- dichloropropane and its isomer, 1,3-dichloropropane.

Overall Quality Determination High

Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Larvae
Health Outcome:	Immobilization
Chemical:	1,1,2-Trichloroethane
HERO ID:	10706027

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Name and CASRN of the test substance was stated in Section 2.2.2.
	Metric 2:	Test Substance Source	Low	Source was stated as Sigma Aldrich. The test substance identity was NOT analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	Purity was stated as 96.7% for test substance and 98.2% for reference substance.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	An appropriate control group was included in the experiment.
	Metric 5:	Negative Control Response	High	Biological response of the control group is adequate (page 39/335).
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Uninformative	The type of experimental system and/or test media preparation methods were not reported for the 48-hr non-GLP screening study.
	Metric 8:	Consistency of Exposure Administration	Low	Reporting omissions are likely to have a substantial impact on results.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured or measurements were not reported.
	Metric 10:	Exposure Duration and Frequency	High	Exposure duration was conducted according to OECD 233.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	Three concentrations (nominal 55-1200 mg/kg) and a control group were included in the screening study. Test concentrations were not measured in the media during the range finding test even though the initial stability dosing trail showed substantial loss of test substance.
	Metric 12:	Testing at or Below Solubility Limit	N/A	Exposures were administered to sediment.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	Source organisms used for the screening study were not reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized and/or whether pretreatment conditions were the same for control and exposed groups.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	Four replicates of 10 midges (first instar, 3 days old) each were exposed to each treatment level and the control.
Domain 5: Outcome Assessment				

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Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Larvae
Health Outcome:	Immobilization
Chemical:	1,1,2-Trichloroethane
HERO ID:	10706027

Domain	Metric		Rating	Comments
	Metric 16:	Adequacy of Test Conditions	Low	Reporting of housing, environmental conditions, food, water, nutrients, and biomass loading were not sufficiently reported to evaluate if adequate; and whether differences occurred between control and exposed populations.
	Metric 17:	Outcome Assessment Methodology	Low	The outcome assessment methodology was not clearly reported.
	Metric 18:	Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol for outcome assessment were not reported.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Statistical analysis was not conducted.
	Metric 22:	Reporting of Data	Low	Mean percent immobility data was presented without measures of variability.
	Metric 23:	Explanation of Unexpected Outcomes	Low	The study did not report any measures of variability.

Additional Comments: This evaluation form is for the percent immobility assessed in the 48-hr non- GLP water only screening study.

Overall Quality Determination — Uninformative

Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Adult
Health Outcome:	Development/Growth
Chemical:	1,1,2-Trichloroethane
HERO ID:	10706027

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Name and CASRN of the test substance was stated in Section 2.2.2.
	Metric 2:	Test Substance Source	Low	Source was stated as Sigma Aldrich. The test substance identity was NOT analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	Purity was stated as 96.7% for test substance and 98.2% for reference substance.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	An appropriate control group was included in the experiment.
	Metric 5:	Negative Control Response	High	Control male, female, and combined developmental rates are shown in Table 19, and they seem reasonable.
	Metric 6:	Randomized Allocation	Medium	It was stated that test organisms were impartially distributed. Vessels were randomly positioned in the water bath.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	The experimental set-up was well described in Section 2.8.2. Tests were conducted according to OECD guideline 233. Measures were taken to minimize loss of volatile test substance but even then, substantial loss of test chemical and disruption of concentration gradient (in sediment, porewater and overlying water; Tables 16, 17 and 18) were observed during the course of the experiment. Concentrations of test substances were measured but only one sample was measured.
	Metric 8:	Consistency of Exposure Administration	Low	Details of exposure administration were reported but substantial loss of test chemical and disruption of concentration gradient (in sediment, porewater and overlying water; Tables 16, 17 and 18) was observed during the course of the experiment. These would have had significant impact on results. Also, it was reported that in some test vials, more than 20 midges emerged (pp. 289,292, 298), which raises the uncertainty of the same number of midges in each test vial.
	Metric 9:	Measurement of Test Substance Concentration	Low	Measurements were obtained at several timepoints during the study for sediment, pore water, and overlying water. Time-weighted mean was presented in addition to individual measurements. Given the high volatility of the substance, multiple samples should have been analyzed to understand the variability of test concentrations in sediment, porewater and overlying water in the exposure vessels.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was conducted according to OECD 233.

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Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Adult
Health Outcome:	Development/Growth
Chemical:	1,1,2-Trichloroethane
HERO ID:	10706027

Domain	Metric		Rating	Comments
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	Five concentrations (nominal 63-1000 mg/kg) and a control group were included in the study. Substantial loss of test chemical and disruption of concentration gradient were observed during the course of the experiment. The nominal concentrations were determined based on a range finding study, however, test concentrations were not measured in the media during the range finding test even though the initial stability dosing trail showed substantial loss of test substance. Even when developmental rate at a particular concentration was found to be significantly reduced compared to the control (Table 19; page 82/335), the study authors conclude that 'due to the lack of a continuous dose response correlating to the exposure concentration gradient, this reduction is not considered to be treatment-related.'
	Metric 12:	Testing at or Below Solubility Limit	N/A	Exposures were administered in sediment.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The source and age of organisms were reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	Some pretreatment conditions were described. Organisms were added to beakers already containing treated sediment.
	Metric 15:	Number of Organisms and Replicates per Group	Low	There were eight replicate beakers (20 midges per beaker) per treatment level for a total of 160 midges per treatment level. But it was reported that in some test vials, more than 20 midges emerged (pp. 289, 292, 298), which raises the uncertainty of the same number of midges in each test vial.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Test conditions were adequately described in Section 2.6 and 2.8.4. High ammonia was observed in overlying water at the end of the experiment. Aeration was provided even though the test guideline (OECD 233) recommends not providing aeration when testing volatile chemicals. " When testing volatile chemicals, consideration should be given not to aerate the sediment-water system, while at the same time the validity criterion of minimal 60% ASV (paragraph 10) should be fulfilled."
	Metric 17:	Outcome Assessment Methodology	High	The protocol for determining developmental rate was well described in 2.10.2.
	Metric 18:	Consistency of Outcome Assessment	High	Details of emergence time observations were reported in Section 2.10.2 and appeared consistent among treatment groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Medium	Protocol deviations were stated when they occurred. Increase in ammonia concentrations in overlying water with time was observed in control and treatment groups.

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Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Adult
Health Outcome:	Development/Growth
Chemical:	1,1,2-Trichloroethane
HERO ID:	10706027

Domain	Metric		Rating	Comments
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistics were adequately described in Section 2.13.
	Metric 22:	Reporting of Data	High	Data was well-described in text, tables, and figures.
	Metric 23:	Explanation of Unexpected Outcomes	Low	Endpoint values for development rate were empirically estimated, therefore corresponding 95% confidence could not be determined.

Additional Comments: This evaluation form is for the developmental rate - F1 Generation (M/F/Combined). Measures were taken to minimize loss of volatile test substance but even then, substantial loss of test chemical and disruption of concentration gradient (in sediment, porewater and overlying water; Tables 16, 17 and 18) were observed during the course of the experiment. As such, hazard effect/endpoint values derived cannot be directly linked to the tested chemical.

Overall Quality Determination Medium

Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Adult
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,1,2-Trichloroethane
HERO ID:	10706027

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Name and CASRN of the test substance was stated in Section 2.2.2.
	Metric 2:	Test Substance Source	Low	Source was stated as Sigma Aldrich. The test substance identity was NOT analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	Purity was stated as 96.7% for test substance and 98.2% for reference substance.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	An appropriate control group was included in the experiment.
	Metric 5:	Negative Control Response	High	Percent female of the emerged control adults is shown in Table 11, and it seems reasonable.
	Metric 6:	Randomized Allocation	Medium	It was stated that test organisms were impartially distributed. Vessels were randomly positioned in the water bath.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	The experimental set-up was well described in Section 2.8.2. Tests were conducted according to OECD guideline 233. Measures were taken to minimize loss of volatile test substance but even then, substantial loss of test chemical and disruption of concentration gradient (in sediment, porewater and overlying water; Tables 6, 7 and 8) were observed during the course of the experiment. Concentrations of test substances were measured but only one sample was measured.
	Metric 8:	Consistency of Exposure Administration	Low	Details of exposure administration were reported but substantial loss of test chemical and disruption of concentration gradient (in sediment, porewater and overlying water; Tables 6, 7 and 8) was observed during the course of the experiment. These would have had significant impact on results. Also, it was reported that in some test vials, more than 20 midges emerged (pp. 260 and 261), which raises the uncertainty of the same number of midges in each test vial.
	Metric 9:	Measurement of Test Substance Concentration	Low	Measurements were obtained at several timepoints during the study for sediment, pore water, and overlying water. Time-weighted mean was presented in addition to individual measurements. Given the high volatility of the substance (evident from initial stability dosing trial, multiple samples should have been analyzed at each timepoint to understand the variability of test concentrations in sediment, porewater and overlying water instead of just analyzing one sample at each time point.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was conducted according to OECD 233.

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Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Adult
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,1,2-Trichloroethane
HERO ID:	10706027

Domain	Metric		Rating	Comments
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	Five concentrations (nominal 63-1000 mg/kg) and a control group were included in the study. Substantial loss of test chemical and disruption of concentration gradient were observed during the course of the experiment. The nominal concentrations were determined based on a range finding study, however, test concentrations were not measured in the media during the range finding test even though the initial stability dosing trail showed substantial loss of test substance.
	Metric 12:	Testing at or Below Solubility Limit	N/A	Exposures were administered in sediment.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The source and age of organisms was reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	Some pretreatment conditions were described. Organisms were added to beakers already containing treated sediment.
	Metric 15:	Number of Organisms and Replicates per Group	Low	There were eight replicate beakers (20 midges per beaker) per treatment level for a total of 160 midges per treatment level. But it was reported that in some test vials, more than 20 midges emerged (pp. 260, 2261, 269), which raises the uncertainty of the same number of midges in each test vial.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Test conditions were adequately described in Section 2.6 and 2.8.4. High ammonia was observed in overlying water at the end of the experiment. Aeration was provided even though the test guideline (OECD 233) recommends not providing aeration when testing volatile chemicals. ” When testing volatile chemicals, consideration should be given not to aerate the sediment-water system, while at the same time the validity criterion of minimal 60% ASV (paragraph 10) should be fulfilled.”
	Metric 17:	Outcome Assessment Methodology	High	The protocol for distinguishing male from female midges was described in 2.10.2.
	Metric 18:	Consistency of Outcome Assessment	High	Details of sexing observations were reported in Section 2.10.2 and appeared consistent among treatment groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Medium	Protocol deviations stated when they occurred. Increase in ammonia concentrations in overlying water with time was observed in control and treatment groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistics were adequately described in Section 2.13.

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Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Adult
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,1,2-Trichloroethane
HERO ID:	10706027

Domain	Metric		Rating	Comments
	Metric 22:	Reporting of Data	High	Data was well-described in text, tables, and figures.
	Metric 23:	Explanation of Unexpected Outcomes	Medium	No standard deviation was reported because the result is a percentage.

