

TEXT SEARCHABLE DOCUMENT

Data Evaluation Record on the photolysis of chloropicrin in water

PMRA Submission Number {.....}

EPA MRID Number 42900201

Data Requirement: PMRA Data Code:
EPA DP Barcode: D314391
OECD Data Point:
EPA Guideline: 161-2

Test material:

Common name: Chloropicrin.
Chemical name:
IUPAC name: Trichloronitromethane.
CAS name: Trichloronitromethane.
CAS No.: 76-06-2.
Synonyms
Smiles string: O=N(=O)C(Cl)(Cl)Cl (EPI Suite, v3.12 SMILES).

Primary Reviewer: Leanne Ganser
Cambridge Environmental

Signature: *Leanne Ganser*
Date: 05/16/07

Secondary Reviewer: Joan Gaidos
Cambridge Environmental

Signature: *JG*
Date: 05/16/07

QC/QA Manager: Joan Gaidos
Cambridge Environmental

Signature: *JG*
Date: 05/16/07

Final Reviewer: Faruque Khan
EPA Reviewer

Signature: *Faruque Khan*
Date: 8/21/07

Company Code:
Active Code:
Use Site Category:
EPA PC Code: 081501

CITATION: Moreno, T. and H. Lee. 1993. Photohydrolysis of chloropicrin. Unpublished study performed by Bolsa Research Associates, Inc., Hollister, California, and submitted by Chloropicrin Manufacturers Task Force. Laboratory Project ID No.: BR389.1:93. Experiment start date and completion date not reported. Final report issue date not reported.



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EXECUTIVE SUMMARY

The aqueous phototransformation of unlabeled trichloronitromethane (chloropicrin; purity 99.7%), at a nominal concentration of 164 mg a.i./L, was studied in sterile pH 7 buffer (0.05 M phosphate) irradiated on a 12 hour light/12 hour dark cycle using a xenon arc lamp (filters not reported) for 7 days, and continuously for the final 24 hours (108 total hours of irradiation; equivalent to 9 days 12 hour light/dark) at 25°C. The average intensity of the lamp was 1290-1310 lumens/m² and was approximately twice the intensity of natural sunlight in April in Hollister, California. Guidelines followed and compliance with GLP standards were not reported. The test system consisted of Kimble vials (material unspecified) completely filled with treated buffer solution (12 mL), which were pressure-sealed with Teflon-lined screw tops. The irradiated samples were maintained in a circulating water bath at 25°C in a photochamber. Dark controls were wrapped in foil and maintained at 25°C. Single irradiated samples and dark controls were collected at 0, 12, 24, 36, 48, 60, 72, 84 and 108 hours of irradiation. The test solutions were analyzed directly by GC/FID. Samples were analyzed for carbon dioxide by GC/MS.

The temperature was maintained at 25°C (supporting data not provided). The sterility of the samples was not reported. In the irradiated samples, the pH was 6.774-7.043 and in the dark controls was 6.847-6.998.

Overall recoveries were only reported for irradiated samples. The material balances ranged from 59.0-112.2% for chloropicrin plus chloride, 63.2-117.3% for chloropicrin plus nitrate and nitrite, and 62.8-112.1% for chloropicrin plus carbon dioxide and bicarbonate.

Chloropicrin degraded quickly in the irradiated samples, with a reviewer-calculated half-life (first order linear, Excel 2003) of 30 hours (1.3 days) based on the 12-hour light/12-hour dark cycle used in the study (all data). The observed DT50 was *ca.* 40 hours. In the irradiated solutions, chloropicrin decreased from 0.00090-0.00134 M (89-132% of the applied) at 0-12 hours of irradiation to 0.00057-0.00077 M (56-76% of the applied) at 24-36 hours to 0.00022-0.00036 M (22-35% of the applied) at 60 hours of irradiation and was 0.00004-0.00012 M (4-12% of the applied) at 108 hours of irradiation. Chloropicrin was stable in the dark controls, ranging from 0.00075-0.00122 M (74-120% of the applied) with no pattern of decline throughout the study; however, chloropicrin was 0.00159-0.00229 M (156-225% of the applied) at 12 hours of irradiation posttreatment.