Additional Comments: This evaluation is for male/female sex ratio (% females in emerged midges) - Parent Generation.Measures were taken to minimize loss of volatile test substance but even then, substantial loss of test chemical and disruption of concentration gradient (in sediment, porewater and overlying water; Tables 6, 7 and 8) were observed during the course of the experiment. As such, hazard effect/end point values derived cannot be linked directly to the chemical.

Overall Quality Determination Medium

Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Adult
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,1,2-Trichloroethane
HERO ID:	10706027

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Name and CASRN of the test substance was stated in Section 2.2.2.
	Metric 2:	Test Substance Source	Low	Source was stated as Sigma Aldrich. The test substance identity was NOT analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	Purity was stated as 96.7% for test substance and 98.2% for reference substance.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	An appropriate control group was included in the experiment.
	Metric 5:	Negative Control Response	High	Biological response of the control group was reported and seemed adequate.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Uninformative	Experimental set up for the preliminary exposure was not described well. Test media preparation methods were not reported for the 2-generation static range-finding preliminary exposure.
	Metric 8:	Consistency of Exposure Administration	Low	Reporting omissions are likely to have a substantial impact on results.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured or measurements were not reported.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was conducted according to OECD 233.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	Five concentrations (nominal 8.1- 1000 mg/kg) and a control group were included in the range finding test. Test concentrations were not measured in the media during the range finding test even though the initial stability dosing trial showed substantial loss of test substance.
	Metric 12:	Testing at or Below Solubility Limit	N/A	Exposures were administered in sediment.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	Source organisms used for the range finding study were not reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized and/or whether pre-treatment conditions were the same for control and exposed groups.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	"Six replicates of 20 midges (first instar, 2 days post-hatch) each were exposed to each treatment level and the control for the P generation. Two breeding cages were included in each treatment level and the control, and four replicates of 20 midges were included with each treatment level and the control for the F generation."
Domain 5: Outcome Assessment				

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Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Adult
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,1,2-Trichloroethane
HERO ID:	10706027

Domain	Metric		Rating	Comments
	Metric 16:	Adequacy of Test Conditions	Low	Reporting of housing, environmental conditions, food, water, nutrients, and biomass loading was not sufficient to evaluate if adequate, and whether differences occurred between control and exposed populations.
	Metric 17:	Outcome Assessment Methodology	Low	The outcome assessment methodology was not clearly reported.
	Metric 18:	Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol for outcome assessment were not reported.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical analysis was conducted.
	Metric 22:	Reporting of Data	High	Results of developmental end points of P and F1 generation were reported.
	Metric 23:	Explanation of Unexpected Outcomes	Low	Insufficient information was provided to determine if excessive variability or unexpected outcomes occurred.

Additional Comments: This evaluation form is for the developmental end points measured in parent and F 1 generation in the range finding test.

Overall Quality Determination — Uninformative

Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Adult
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,1,2-Trichloroethane
HERO ID:	10706027

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Name and CASRN of the test substance was stated in Section 2.2.2.
	Metric 2:	Test Substance Source	Low	Source was stated as Sigma Aldrich. The test substance identity was NOT analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	Purity was stated as 96.7% for test substance and 98.2% for reference substance.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	An appropriate control group was included in the experiment.
	Metric 5:	Negative Control Response	High	The percent female of the emerged control adults is shown in Table 20 and seems reasonable.
	Metric 6:	Randomized Allocation	Medium	It was stated that test organisms were impartially distributed. Vessels were randomly positioned in the water bath.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	The experimental set-up well described in Section 2.8.2. Tests were conducted according to OECD guideline 233. Measures were taken to minimize loss of volatile test substance but even then, substantial loss of test chemical and disruption of concentration gradient (in sediment, porewater and overlying water; Tables 16, 17 and 18) were observed during the course of the experiment. Concentrations of test substances were measured but only one sample was measured.
	Metric 8:	Consistency of Exposure Administration	Low	Details of exposure administration were reported but substantial loss of test chemical and disruption of concentration gradient (in sediment, porewater and overlying water; Tables 16, 17 and 18) was observed during the course of the experiment. These would have had significant impact on results. Also, it was reported that in some test vials, more than 20 midges emerged (pp. 289,292, 298), which raises the uncertainty of the same number of midges in each test vial.
	Metric 9:	Measurement of Test Substance Concentration	Low	Measurements were obtained at several timepoints during the study for sediment, pore water, and overlying water. Time-weighted mean was presented in addition to individual measurements. Given the high volatility of the substance (evident from initial stability dosing trial), multiple samples should have been analyzed at each timepoint to understand the variability of test concentrations in sediment, porewater and overlying water, instead of just analyzing one sample at each time point.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was conducted according to OECD 233.

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Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Adult
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,1,2-Trichloroethane
HERO ID:	10706027

Domain	Metric		Rating	Comments
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	Five concentrations (nominal 63-1000 mg/kg) and a control group were included in the study. Substantial loss of test chemical and disruption of concentration gradient were observed during the course of the experiment. The nominal concentrations were determined based on a range finding study, however, test concentrations were not measured in the media during the range finding test even though the initial stability dosing trail showed substantial loss of test substance.
	Metric 12:	Testing at or Below Solubility Limit	N/A	Exposures were administered in sediment.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The source and age of organisms were reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	Some pretreatment conditions were described. Organisms were added to beakers already containing treated sediment.
	Metric 15:	Number of Organisms and Replicates per Group	Low	There were eight replicate beakers (20 midges per beaker) per treatment level for a total of 160 midges per treatment level. But it was reported that in some test vials, more than 20 midges emerged (pp. 289, 292, 298), which raises the uncertainty of the same number of midges in each test vial.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Test conditions were adequately described in Section 2.6 and 2.8.4. High ammonia was observed in overlying water at the end of the experiment. Aeration was provided even though the test guideline (OECD 233) recommends not providing aeration when testing volatile chemicals. ” When testing volatile chemicals, consideration should be given not to aerate the sediment-water system, while at the same time the validity criterion of minimal 60% ASV (paragraph 10) should be fulfilled.”
	Metric 17:	Outcome Assessment Methodology	High	The protocol for distinguishing male from female midges was described in 2.10.2.
	Metric 18:	Consistency of Outcome Assessment	High	Details of sexing observations were reported in Section 2.10.2 and appeared consistent among treatment groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Medium	Protocol deviations stated when they occurred. Increase in ammonia concentrations in overlying water with time was observed in control and treatment groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistics were adequately described in Section 2.13.

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Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Adult
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,1,2-Trichloroethane
HERO ID:	10706027

Domain	Metric		Rating	Comments
	Metric 22:	Reporting of Data	High	Data was well-described in text, tables, and figures.
	Metric 23:	Explanation of Unexpected Outcomes	Medium	No standard deviation was reported because the result is a percentage.

Additional Comments: This evaluation is for male/female sex ratio (% females in emerged midges) - F1 Generation.Measures were taken to minimize loss of volatile test substance but even then, substantial loss of test chemical and disruption of concentration gradient (in sediment, porewater and overlying water; Tables 16, 17 and 18) were observed during the course of the experiment. As such, hazard effect/end point values derived cannot be linked directly to the chemical.

Overall Quality Determination Medium

Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Larvae
Health Outcome:	Development/Growth
Chemical:	1,1,2-Trichloroethane
HERO ID:	10706027

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Name and CASRN of the test substance was stated in Section 2.2.2.
	Metric 2:	Test Substance Source	Low	Source was stated as Sigma Aldrich. The test substance identity was NOT analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	Purity was stated as 96.7% for test substance and 98.2% for reference substance.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	An appropriate control group was included in the experiment.
	Metric 5:	Negative Control Response	Low	Biological response of the control group was reported but did not meet acceptability criteria listed on page 53/335.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Uninformative	Experimental set up for the preliminary exposure was not described well. Test media preparation methods were not reported for the 2-generation static range-finding preliminary exposure.
	Metric 8:	Consistency of Exposure Administration	Low	Reporting omissions are likely to have a substantial impact on results.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured or measurements were not reported.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was conducted according to OECD 233.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	Five concentrations (nominal 8.1 - 1000 mg/kg) and a control group were included in the range finding test. Test concentrations were not measured in the media during the range finding test even though the initial stability dosing trial showed substantial loss of test substance.
	Metric 12:	Testing at or Below Solubility Limit	N/A	Exposures were administered in sediment.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	Source organisms used for the range finding study were not reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized and/or whether pre-treatment conditions were the same for control and exposed groups.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	"Six replicates of 20 midges (first instar, 2 days post-hatch) each were exposed to each treatment level and the control for the P generation. Two breeding cages were included in each treatment level and the control, and four replicates of 20 midges were included with each treatment level and the control for the F generation."

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Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Larvae
Health Outcome:	Development/Growth
Chemical:	1,1,2-Trichloroethane
HERO ID:	10706027

Domain	Metric		Rating	Comments
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Reporting of housing, environmental conditions, food, water, nutrients, and biomass loading was not sufficient to evaluate if adequate, and whether differences occurred between control and exposed populations.
	Metric 17:	Outcome Assessment Methodology	Low	The outcome assessment methodology was not clearly reported.
	Metric 18:	Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol for outcome assessment were not reported.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical analysis was conducted.
	Metric 22:	Reporting of Data	High	Results of developmental end points of P and F1 generation were reported.
	Metric 23:	Explanation of Unexpected Outcomes	Low	Insufficient information was provided to determine if excessive variability or unexpected outcomes occurred.

Additional Comments: This evaluation form is for the developmental end points measured in parent and F 1 generation in the range finding test.

Overall Quality Determination — Uninformative

Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Larvae
Health Outcome:	Development/Growth
Chemical:	1,1,2-Trichloroethane
HERO ID:	10706027

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Name and CASRN of the test substance was stated in Section 2.2.2.
	Metric 2:	Test Substance Source	Low	Source was stated as Sigma Aldrich. The test substance identity was NOT analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	Purity was stated as 96.7% for test substance and 98.2% for reference substance.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	An appropriate control group was included in the experiment.
	Metric 5:	Negative Control Response	High	The percent emergence in controls was 81%, which seems reasonable.
	Metric 6:	Randomized Allocation	Medium	It was stated that test organisms were impartially distributed. Vessels were randomly positioned in the water bath.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	The experimental set-up was well described in Section 2.8.2. Tests were conducted according to OECD guideline 233. Measures were taken to minimize loss of volatile test substance but even then, substantial loss of test chemical and disruption of concentration gradient (in sediment, porewater and overlying water; Tables 6, 7 and 8) were observed during the course of the experiment. Concentrations of test substances were measured but only one sample was measured.
	Metric 8:	Consistency of Exposure Administration	Low	Details of exposure administration were reported but substantial loss of test chemical and disruption of concentration gradient (in sediment, porewater and overlying water; Tables 6, 7 and 8) was observed during the course of the experiment. These would have had significant impact on results. Also, it was reported that in some test vials, more than 20 midges emerged (pp. 260 and 261), which raises the uncertainty of the same number of midges in each test vial.
	Metric 9:	Measurement of Test Substance Concentration	Low	Measurements were obtained at several timepoints during the study for sediment, pore water, and overlying water. Time-weighted mean was presented in addition to individual measurements. Given the high volatility of the substance (evident from initial stability dosing trial), multiple samples should have been analyzed at each timepoint to understand the variability of test concentrations in sediment, porewater and overlying water instead of just analyzing one sample at each time point.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was conducted according to OECD 233.

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Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Larvae
Health Outcome:	Development/Growth
Chemical:	1,1,2-Trichloroethane
HERO ID:	10706027

Domain	Metric		Rating	Comments
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	Five concentrations (nominal 63-1000 mg/kg) and a control group were included in the study. Substantial loss of test chemical and disruption of concentration gradient were observed during the course of the experiment. The nominal concentrations were determined based on a range finding study, however, test concentrations were not measured in the media during the range finding test even though the initial stability dosing trail showed substantial loss of test substance. Even when percent emergence at a particular concentration was found to be significantly reduced compared to the control (Table 10; page 71/335), the study authors conclude that 'due to the lack of a continuous dose response correlating to the exposure concentration gradient, this reduction is not considered to be treatment-related.'
	Metric 12:	Testing at or Below Solubility Limit	N/A	Exposures were administered in sediment.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The source and age of organisms were reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	Some pretreatment conditions were described. Organisms were added to beakers already containing treated sediment.
	Metric 15:	Number of Organisms and Replicates per Group	Low	There were eight replicate beakers (20 midges per beaker) per treatment level for a total of 160 midges per treatment level. But it was reported that in some test vials, more than 20 midges emerged (pp. 260, 2261, 269), which raises the uncertainty of the same number of midges in each test vial.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Test conditions were adequately described in Section 2.6 and 2.8.4. High ammonia was observed in overlying water at the end of the experiment. Aeration was provided even though the test guideline (OECD 233) recommends not providing aeration when testing volatile chemicals. " When testing volatile chemicals, consideration should be given not to aerate the sediment-water system, while at the same time the validity criterion of minimal 60% ASV (paragraph 10) should be fulfilled."
	Metric 17:	Outcome Assessment Methodology	High	The protocol for determining emergence was well described in 2.10.2.
	Metric 18:	Consistency of Outcome Assessment	High	Details of emergence observations were reported in Section 2.10.2 and appeared consistent among treatment groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Medium	Protocol deviations stated when they occurred. Increase in ammonia concentrations in overlying water with time was observed in control and treatment groups.

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Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Larvae
Health Outcome:	Development/Growth
Chemical:	1,1,2-Trichloroethane
HERO ID:	10706027

Domain	Metric		Rating	Comments
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistics were adequately described in Section 2.13.
	Metric 22:	Reporting of Data	High	Data was well-described in text, tables, and figures.
	Metric 23:	Explanation of Unexpected Outcomes	Low	”EC value was empirically estimated; therefore, the corresponding 95% confidence interval could not be determined.”

Additional Comments: This evaluation form is for the percent emergence in the parent generation. Measures were taken to minimize loss of volatile test substance but even then, substantial loss of test chemical and disruption of concentration gradient (in sediment, porewater and overlying water; Tables 6, 7 and 8) were observed during the course of the experiment. As such, hazard effect/end point values derived cannot be linked directly to the chemical.

Overall Quality Determination Medium

Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Larvae
Health Outcome:	Development/Growth
Chemical:	1,1,2-Trichloroethane
HERO ID:	10706027

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Name and CASRN of the test substance was stated in Section 2.2.2.
	Metric 2:	Test Substance Source	Low	Source was stated as Sigma Aldrich. The test substance identity was NOT analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	Purity was stated as 96.7% for test substance and 98.2% for reference substance.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	An appropriate control group was included in the experiment.
	Metric 5:	Negative Control Response	High	Percent emergence in the controls was 77% which seems reasonable.
	Metric 6:	Randomized Allocation	Medium	It was stated that test organisms were impartially distributed. Vessels were randomly positioned in the water bath.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	The experimental set-up was well described in Section 2.8.2. Tests were conducted according to OECD guideline 233. Measures were taken to minimize loss of volatile test substance but even then, substantial loss of test chemical and disruption of concentration gradient (in sediment, porewater and overlying water; Tables 16, 17 and 18) were observed during the course of the experiment. Concentrations of test substances were measured but only one sample was measured.
	Metric 8:	Consistency of Exposure Administration	Low	Details of exposure administration were reported but substantial loss of test chemical and disruption of concentration gradient (in sediment, porewater and overlying water; Tables 16, 17 and 18) was observed during the course of the experiment. These would have had significant impact on results. Also, it was reported that in some test vials, more than 20 midges emerged (pp. 289, 292, 298), which raises the uncertainty of the same number of midges in each test vial.
	Metric 9:	Measurement of Test Substance Concentration	Low	Measurements were obtained at several timepoints during the study for sediment, pore water, and overlying water. Time-weighted mean was presented in addition to individual measurements. Given the high volatility of the substance (evident from initial stability dosing trial), multiple samples should have been analyzed at each timepoint to understand the variability of test concentrations in sediment, porewater and overlying water instead of just analyzing 1 sample at each time point.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was conducted according to OECD 233.

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Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Larvae
Health Outcome:	Development/Growth
Chemical:	1,1,2-Trichloroethane
HERO ID:	10706027

Domain	Metric		Rating	Comments
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	Five concentrations (nominal 63-1000 mg/kg) and a control group were included in the study. Substantial loss of test chemical and disruption of concentration gradient were observed during the course of the experiment. The nominal concentrations were determined based on a range finding study, however, test concentrations were not measured in the media during the range finding test even though the initial stability dosing trail showed substantial loss of test substance.
	Metric 12:	Testing at or Below Solubility Limit	N/A	Exposures were administered in sediment.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The source and age of organisms was reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	Some pretreatment conditions were described. Organisms were added to beakers already containing treated sediment.
	Metric 15:	Number of Organisms and Replicates per Group	Low	There were eight replicate beakers (20 midges per beaker) per treatment level for a total of 160 midges per treatment level. But it was reported that in some test vials, more than 20 midges emerged (pp. 289, 292, 298), which raises the uncertainty of the same number of midges in each test vial.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Test conditions were adequately described in Section 2.6 and 2.8.4. High ammonia was observed in overlying water at the end of the experiment. Aeration was provided even though the test guideline (OECD 233) recommends not providing aeration when testing volatile chemicals. ” When testing volatile chemicals, consideration should be given not to aerate the sediment-water system, while at the same time the validity criterion of minimal 60% ASV (paragraph 10) should be fulfilled.”
	Metric 17:	Outcome Assessment Methodology	High	The protocol for determining emergence was well described in 2.10.2.
	Metric 18:	Consistency of Outcome Assessment	High	Details of emergence observations were reported in Section 2.10.2 and appeared consistent among treatment groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Medium	Protocol deviations were stated when they occurred. Increase in ammonia concentrations in overlying water with time was observed in control and treatment groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistics were adequately described in Section 2.13.

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Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Larvae
Health Outcome:	Development/Growth
Chemical:	1,1,2-Trichloroethane
HERO ID:	10706027

Domain	Metric		Rating	Comments
	Metric 22:	Reporting of Data	High	Data was well-described in text, tables, and figures.
	Metric 23:	Explanation of Unexpected Outcomes	High	Endpoint values were reported with confidence intervals.

Additional Comments: This evaluation form is for percent emergence - F1 Generation. Measures were taken to minimize loss of volatile test substance but even then, substantial loss of test chemical and disruption of concentration gradient (in sediment, porewater and overlying water; Tables 16, 17 and 18) were observed during the course of the experiment. As such, hazard effect/endpoint values derived cannot be directly linked to the tested chemical.

Overall Quality Determination Medium

Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Adult
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,1,2-Trichloroethane
HERO ID:	10706027

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Name and CASRN of the test substance was stated in Section 2.2.2.
	Metric 2:	Test Substance Source	Low	Source was stated as Sigma Aldrich. The test substance identity was NOT analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	Purity was stated as 96.7% for test substance and 98.2% for reference substance.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	An appropriate control group was included in the experiment.
	Metric 5:	Negative Control Response	High	Fecundity and fertility of the control group is shown in Table 11 and they seem reasonable.
	Metric 6:	Randomized Allocation	Medium	It was stated that test organisms were impartially distributed. Vessels were randomly positioned in the water bath.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	The experimental set-up was well described in Section 2.8.2. Tests were conducted according to OECD guideline 233. Measures were taken to minimize loss of volatile test substance but even then, substantial loss of test chemical and disruption of concentration gradient (in sediment, porewater and overlying water; Tables 6, 7 and 8) were observed during the course of the experiment. Concentrations of test substances were measured but only one sample was measured. Comparison of the test chemical concentrations in overlying water in the P generation test vessels versus the breeding cages, showed that concentrations were not similar on day 13/14.
	Metric 8:	Consistency of Exposure Administration	Low	Details of exposure administration were reported but substantial loss of test chemical and disruption of concentration gradient (in sediment, porewater and overlying water; Tables 6, 7 and 8) was observed during the course of the experiment. These would have had significant impact on results. Comparison of the test chemical concentrations in overlying water in the P generation test vessels versus the breeding cages, showed that concentrations were not similar on day 13/14.
	Metric 9:	Measurement of Test Substance Concentration	Low	Measurements were obtained at several timepoints during the study for sediment, pore water, and overlying water. Time-weighted mean was presented in addition to individual measurements. Given the high volatility of the substance (evident from initial stability dosing trial), multiple samples should have been analyzed at each timepoint to understand the variability of test concentrations in sediment, porewater and overlying water, instead of just analyzing one sample at each time point.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was conducted according to OECD 233.

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Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Adult
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,1,2-Trichloroethane
HERO ID:	10706027

Domain	Metric		Rating	Comments
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	Five concentrations (nominal 63-1000 mg/kg) and a control group were included in the study. Substantial loss of test chemical and disruption of concentration gradient were observed during the course of the experiment. The nominal concentrations were determined based on a range finding study, however, tests concentrations were not measured in the media during the range finding test even though the initial stability dosing trail showed substantial loss of test substance. For reproduction, fecundity and fertility results are expressed on the basis of time weighted sediment concentration measurement in the P generation vials. It would have been better if the sediment concentration in the breeding cages were measured.
	Metric 12:	Testing at or Below Solubility Limit	N/A	Exposures were administered in sediment.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The source and age of organisms were reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	Some pretreatment conditions were described. Organisms were added to beakers already containing treated sediment.
	Metric 15:	Number of Organisms and Replicates per Group	Low	There were eight replicate beakers (20 midges per beaker) per treatment level for a total of 160 midges per treatment level. But it was reported that in some test vials, more than 20 midges emerged (pp. 260, 2261, 269), which raises the uncertainty of the same number of midges in each test vial.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Test conditions were adequately described in Section 2.6 and 2.8.4. High ammonia was observed in overlying water at the end of the experiment. Aeration was provided even though the test guideline (OECD 233) recommends not providing aeration when testing volatile chemicals. " When testing volatile chemicals, consideration should be given not to aerate the sediment-water system, while at the same time the validity criterion of minimal 60% ASV (paragraph 10) should be fulfilled."
	Metric 17:	Outcome Assessment Methodology	High	The protocol for determining fecundity and fertility was described in 2.10.3.
	Metric 18:	Consistency of Outcome Assessment	High	Details of fecundity and fertility observations were reported in Section 2.10.3 and appeared consistent among treatment groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Medium	Protocol deviations stated when they occurred. Increase in ammonia concentrations in overlying water with time was observed in control and treatment groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.

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Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Adult
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,1,2-Trichloroethane
HERO ID:	10706027

Domain	Metric		Rating	Comments
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistics were adequately described in Section 2.13.
	Metric 22:	Reporting of Data	High	Data was well-described in text, tables, and figures.
	Metric 23:	Explanation of Unexpected Outcomes	Low	The EC value was empirically estimated; therefore, the corresponding 95% confidence interval could not be determined.

Additional Comments: This evaluation form is for the number of egg masses per female (fecundity) and number of fertile egg masses (fertility) - Parent Generation. Measures were taken to minimize loss of volatile test substance but even then, substantial loss of test chemical and disruption of concentration gradient (in sediment, porewater and overlying water; Tables 6, 7 and 8) were observed during the course of the experiment. As such, hazard effect/endpoint values derived cannot be directly linked to the tested chemical.

Overall Quality Determination Medium

Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Adult
Health Outcome:	Development/Growth
Chemical:	1,1,2-Trichloroethane
HERO ID:	10706027

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Name and CASRN of the test substance was stated in Section 2.2.2.
	Metric 2:	Test Substance Source	Low	Source was stated as Sigma Aldrich. The test substance identity was NOT analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	Purity was stated as 96.7% for test substance and 98.2% for reference substance.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	An appropriate control group was included in the experiment.
	Metric 5:	Negative Control Response	High	Control male, female, and combined developmental rates are shown in Table 10, and they seem reasonable.
	Metric 6:	Randomized Allocation	Medium	It was stated that test organisms were impartially distributed. Vessels were randomly positioned in the water bath.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	The experimental set-up was well described in Section 2.8.2. Tests were conducted according to OECD guideline 233. Measures were taken to minimize loss of volatile test substance but even then, substantial loss of test chemical and disruption of concentration gradient (in sediment, porewater and overlying water; Tables 6, 7 and 8) were observed during the course of the experiment. Concentrations of test substances were measured but only one sample was measured.
	Metric 8:	Consistency of Exposure Administration	Low	Details of exposure administration were reported but substantial loss of test chemical and disruption of concentration gradient (in sediment, porewater and overlying water; Tables 6, 7 and 8) was observed during the course of the experiment. These would have had significant impact on results. Also, it was reported that in some test vials, more than 20 midges emerged (pp 260 and 261), which raises the uncertainty of the same number of midges in each test vial.
	Metric 9:	Measurement of Test Substance Concentration	Low	Measurements were obtained at several timepoints during the study for sediment, pore water, and overlying water. Time-weighted mean was presented in addition to individual measurements. Given the high volatility of the substance (evident from initial stability dosing trial), multiple samples should have been analyzed at each timepoint to understand the variability of test concentrations in sediment, porewater and overlying water, instead of just analyzing one sample at each time point.
	Metric 10:	Exposure Duration and Frequency	High	The exposure duration was conducted according to OECD 233.

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Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Adult
Health Outcome:	Development/Growth
Chemical:	1,1,2-Trichloroethane
HERO ID:	10706027

Domain	Metric		Rating	Comments
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	Five concentrations (nominal 63-1000 mg/kg) and a control group were included in the study. Substantial loss of test chemical and disruption of concentration gradient were observed during the course of the experiment. The nominal concentrations were determined based on a range finding study, however, test concentrations were not measured in the media during the range finding test even though the initial stability dosing trail showed substantial loss of test substance. Negative findings for mean individual and combined (female/male) developmental rate could have been the result of the disruption of the concentration gradient.
	Metric 12:	Testing at or Below Solubility Limit	N/A	Exposures were administered in sediment.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The source and age of organisms were reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	Organisms were added to beakers already containing treated sediment. All pretreatment conditions were the same for control and exposed organisms.
	Metric 15:	Number of Organisms and Replicates per Group	Low	There were eight replicate beakers (20 midges per beaker) per treatment level for a total of 160 midges per treatment level. But it was reported that in some test vials, more than 20 midges emerged (pp. 260, 261, 269), which raises the uncertainty of the same number of midges in each test vial.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Test conditions were adequately described in Section 2.6 and 2.8.4. High ammonia was observed in overlying water at the end of the experiment. Aeration was provided even though the test guideline (OECD 233) recommends not providing aeration when testing volatile chemicals. ” When testing volatile chemicals, consideration should be given not to aerate the sediment-water system, while at the same time the validity criterion of minimal 60% ASV (paragraph 10) should be fulfilled.”
	Metric 17:	Outcome Assessment Methodology	High	The protocol for determining developmental rate was well described in 2.10.2.
	Metric 18:	Consistency of Outcome Assessment	High	Details of emergence time observations were reported in Section 2.10.2 and appeared consistent among treatment groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Medium	Protocol deviations stated when they occurred. Increase in ammonia concentrations in overlying water with time was observed in control and treatment groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.

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Study Citation:	Smithers, (2023). 1,1,2-Trichloroethane - Sediment-water chironomid (Chironomus riparius) life-cycle toxicity test using spiked sediment, following OECD Guideline 233.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Sediment; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Chironomus riparius*; Adult
Health Outcome:	Development/Growth
Chemical:	1,1,2-Trichloroethane
HERO ID:	10706027

Domain	Metric		Rating	Comments
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistics were adequately described in Section 2.13.
	Metric 22:	Reporting of Data	High	Data was well-described in text, tables, and figures.
	Metric 23:	Explanation of Unexpected Outcomes	Low	Endpoint values for development rate were empirically estimated, therefore corresponding 95% confidence could not be determined.

Additional Comments: This evaluation form is for developmental rate - parent generation (M/F/Combined). Measures were taken to minimize loss of volatile test substance but even then, substantial loss of test chemical and disruption of concentration gradient (in sediment, porewater and overlying water; Tables 6, 7 and 8) were observed during the course of the experiment. As such, hazard effect/endpoint values derived cannot be directly linked to the tested chemical.

Overall Quality Determination Medium

Study Citation:	Boeri, R.L. (1988). Letter from dow chem co to us epa regarding submission of final study reports for 1,2-dichloropropane with attachments.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloropropane
HERO ID:	5468652

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified definitively.
	Metric 2:	Test Substance Source	High	The source, lot number and form of the test substance was reported and it was analytically verified.
	Metric 3:	Test Substance Purity	High	Purity was reported as 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	The biological responses (survival) of the negative control group were adequate.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	The study provided only limited details on the measures taken to appropriately prepare test concentrations.
	Metric 8:	Consistency of Exposure Administration	Medium	Few details were provided for the preliminary test.
	Metric 9:	Measurement of Test Substance Concentration	High	Exposure concentrations were measured using appropriate analytical technologies and methods.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure and/or exposure frequency were reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The number of exposure groups and spacing of exposure levels were justified for a dose response.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were at or below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The test organisms were acclimatized to test conditions and all pretreatment conditions were the same for control and exposed organisms.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Organism environmental conditions were conducive to maintenance of organism health.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology reported the intended outcome of interest.

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Study Citation:	Boeri, R.L. (1988). Letter from dow chem co to us epa regarding submission of final study reports for 1,2-dichloropropane with attachments.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloropropane
HERO ID:	5468652

Domain	Metric		Rating	Comments
	Metric 18:	Consistency of Outcome Assessment	High	Outcomes were assessed consistently across study groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors.
	Metric 20:	Outcomes Unrelated to Exposure	High	There were no differences among groups that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical methods (including any calculations or data transformations) were clearly described.
	Metric 22:	Reporting of Data	High	Data for exposure-related findings were presented for each treatment and control group.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: This evaluation is for the preliminary test.

Overall Quality Determination High

Study Citation:	LeBlanc, G. A. (1980). Acute toxicity of priority pollutants to water flea (Daphnia magna). Bulletin of Environmental Contamination and Toxicology 24(5):684-691.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	o-Dichlorobenzene
HERO ID:	7508

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	The chemical was identified by name only.
	Metric 2:	Test Substance Source	Low	The test substance identity was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	Low	Purity and/or grade of test substance were not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	Mortality among water flea control populations never exceeded 10% in any test.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	The study provided only limited details on the measures taken to appropriately prepare test concentrations. Methods were generalized for multiple chemicals.
	Metric 8:	Consistency of Exposure Administration	Medium	Reporting omissions could have a substantial impact on results.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure was reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	Range or spacing of test concentrations was not reported.
	Metric 12:	Testing at or Below Solubility Limit	Low	Reporting omissions prevented determination of whether exposure concentrations exceeded the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	The original source was not reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized.
	Metric 15:	Number of Organisms and Replicates per Group	Low	The number of test organisms and/or replicates was not reported.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Environmental conditions of the test system were conducive to maintenance of organism health.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed the intended outcome of interest.

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Study Citation:	LeBlanc, G. A. (1980). Acute toxicity of priority pollutants to water flea (Daphnia magna). Bulletin of Environmental Contamination and Toxicology 24(5):684-691.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	o-Dichlorobenzene
HERO ID:	7508

Domain	Metric		Rating	Comments
	Metric 18:	Consistency of Outcome Assessment	High	Details regarding the execution of the study protocol for outcome assessment (observation of heartbeat) were limited.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Not including control mortality in final calculation was reason to downgrade this.
	Metric 22:	Reporting of Data	Low	Data for exposure-related findings were not shown for each treatment and control group.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: None

Overall Quality Determination Medium

Study Citation:	LeBlanc, G. A. (1980). Acute toxicity of priority pollutants to water flea (Daphnia magna). Bulletin of Environmental Contamination and Toxicology 24(5):684-691.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,1,2-Trichloroethane
HERO ID:	7508

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	The chemical was identified by name only.
	Metric 2:	Test Substance Source	Low	The test substance identity was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	Low	Purity and/or grade of test substance were not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	Mortality among water flea control populations never exceeded 10% in any test.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	The study provided only limited details on the measures taken to appropriately prepare test concentrations. Methods were generalized for multiple chemicals.
	Metric 8:	Consistency of Exposure Administration	Medium	Reporting omissions could have a substantial impact on results.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure was reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	Range or spacing of test concentrations was not reported.
	Metric 12:	Testing at or Below Solubility Limit	Low	Reporting omissions prevented determination of whether exposure concentrations exceeded the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	The original source was not reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized.
	Metric 15:	Number of Organisms and Replicates per Group	Low	The number of test organisms and/or replicates was not reported.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Environmental conditions of the test system were conducive to maintenance of organism health.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed the intended outcome of interest.
	Metric 18:	Consistency of Outcome Assessment	High	Details regarding the execution of the study protocol for outcome assessment (observation of heartbeat) were limited.

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Study Citation:	LeBlanc, G. A. (1980). Acute toxicity of priority pollutants to water flea (Daphnia magna). Bulletin of Environmental Contamination and Toxicology 24(5):684-691.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,1,2-Trichloroethane
HERO ID:	7508

Domain	Metric		Rating	Comments
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Not including control mortality in final calculation was reason to downgrade this.
	Metric 22:	Reporting of Data	Low	Data for exposure-related findings were not shown for each treatment and control group.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: None

Overall Quality Determination Medium

Study Citation:	LeBlanc, G. A. (1980). Acute toxicity of priority pollutants to water flea (Daphnia magna). Bulletin of Environmental Contamination and Toxicology 24(5):684-691.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane
HERO ID:	7508

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	The chemical was identified by name only.
	Metric 2:	Test Substance Source	Low	The test substance identity was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	Low	Purity and/or grade of test substance were not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	Mortality among water flea control populations never exceeded 10% in any test.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	The study provided only limited details on the measures taken to appropriately prepare test concentrations. Methods were generalized for multiple chemicals.
	Metric 8:	Consistency of Exposure Administration	Medium	Reporting omissions could have a substantial impact on results.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure was reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	Range or spacing of test concentrations was not reported.
	Metric 12:	Testing at or Below Solubility Limit	Low	Reporting omissions prevented determination of whether exposure concentrations exceeded the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	The original source was not reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized.
	Metric 15:	Number of Organisms and Replicates per Group	Low	The number of test organisms and/or replicates was not reported.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Environmental conditions of the test system were conducive to maintenance of organism health.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed the intended outcome of interest.
	Metric 18:	Consistency of Outcome Assessment	High	Details regarding the execution of the study protocol for outcome assessment (observation of heartbeat) were limited.

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Study Citation:	LeBlanc, G. A. (1980). Acute toxicity of priority pollutants to water flea (Daphnia magna). Bulletin of Environmental Contamination and Toxicology 24(5):684-691.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,2-Dichloroethane
HERO ID:	7508

Domain		Metric	Rating	Comments
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Not including control mortality in final calculation was reason to downgrade this.
	Metric 22:	Reporting of Data	Low	Data for exposure-related findings were not shown for each treatment and control group.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: None

Overall Quality Determination Medium

Study Citation:	LeBlanc, G. A. (1980). Acute toxicity of priority pollutants to water flea (Daphnia magna). Bulletin of Environmental Contamination and Toxicology 24(5):684-691.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	trans-1,2-dichloroethylene
HERO ID:	7508

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	The chemical was identified by name only.
	Metric 2:	Test Substance Source	Low	The test substance identity was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	Low	Purity and/or grade of test substance were not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	Mortality among water flea control populations never exceeded 10% in any test.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	The study provided only limited details on the measures taken to appropriately prepare test concentrations. Methods were generalized for multiple chemicals.
	Metric 8:	Consistency of Exposure Administration	Medium	Reporting omissions could have a substantial impact on results.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure was reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	Range or spacing of test concentrations was not reported.
	Metric 12:	Testing at or Below Solubility Limit	Low	Reporting omissions prevented determination of whether exposure concentrations exceeded the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	The original source was not reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized.
	Metric 15:	Number of Organisms and Replicates per Group	Low	The number of test organisms and/or replicates was not reported.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Environmental conditions of the test system were conducive to maintenance of organism health.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed the intended outcome of interest.
	Metric 18:	Consistency of Outcome Assessment	High	Details regarding the execution of the study protocol for outcome assessment (observation of heartbeat) were limited.

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Study Citation:	LeBlanc, G. A. (1980). Acute toxicity of priority pollutants to water flea (Daphnia magna). Bulletin of Environmental Contamination and Toxicology 24(5):684-691.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	trans-1,2-dichloroethylene
HERO ID:	7508

Domain	Metric		Rating	Comments
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Not including control mortality in final calculation was reason to downgrade this.
	Metric 22:	Reporting of Data	Low	Data for exposure-related findings were not shown for each treatment and control group.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: None

Overall Quality Determination Medium

Study Citation:	LeBlanc, G. A. (1980). Acute toxicity of priority pollutants to water flea (Daphnia magna). Bulletin of Environmental Contamination and Toxicology 24(5):684-691.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,2-Dichloropropane
HERO ID:	7508

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	The chemical was identified by name only.
	Metric 2:	Test Substance Source	Low	The test substance identity was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	Low	Purity and/or grade of test substance were not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	Mortality among water flea control populations never exceeded 10% in any test.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	The study provided only limited details on the measures taken to appropriately prepare test concentrations. Methods were generalized for multiple chemicals.
	Metric 8:	Consistency of Exposure Administration	Medium	Reporting omissions could have a substantial impact on results.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure was reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Low	Range or spacing of test concentrations was not reported.
	Metric 12:	Testing at or Below Solubility Limit	Low	Reporting omissions prevented determination of whether exposure concentrations exceeded the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Medium	The original source was not reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized.
	Metric 15:	Number of Organisms and Replicates per Group	Low	The number of test organisms and/or replicates was not reported.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Environmental conditions of the test system were conducive to maintenance of organism health.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed the intended outcome of interest.
	Metric 18:	Consistency of Outcome Assessment	High	Details regarding the execution of the study protocol for outcome assessment (observation of heartbeat) were limited.

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Study Citation:	LeBlanc, G. A. (1980). Acute toxicity of priority pollutants to water flea (Daphnia magna). Bulletin of Environmental Contamination and Toxicology 24(5):684-691.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Mortality
Chemical:	1,2-Dichloropropane
HERO ID:	7508

Domain	Metric		Rating	Comments
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Not including control mortality in final calculation was reason to downgrade this.
	Metric 22:	Reporting of Data	Low	Data for exposure-related findings were not shown for each treatment and control group.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: None

Overall Quality Determination — Medium

Study Citation:	Boeri, R.L. (1988). Letter from dow chem co to us epa regarding submission of final study reports for 1,2-dichloropropane with attachments.
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,2-Dichloropropane
HERO ID:	5468652

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified definitively.
	Metric 2:	Test Substance Source	High	The source, lot number and form of the test substance was reported and it was analytically verified.
	Metric 3:	Test Substance Purity	High	Purity was reported as 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	The biological responses (survival) of the negative control group were adequate.
	Metric 6:	Randomized Allocation	Medium	The study reported that organisms were randomly allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and methods for preparation of test media were described in adequate detail.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Exposure concentrations were measured using appropriate analytical technologies and methods.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure and/or exposure frequency were reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The number of exposure groups and spacing of exposure levels were justified for a dose response.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were at or below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The test organisms were acclimatized to test conditions and all pretreatment conditions were the same for control and exposed organisms.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The number of test organisms and replicates were reported and sufficient to characterize toxicological effects.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Organism environmental conditions were conducive to maintenance of organism health.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology reported the intended outcome of interest.

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Study Citation:	Boeri, R.L. (1988). Letter from dow chem co to us epa regarding submission of final study reports for 1,2-dichloropropane with attachments.
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,2-Dichloropropane
HERO ID:	5468652

Domain	Metric		Rating	Comments
	Metric 18:	Consistency of Outcome Assessment	High	Outcomes were assessed consistently across study groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors.
	Metric 20:	Outcomes Unrelated to Exposure	High	There were no differences among groups that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical methods (including any calculations or data transformations) were clearly described.
	Metric 22:	Reporting of Data	High	Data for exposure-related findings were presented for each treatment and control group.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: None

Overall Quality Determination High

Study Citation:	Boeri, R.L. (1988). Letter from dow chem co to us epa regarding submission of final study reports for 1,2-dichloropropane with attachments.
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloropropane
HERO ID:	5468652

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified definitively.
	Metric 2:	Test Substance Source	High	The source, lot number and form of the test substance was reported and it was analytically verified.
	Metric 3:	Test Substance Purity	High	Purity was reported as 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	The biological responses (survival) of the negative control group were adequate.
	Metric 6:	Randomized Allocation	Medium	The study reported that organisms were randomly allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and methods for preparation of test media were described in adequate detail.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Exposure concentrations were measured using appropriate analytical technologies and methods.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure and/or exposure frequency were reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The number of exposure groups and spacing of exposure levels were justified for a dose response.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were at or below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The test organisms were acclimatized to test conditions and all pretreatment conditions were the same for control and exposed organisms.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The number of test organisms and replicates were reported and sufficient to characterize toxicological effects.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Organism environmental conditions were conducive to maintenance of organism health.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology reported the intended outcome of interest.
	Metric 18:	Consistency of Outcome Assessment	High	Outcomes were assessed consistently across study groups.

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Study Citation:	Boeri, R.L. (1988). Letter from dow chem co to us epa regarding submission of final study reports for 1,2-dichloropropane with attachments.
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 11 - 21 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Daphnia magna*; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloropropane
HERO ID:	5468652

Domain	Metric		Rating	Comments
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors.
	Metric 20:	Outcomes Unrelated to Exposure	High	There were no differences among groups that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical methods (including any calculations or data transformations) were clearly described.
	Metric 22:	Reporting of Data	High	Data for exposure-related findings were presented for each treatment and control group.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: None

Overall Quality Determination High

Study Citation:	Boeri, R.L. (1988). Letter from dow chem co to us epa regarding submission of final study reports for 1,2-dichloropropane with attachments.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Mysidopsis bahia*; 4-5 day; Adult
Health Outcome:	Mortality
Chemical:	1,2-Dichloropropane
HERO ID:	5468652

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified definitively.
	Metric 2:	Test Substance Source	High	The source, lot number and form of the test substance was reported and it was analytically verified.
	Metric 3:	Test Substance Purity	High	Purity was reported as 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	Uninformative	The biological responses (survival) of the negative control group were inadequate. Mortality was 40%.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Low	The study provided only limited details on the measures taken to appropriately prepare the test concentration.
	Metric 8:	Consistency of Exposure Administration	Medium	Few details were provided for the preliminary test.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were not measured.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure and/or exposure frequency were reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The number of exposure groups and spacing of exposure levels were justified for a dose response.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were at or below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized.
	Metric 15:	Number of Organisms and Replicates per Group	Low	Replicates were not used in this preliminary test.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Few details were provided regarding organism health.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology reported the intended outcome of interest.

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Study Citation:	Boeri, R.L. (1988). Letter from dow chem co to us epa regarding submission of final study reports for 1,2-dichloropropane with attachments.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Mysidopsis bahia*; 4-5 day; Adult
Health Outcome:	Mortality
Chemical:	1,2-Dichloropropane
HERO ID:	5468652

Domain	Metric		Rating	Comments
	Metric 18:	Consistency of Outcome Assessment	High	Outcomes were assessed consistently across study groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors.
	Metric 20:	Outcomes Unrelated to Exposure	Low	There was high control mortality on the last day.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical methods (including any calculations or data transformations) were clearly described.
	Metric 22:	Reporting of Data	High	Data for exposure-related findings were presented for each treatment and control group.
	Metric 23:	Explanation of Unexpected Outcomes	Low	There was no explanation for the unexpected outcome of high control mortality.QC: Vapor cross contamination occurred between treatment and control groups from common effluent drain. This condition was corrected in the definitive tests.

Additional Comments: This evaluation is for the preliminary test.

Overall Quality Determination Uninformative

Study Citation:	Schäfer, H., Hettler, H., Fritsche, U., Pitzen, G., Röderer, G., Wenzel, A. (1994). Biotests using unicellular algae and ciliates for predicting long-term effects of toxicants. Ecotoxicology and Environmental Safety 27(1):64-81.
Duration:	Overall Duration: 4 - 10 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Chlamydomonas reinhardi*; strain 11-3Qa; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloropropane
HERO ID:	2797876

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Low	The chemical was identified by name only.
	Metric 2:	Test Substance Source	Low	Shell Research Limited was described as the source. It did not appear that the chemicals were analytically verified before use in the tests.
	Metric 3:	Test Substance Purity	Low	Purity and grade of the test substance were not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	Low	A negative control group was mentioned in the footnote on page 66. "NOEC, highest concentration tested that had no significant effect relative to the control."
	Metric 5:	Negative Control Response	Low	The biological response of the negative control groups was not reported.
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	1,2 dichloropropane was only tested in the flow through system due to its volatile nature. Stock solution preparation was described in adequate detail.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported, and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Chemical analysis was performed at the end of the equilibration period, as well as every 3-4 days during the test.
	Metric 10:	Exposure Duration and Frequency	High	The 10-day exposure appeared to be suitable for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The number of exposure groups and spacing of exposure levels were justified for a dose response.
	Metric 12:	Testing at or Below Solubility Limit	High	A solvent was used to aid in solubility. The solvent concentration never exceeded 0.1g/L.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized and/or whether pre-treatment conditions were the same for control and exposed groups.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The initial algae concentration was 1000 cells/mL per test container.
Domain 5: Outcome Assessment				

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Study Citation:	Schäfer, H., Hettler, H., Fritsche, U., Pitzen, G., Röderer, G., Wenzel, A. (1994). Biotests using unicellular algae and ciliates for predicting long-term effects of toxicants. Ecotoxicology and Environmental Safety 27(1):64-81.
Duration:	Overall Duration: 4 - 10 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Chlamydomonas reinhardi*; strain 11-3Qa; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloropropane
HERO ID:	2797876

Domain	Metric		Rating	Comments
	Metric 16:	Adequacy of Test Conditions	High	Organism housing appeared adequate as the preculture was in the exponential growth phase when inoculum was prepared. This indicates a healthy culture.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome of interest. The NOECs and EC50s were calculated at 4, 7, and 10 days.
	Metric 18:	Consistency of Outcome Assessment	High	Population density was determined using an electronic particle counter and EC values were determined using OECD guidelines.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions or other non-treatment-related factors across study groups.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups in animal attrition or health outcomes unrelated to exposure.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	Statistical analysis was performed but not described adequately. OECD Guideline 201 was cited for EC50 values where performed, but no other information was provided.
	Metric 22:	Reporting of Data	Medium	Control group data was not included in the publication.
	Metric 23:	Explanation of Unexpected Outcomes	Low	No measures of variability were reported.

Additional Comments: A concurrent negative control group was not included or reported. The1,2 dichloropropane was only tested with Chlamydomonas reinhardi in the flow through tests due to its volatile nature. The flow through test appeared to only measure population growth and not photosynthesis like the static tests did.

Overall Quality Determination — Medium

Study Citation:	Boeri, R.L. (1988). Letter from dow chem co to us epa regarding submission of final study reports for 1,2-dichloropropane with attachments.
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Selenastrum capricornutum*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloropropane
HERO ID:	5468652

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified definitively.
	Metric 2:	Test Substance Source	Low	The test substance identity was NOT analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	Purity was reported as 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	The biological responses (survival) of the negative control group were adequate.
	Metric 6:	Randomized Allocation	Medium	The study reported that test flasks were randomly redistributed each sampling day.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and methods for preparation of test media were described in adequate detail.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	Low	Exposure concentrations were measured using appropriate analytical technologies and methods.QC: Because of leakage of screw capped flasks, measured concentrations showed extreme variability among replicates and no correlation to initial concentration.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure and/or exposure frequency were reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The number of exposure groups and spacing of exposure levels were justified for a dose response.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were at or below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	All pretreatment conditions were the same for control and exposed organisms.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The number of test organisms and replicates (3) were reported and sufficient to characterize toxicological effects.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Organism environmental conditions were conducive to maintenance of organism health.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology reported the intended outcome of interest, and it also reported a comparison of algicidal versus algistatic response.

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Study Citation:	Boeri, R.L. (1988). Letter from dow chem co to us epa regarding submission of final study reports for 1,2-dichloropropane with attachments.
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Aquatic (freshwater); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Selenastrum capricornutum*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloropropane
HERO ID:	5468652

Domain	Metric		Rating	Comments
	Metric 18:	Consistency of Outcome Assessment	High	Outcomes were assessed consistently across study groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors.
	Metric 20:	Outcomes Unrelated to Exposure	High	There were no differences among groups that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical methods were reasonably well described.
	Metric 22:	Reporting of Data	High	Data for exposure-related findings were presented for each treatment and control group.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: None

Overall Quality Determination High

Study Citation:	Boeri, R.L. (1988). Letter from dow chem co to us epa regarding submission of final study reports for 1,2-dichloropropane with attachments.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Mysidopsis bahia*; Larvae
Health Outcome:	Mortality
Chemical:	1,2-Dichloropropane
HERO ID:	5468652

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified definitively.
	Metric 2:	Test Substance Source	High	The source, lot number and form of the test substance were reported, and the substance was analytically verified.
	Metric 3:	Test Substance Purity	High	Purity was reported as 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	The biological responses (survival) of the negative control group were adequate.
	Metric 6:	Randomized Allocation	Medium	The study reported that organisms were randomly allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and methods for preparation of test media were described in adequate detail.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Exposure concentrations were measured using appropriate analytical technologies and methods.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure and/or exposure frequency were reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The number of exposure groups and spacing of exposure levels were justified for a dose response.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were at or below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized.
	Metric 15:	Number of Organisms and Replicates per Group	Low	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects, although only two replicates were used.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Organism environmental conditions were conducive to maintenance of organism health.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology reported the intended outcome of interest.

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Study Citation:	Boeri, R.L. (1988). Letter from dow chem co to us epa regarding submission of final study reports for 1,2-dichloropropane with attachments.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Mysidopsis bahia*; Larvae
Health Outcome:	Mortality
Chemical:	1,2-Dichloropropane
HERO ID:	5468652

Domain	Metric		Rating	Comments
	Metric 18:	Consistency of Outcome Assessment	High	Outcomes were assessed consistently across study groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors.
	Metric 20:	Outcomes Unrelated to Exposure	High	There were no differences among groups that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical methods were clearly described.
	Metric 22:	Reporting of Data	High	Data for exposure-related findings were presented for each treatment and control group.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: None

Overall Quality Determination High

Study Citation:	Boeri, R.L. (1988). Letter from dow chem co to us epa regarding submission of final study reports for 1,2-dichloropropane with attachments.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Mysidopsis bahia*; 3-4 day; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloropropane
HERO ID:	5468652

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified definitively.
	Metric 2:	Test Substance Source	High	The source, lot number and form of the test substance were reported and the substance was analytically verified.
	Metric 3:	Test Substance Purity	High	Purity was reported as 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	The biological responses (survival) of the negative control group were adequate.
	Metric 6:	Randomized Allocation	Medium	The study reported that organisms were randomly allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and methods for preparation of test media were described in adequate detail.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Exposure concentrations were measured using appropriate analytical technologies and methods.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure and/or exposure frequency were reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Medium	The highest concentration did not have a sufficient response to calculate an LC50.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were at or below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether test organisms were acclimatized.
	Metric 15:	Number of Organisms and Replicates per Group	Low	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects, although only two replicates were used.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Organism environmental conditions were conducive to maintenance of organism health.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology reported the intended outcome of interest.
	Metric 18:	Consistency of Outcome Assessment	High	Outcomes were assessed consistently across study groups.

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Study Citation:	Boeri, R.L. (1988). Letter from dow chem co to us epa regarding submission of final study reports for 1,2-dichloropropane with attachments.
Duration:	Overall Duration: 0 - 4 days (0-96h); Exposure Duration: 0 - 4 days (0-96h)
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Mysidopsis bahia*; 3-4 day; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloropropane
HERO ID:	5468652

Domain	Metric		Rating	Comments
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors.
	Metric 20:	Outcomes Unrelated to Exposure	High	There were no differences among groups that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical methods were clearly described.
	Metric 22:	Reporting of Data	High	Data for exposure-related findings were presented for each treatment and control group.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: None

Overall Quality Determination High

Study Citation:	Hunter/ESE Inc, (1989). 1,2-Dichloropropane: chronic toxicity to the mysid under flow-through conditions with cover letter.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Mysidopsis bahia*; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloropropane
HERO ID:	2803625

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified definitively.
	Metric 2:	Test Substance Source	Low	The test substance identity was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	Chemical purity was reported as 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	The biological responses of the negative control group were adequate.
	Metric 6:	Randomized Allocation	Medium	The study reported that organisms were randomly allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Medium	The experimental system and methods for preparation of test media were described in adequate detail. Notable loss of the test substance was observed, but concentrations were measured.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported, but minor inconsistencies in administration of exposures among study groups were identified.
	Metric 9:	Measurement of Test Substance Concentration	High	Exposure concentrations were measured using appropriate analytical technologies and methods.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure and/or exposure frequency were reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Medium	The number of exposure groups and spacing of exposure levels were not adequate to calculate a dose response curve. Due to volatilization of the test substance, exposure concentrations were fairly close together and no effects were observed. The NOEC value provided is a greater than value.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were at or below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The test organisms were acclimatized to test conditions and all pretreatment conditions were the same for control and exposed organisms.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects.
Domain 5: Outcome Assessment				

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Study Citation:	Hunter/ESE Inc, (1989). 1,2-Dichloropropane: chronic toxicity to the mysid under flow-through conditions with cover letter.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Mysidopsis bahia*; Juvenile
Health Outcome:	Mortality
Chemical:	1,2-Dichloropropane
HERO ID:	2803625

Domain	Metric		Rating	Comments
	Metric 16:	Adequacy of Test Conditions	Medium	Minor limitations were identified regarding environmental conditions, but these are not likely to have a substantial impact on results.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome(s) of interest.
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Medium	The study reported minor differences among the study groups with respect to environmental conditions or other non-treatment-related factors, but these are unlikely to have a substantial impact on results.
	Metric 20:	Outcomes Unrelated to Exposure	High	There were no differences among groups that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical methods were clearly described.
	Metric 22:	Reporting of Data	High	Data for exposure-related findings were presented for each treatment and control group and were adequate to determine values.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: The number of exposure groups and spacing of exposure levels were not adequate to calculate a dose response curve. Due to volatilization of the test substance exposure, the test concentrations were close together and no effects were observed. A greater than NOEC value is provided.

Overall Quality Determination High

Study Citation:	Hunter/ESE Inc, (1989). 1,2-Dichloropropane: chronic toxicity to the mysid under flow-through conditions with cover letter.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Mysidopsis bahia*; Juvenile
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,2-Dichloropropane
HERO ID:	2803625

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified definitively.
	Metric 2:	Test Substance Source	Low	The test substance identity was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	Chemical purity was reported as 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	The biological responses of the negative control group were adequate.
	Metric 6:	Randomized Allocation	Medium	The study reported that organisms were randomly allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Medium	The experimental system and methods for preparation of test media were described in adequate detail. Notable loss of the test substance was observed, but concentrations were measured.
	Metric 8:	Consistency of Exposure Administration	Medium	Details of exposure administration were reported, but minor inconsistencies in administration of exposures among study groups were identified.
	Metric 9:	Measurement of Test Substance Concentration	High	Exposure concentrations were measured using appropriate analytical technologies and methods.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure and/or exposure frequency were reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Medium	The number of exposure groups and spacing of exposure levels were not adequate to calculate a dose response curve. Due to volatilization of the test substance, exposure concentrations were fairly close together and no effects were observed. The NOEC value provided is a greater than value.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were at or below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The test organisms were acclimatized to test conditions and all pretreatment conditions were the same for control and exposed organisms.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Medium	Minor limitations were identified regarding environmental conditions, but these are not likely to have a substantial impact on results.

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Study Citation:	Hunter/ESE Inc, (1989). 1,2-Dichloropropane: chronic toxicity to the mysid under flow-through conditions with cover letter.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Mysidopsis bahia*; Juvenile
Health Outcome:	Reproductive/Teratogenic
Chemical:	1,2-Dichloropropane
HERO ID:	2803625

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome(s) of interest.
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Medium	The study reported minor differences among the study groups with respect to environmental conditions or other non-treatment-related factors, but these are unlikely to have a substantial impact on results.
	Metric 20:	Outcomes Unrelated to Exposure	High	There were no differences among groups that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical methods were clearly described.
	Metric 22:	Reporting of Data	High	Data for exposure-related findings were presented for each treatment and control group and were adequate to determine values.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: The number of exposure groups and spacing of exposure levels were not adequate to calculate a dose response curve. Due to volatilization of the test substance, exposure concentrations were fairly close together and no effects were observed. The NOEC value provided is a greater than value.

Overall Quality Determination High

Study Citation:	Hunter/ESE Inc, (1989). 1,2-Dichloropropane: chronic toxicity to the mysid under flow-through conditions with cover letter.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Mysidopsis bahia*; Juvenile
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloropropane
HERO ID:	2803625

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified definitively.
	Metric 2:	Test Substance Source	Low	The test substance identity was not analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	Chemical purity was reported as 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	The biological responses of the negative control group were adequate.
	Metric 6:	Randomized Allocation	Medium	The study reported that organisms were randomly allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Medium	The experimental system and methods for preparation of test media were described in adequate detail. Notable loss of the test substance was observed, but concentrations were measured.
	Metric 8:	Consistency of Exposure Administration	Medium	Details of exposure administration were reported, but minor inconsistencies in administration of exposures among study groups were identified.
	Metric 9:	Measurement of Test Substance Concentration	High	Exposure concentrations were measured using appropriate analytical technologies and methods.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure and/or exposure frequency were reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	Medium	The number of exposure groups and spacing of exposure levels were not adequate to calculate a dose response curve. Due to volatilization of the test substance, exposure concentrations were fairly close together and no effects were observed. The NOEC value provided is a greater than value.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were at or below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The test organisms were acclimatized to test conditions and all pretreatment conditions were the same for control and exposed organisms.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Medium	Minor limitations were identified regarding o environmental conditions, but these are not likely to have a substantial impact on results.

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Study Citation:	Hunter/ESE Inc, (1989). 1,2-Dichloropropane: chronic toxicity to the mysid under flow-through conditions with cover letter.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Invertebrate; Arthropods; *Mysidopsis bahia*; Juvenile
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloropropane
HERO ID:	2803625

Domain	Metric		Rating	Comments
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed or reported the intended outcome(s) of interest.
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Medium	The study reported minor differences among the study groups with respect to environmental conditions or other non-treatment-related factors, but these are unlikely to have a substantial impact on results.
	Metric 20:	Outcomes Unrelated to Exposure	High	There were no differences among groups that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical methods were clearly described.
	Metric 22:	Reporting of Data	High	Data for exposure-related findings were presented for each treatment and control group and were adequate to determine values.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: The number of exposure groups and spacing of exposure levels were not adequate to calculate a dose response curve. Due to volatilization of the test substance exposure, the test concentrations were close together and no effects were observed. A greater than NOEC value is provided.

Overall Quality Determination High

Study Citation:	Dow Chemical, (2010). [Redacted] Reanalysis of algal growth inhibition data from 1,2-dichloropropane report "1,2-Dichloropropane: The toxicity to Skeletonema costatum".
Duration:	Overall Duration: 4 - 10 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Skeletonema costatum*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloropropane
HERO ID:	10610562

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The chemical was identified by name and CASRN.
	Metric 2:	Test Substance Source	Low	The source was not reported.
	Metric 3:	Test Substance Purity	Low	Purity and/or grade of the test substance were not reported.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	The biological response of the negative control group was reported and reasonable for assessed outcomes (Tables 2-4).
	Metric 6:	Randomized Allocation	Low	Researchers did not report how organisms were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	Medium	The study is lacking detail on measures taken to appropriately prepare test concentrations; however, the experiments were conducted in closed vessels.
	Metric 8:	Consistency of Exposure Administration	Low	Reporting omissions are likely to have a substantial impact on results.
	Metric 9:	Measurement of Test Substance Concentration	Medium	Analytical technologies and methods were not reported, while measured concentrations were similar to nominal.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure and/or exposure frequency were reported and appropriate for the study type (120 h). Intermediate duration values were also reported.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The number of exposure groups and spacing of exposure levels were suitable for a dose response.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	Low	The source of the test algae was not reported.
	Metric 14:	Acclimatization and Pretreatment Conditions	Low	The study did not report whether pretreatment conditions were the same for control and exposed groups.
	Metric 15:	Number of Organisms and Replicates per Group	Low	The initial number of test organisms was not reported, but 3 replicates were apparently used.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	Low	Environmental conditions were not sufficiently reported to evaluate if adequate.
	Metric 17:	Outcome Assessment Methodology	Low	The outcome assessment methodology was not clearly reported.

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Study Citation:	Dow Chemical, (2010). [Redacted] Reanalysis of algal growth inhibition data from 1,2-dichloropropane report "1,2-Dichloropropane: The toxicity to Skeletonema costatum".
Duration:	Overall Duration: 4 - 10 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Skeletonema costatum*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloropropane
HERO ID:	10610562

Domain	Metric		Rating	Comments
	Metric 18:	Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol for outcome assessment were limited.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	Low	The study did not provide enough information to allow a comparison of environmental conditions.
	Metric 20:	Outcomes Unrelated to Exposure	Medium	There was no information in the study to suggest differences among groups.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical methods were adequately described.
	Metric 22:	Reporting of Data	High	Data for exposure-related findings were presented for each treatment and control group.
	Metric 23:	Explanation of Unexpected Outcomes	Medium	Minor uncertainties regarding chemical concentration variability were identified.

Additional Comments: Re-evaluation of results show that few exposure details were reported. The data presented in this reference is the same data reported in HERO ID 5468652. Authors reanalyzed measured chemical concentrations per day reported in 5468652 (Table 2) to geometric means in range of days (0-3, 0-4, 0-5; Table 1). Mean cell counts and SD (Table 2) are identical to results reported in 5468652 (Table 3).

Overall Quality Determination Medium

Study Citation:	Boeri, R.L. (1988). Letter from dow chem co to us epa regarding submission of final study reports for 1,2-dichloropropane with attachments.
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Skelotonema costatum*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloropropane
HERO ID:	5468652

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified definitively.
	Metric 2:	Test Substance Source	Low	The test substance identity was NOT analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	Purity was reported as 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	The biological responses (survival) of the negative control group was adequate.
	Metric 6:	Randomized Allocation	Medium	The study reported that test flasks were randomly redistributed each sampling day.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and methods for preparation of test media were described in adequate detail.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Exposure concentrations were measured using appropriate analytical technologies and methods.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure and/or exposure frequency were reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The number of exposure groups and spacing of exposure levels were justified for a dose response.
	Metric 12:	Testing at or Below Solubility Limit	High	Exposure concentrations were at or below the water solubility limit.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	Medium	All pretreatment conditions were the same for control and exposed organisms.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The number of test organisms and replicates (3) were reported and sufficient to characterize toxicological effects.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Organism environmental conditions were conducive to maintenance of organism health.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology reported the intended outcome of interest, and it also reported a comparison of algicidal versus algistatic response.

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Study Citation:	Boeri, R.L. (1988). Letter from dow chem co to us epa regarding submission of final study reports for 1,2-dichloropropane with attachments.
Duration:	Overall Duration: 11 - 21 days; Exposure Duration: 4 - 10 days
Exposure Route, Media, Path:	Aquatic (marine); Water; Not determined by study authors (i.e., chemical of interest in exposure water, but unable to determine exact uptake route)
Taxa, Species, Age:	Vegetation; Non-vascular Plants; *Skelotonema costatum*; Not Applicable (e.g., fungi or algae studies) or Not Reported
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloropropane
HERO ID:	5468652

Domain	Metric		Rating	Comments
	Metric 18:	Consistency of Outcome Assessment	High	Outcomes were assessed consistently across study groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions or other factors.
	Metric 20:	Outcomes Unrelated to Exposure	High	There were no differences among groups that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical methods were reasonably well described.
	Metric 22:	Reporting of Data	High	Data for exposure-related findings were presented for each treatment and control group.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: None

Overall Quality Determination High

Study Citation:	Boeri, R.L. (1988). Letter from dow chem co to us epa regarding submission of final study reports for 1,2-dichloropropane with attachments.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Terrestrial; Food/Diet; Dietary
Taxa, Species, Age:	Vertebrate; Mammalian; *Rattus norvegicus*; Fisher 344; Adult
Health Outcome:	Mortality
Chemical:	1,2-Dichloropropane
HERO ID:	5468652

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified definitively.
	Metric 2:	Test Substance Source	High	The test substance identity was analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	Purity was reported as 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	The biological responses of the negative control group were adequate for all measurements.
	Metric 6:	Randomized Allocation	Medium	The study reported that organisms were randomly allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and methods for preparation of test media were described in adequate detail.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Exposure concentrations were measured using appropriate analytical technologies and methods.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure and/or exposure frequency were reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The number of exposure groups and spacing of exposure levels were justified for a dose response.
	Metric 12:	Testing at or Below Solubility Limit	N/A	Dosing was via gavage.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The test organisms were acclimatized to test conditions and all pretreatment conditions were the same for control and exposed organisms.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Organism housing, environmental conditions, food, water, and nutrients were conducive to maintenance of health.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology reported the intended outcomes of interest.

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Study Citation:	Boeri, R.L. (1988). Letter from dow chem co to us epa regarding submission of final study reports for 1,2-dichloropropane with attachments.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Terrestrial; Food/Diet; Dietary
Taxa, Species, Age:	Vertebrate; Mammalian; *Rattus norvegicus*; Fisher 344; Adult
Health Outcome:	Mortality
Chemical:	1,2-Dichloropropane
HERO ID:	5468652

Domain	Metric		Rating	Comments
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions.
	Metric 20:	Outcomes Unrelated to Exposure	High	There were no differences among groups that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	No mortalities were reported so statistical analysis was not used or needed.
	Metric 22:	Reporting of Data	Low	No mortalities were reported as part of the narrative for all treatment and control groups.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: This evaluation is an assessment of the mortality outcome.

Overall Quality Determination High

Study Citation:	Boeri, R.L. (1988). Letter from dow chem co to us epa regarding submission of final study reports for 1,2-dichloropropane with attachments.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Terrestrial; Food/Diet; Dietary
Taxa, Species, Age:	Vertebrate; Mammalian; *Rattus norvegicus*; Fisher 344; Adult
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloropropane
HERO ID:	5468652

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified definitively.
	Metric 2:	Test Substance Source	High	The test substance identity was analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	Purity was reported as 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	The biological responses of the negative control group were adequate for all measurements.
	Metric 6:	Randomized Allocation	Medium	The study reported that organisms were randomly allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and methods for preparation of test media were described in adequate detail.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Exposure concentrations were measured using appropriate analytical technologies and methods.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure and/or exposure frequency were reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The number of exposure groups and spacing of exposure levels were justified for a dose response.
	Metric 12:	Testing at or Below Solubility Limit	N/A	Dosing was via gavage.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The test organisms were acclimatized to test conditions and all pretreatment conditions were the same for control and exposed organisms.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Organism housing, environmental conditions, food, water, and nutrients were conducive to maintenance of health.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology reported the intended outcomes of interest.

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Study Citation:	Boeri, R.L. (1988). Letter from dow chem co to us epa regarding submission of final study reports for 1,2-dichloropropane with attachments.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Terrestrial; Food/Diet; Dietary
Taxa, Species, Age:	Vertebrate; Mammalian; *Rattus norvegicus*; Fisher 344; Adult
Health Outcome:	Development/Growth
Chemical:	1,2-Dichloropropane
HERO ID:	5468652

Domain	Metric		Rating	Comments
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions.
	Metric 20:	Outcomes Unrelated to Exposure	High	There were no differences among groups that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical methods were clearly described.
	Metric 22:	Reporting of Data	High	Data for exposure-related findings were presented for each treatment and control group.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: This evaluation is an assessment of the devlopment/growth outcome.

Overall Quality Determination High

Study Citation:	Boeri, R.L. (1988). Letter from dow chem co to us epa regarding submission of final study reports for 1,2-dichloropropane with attachments.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Terrestrial; Food/Diet; Dietary
Taxa, Species, Age:	Vertebrate; Mammalian; *Rattus norvegicus*; Fisher 344; Adult
Health Outcome:	Nutritional and Metabolic
Chemical:	1,2-Dichloropropane
HERO ID:	5468652

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified definitively.
	Metric 2:	Test Substance Source	High	The test substance identity was analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	Purity was reported as 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	The biological responses of the negative control group were adequate for all measurements.
	Metric 6:	Randomized Allocation	Medium	The study reported that organisms were randomly allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and methods for preparation of test media were described in adequate detail.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Exposure concentrations were measured using appropriate analytical technologies and methods.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure and/or exposure frequency were reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The number of exposure groups and spacing of exposure levels were justified for a dose response.
	Metric 12:	Testing at or Below Solubility Limit	N/A	Dosing was via gavage.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The test organisms were acclimatized to test conditions and all pretreatment conditions were the same for control and exposed organisms.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Organism housing, environmental conditions, food, water, and nutrients were conducive to maintenance of health.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology reported the intended outcomes of interest.

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Study Citation:	Boeri, R.L. (1988). Letter from dow chem co to us epa regarding submission of final study reports for 1,2-dichloropropane with attachments.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Terrestrial; Food/Diet; Dietary
Taxa, Species, Age:	Vertebrate; Mammalian; *Rattus norvegicus*; Fisher 344; Adult
Health Outcome:	Nutritional and Metabolic
Chemical:	1,2-Dichloropropane
HERO ID:	5468652

Domain	Metric		Rating	Comments
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions.
	Metric 20:	Outcomes Unrelated to Exposure	High	There were no differences among groups that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical methods were clearly described.
	Metric 22:	Reporting of Data	High	Data for exposure-related findings were presented for each treatment and control group.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: This evaluation is an assessment of the nutritional and metabolic outcome, specifically looking at body temperature and heart rate.

Overall Quality Determination — High

Study Citation:	Boeri, R.L. (1988). Letter from dow chem co to us epa regarding submission of final study reports for 1,2-dichloropropane with attachments.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Terrestrial; Food/Diet; Dietary
Taxa, Species, Age:	Vertebrate; Mammalian; *Rattus norvegicus*; Fisher 344; Adult
Health Outcome:	Neurological
Chemical:	1,2-Dichloropropane
HERO ID:	5468652

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified definitively.
	Metric 2:	Test Substance Source	High	The test substance identity was analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	Purity was reported as 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	The biological responses of the negative control group were adequate for all measurements.
	Metric 6:	Randomized Allocation	Medium	The study reported that organisms were randomly allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and methods for preparation of test media were described in adequate detail.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Exposure concentrations were measured using appropriate analytical technologies and methods.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure and/or exposure frequency were reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The number of exposure groups and spacing of exposure levels were justified for a dose response.
	Metric 12:	Testing at or Below Solubility Limit	N/A	Dosing was via gavage.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The test organisms were acclimatized to test conditions and all pretreatment conditions were the same for control and exposed organisms.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Organism housing, environmental conditions, food, water, and nutrients were conducive to maintenance of health.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology reported the intended outcomes of interest.

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Study Citation:	Boeri, R.L. (1988). Letter from dow chem co to us epa regarding submission of final study reports for 1,2-dichloropropane with attachments.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Terrestrial; Food/Diet; Dietary
Taxa, Species, Age:	Vertebrate; Mammalian; *Rattus norvegicus*; Fisher 344; Adult
Health Outcome:	Neurological
Chemical:	1,2-Dichloropropane
HERO ID:	5468652

Domain	Metric		Rating	Comments
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions.
	Metric 20:	Outcomes Unrelated to Exposure	High	There were no differences among groups that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	Low	These were routine observations that weren't quantified, so no statistical analysis was used or needed.
	Metric 22:	Reporting of Data	Low	These were only routine observations reported numerically and mentioned as part of the narrative for all treatment and control groups. No analysis was reported.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: Authors made routine neurotoxicological observations for several standard elements.

Overall Quality Determination High

Study Citation:	Boeri, R.L. (1988). Letter from dow chem co to us epa regarding submission of final study reports for 1,2-dichloropropane with attachments.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Terrestrial; Food/Diet; Dietary
Taxa, Species, Age:	Vertebrate; Mammalian; *Rattus norvegicus*; Fisher 344; Adult
Health Outcome:	Behavioral
Chemical:	1,2-Dichloropropane
HERO ID:	5468652

Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified definitively.
	Metric 2:	Test Substance Source	High	The test substance identity was analytically verified by the performing laboratory.
	Metric 3:	Test Substance Purity	High	Purity was reported as 99.9%.
Domain 2: Test Design				
	Metric 4:	Negative Controls	High	Study authors reported using an appropriate concurrent negative control group.
	Metric 5:	Negative Control Response	High	The biological responses of the negative control group were adequate for all measurements.
	Metric 6:	Randomized Allocation	Medium	The study reported that organisms were randomly allocated into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Experimental System/Test Media Preparation	High	The experimental system and methods for preparation of test media were described in adequate detail.
	Metric 8:	Consistency of Exposure Administration	High	Details of exposure administration were reported and exposures were administered consistently across study groups.
	Metric 9:	Measurement of Test Substance Concentration	High	Exposure concentrations were measured using appropriate analytical technologies and methods.
	Metric 10:	Exposure Duration and Frequency	High	The duration of exposure and/or exposure frequency were reported and appropriate for the study type.
	Metric 11:	Number of Exposure Groups/ Spacing of Exposure Levels	High	The number of exposure groups and spacing of exposure levels were justified for a dose response.
	Metric 12:	Testing at or Below Solubility Limit	N/A	Dosing was via gavage.
Domain 4: Test Organism				
	Metric 13:	Test Organism Characteristics	High	The test organisms were adequately described and were obtained from a reliable source.
	Metric 14:	Acclimatization and Pretreatment Conditions	High	The test organisms were acclimatized to test conditions and all pretreatment conditions were the same for control and exposed organisms.
	Metric 15:	Number of Organisms and Replicates per Group	Medium	The numbers of test organisms and replicates were reported and sufficient to characterize toxicological effects.
Domain 5: Outcome Assessment				
	Metric 16:	Adequacy of Test Conditions	High	Organism housing, environmental conditions, food, water, and nutrients were conducive to maintenance of health.
	Metric 17:	Outcome Assessment Methodology	High	The outcome assessment methodology reported the intended outcomes of interest.

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Study Citation:	Boeri, R.L. (1988). Letter from dow chem co to us epa regarding submission of final study reports for 1,2-dichloropropane with attachments.
Duration:	Overall Duration: > 21 days; Exposure Duration: > 21 days
Exposure Route, Media, Path:	Terrestrial; Food/Diet; Dietary
Taxa, Species, Age:	Vertebrate; Mammalian; *Rattus norvegicus*; Fisher 344; Adult
Health Outcome:	Behavioral
Chemical:	1,2-Dichloropropane
HERO ID:	5468652

Domain	Metric		Rating	Comments
	Metric 18:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported, and outcomes were assessed consistently across study groups.
Domain 6: Confounding / Variable Control				
	Metric 19:	Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups in environmental conditions.
	Metric 20:	Outcomes Unrelated to Exposure	High	There were no differences among groups that could influence the outcome assessment.
Domain 7: Data Presentation and Analysis				
	Metric 21:	Statistical Methods	High	Statistical methods were clearly described.
	Metric 22:	Reporting of Data	High	Data for exposure-related findings were presented for each treatment and control group.
	Metric 23:	Explanation of Unexpected Outcomes	High	There were no unexpected outcomes.

Additional Comments: None

Overall Quality Determination High