In the irradiated samples, two major transformation products were identified as chloride and bicarbonate and two minor transformation products were identified as nitrate and nitrate. In the dark controls, chloride, bicarbonate, nitrate and nitrate were identified as minor transformation products.

In the irradiated samples, chloride increased from 0.214-0.287 x 10⁻⁴ M (0.7-1.0% of the applied) at time 0 to 12.5-24.0 x 10⁻⁴ M (42-80% of the applied) at 108 hours of irradiation (study termination). Bicarbonate, estimated from carbon dioxide concentration, increased from 0.04 x

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10^{-4} M at time 0 to 5.73×10^{-4} M at 108 hours of irradiation. Nitrate increased from 0.131-0.194 $\times 10^{-4}$ M at 0-12 hours of irradiation to 0.654-1.12 $\times 10^{-4}$ M at 108 hours of irradiation. Nitrite increased from 0.001-0.003 $\times 10^{-4}$ M at time 0 to Carbon dioxide totaled 1.20-1.43 $\times 10^{-4}$ M (12.0-14.3% of the applied) at 72-108 hours of irradiation. Volatile organics were not reported.

In the dark controls, chloride ranged from 1.33-9.34 $\times 10^{-5}$ M (0.4-3.1% of the applied) at 12-72 hours of irradiation and was 0.7-1.1 $\times 10^{-5}$ M (0.2-0.4% of the applied) at 84-108 hours of irradiation. Bicarbonate, estimated from carbon dioxide concentration, was $\leq 3.24 \times 10^{-5}$ M throughout the study. Nitrate ranged from 0.524-1.85 $\times 10^{-5}$ M throughout the study. Nitrite ranged from 0.225-2.46 $\times 10^{-6}$ M throughout the study. Carbon dioxide was $\leq 0.81 \times 10^{-5}$ M (≤ 0.81 of the applied) throughout the study. Volatile organics were not reported.

Since chloropicrin was stable in the dark control, the phototransformation half-life is equivalent to the half-life observed in the irradiated samples. The **phototransformation half-life** of chloropicrin is 30 days based on the 12-hour light/12-hour dark cycle used in this study.

The study author stated that irradiation with the artificial light was approximately twice the intensity of natural sunlight in April in Hollister, California. Assuming, one day of artificial light is equivalent to two days of natural sunlight, the **environmental phototransformation half-life** of chloropicrin is expected to be *ca.* 60 days.

A transformation pathway was not presented by the study authors. Chloropicrin degrades into chloride, nitrate, nitrate, bicarbonate and carbon dioxide.

Results Synopsis

pH 7	Half-life (hours)	Transformation products	
		Major	Minor
Irradiated	30.0 (1.3 days)	Chloride. Bicarbonate. CO ₂ .	Nitrate. Nitrite.
Dark	Stable.	None.	Chloride. Bicarbonate. Nitrate. Nitrite. CO ₂ .

Study Acceptability: This study is classified as **supplemental**. This study was previously (DER 10/20/94) determined to be unacceptable. The following significant deviation was noted: it was not possible to ascertain if the material balances were complete (material balances were calculated by the study authors from information provided in summary tables); however, various results within the summary tables differed considerably from the results reported in the raw data. Even though the study shows a number of deficiencies, some useful information can be derived from it.

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The study was determined to be upgradable if the study authors can verify the material balances. As part of the verification, the study author must adequately address: discrepancies between some of the average chloride and chloropicrin results reported in the summary tables and the average results reported within the raw data; the discrepancies between the nitrate and nitrate results reported in the raw data and those reported in the summary tables; and the accuracy of the carbon dioxide results.

This DER is primarily a reformatting of the DER for MRID 42900201 dated 10/20/94 and signed by Stephanie Syslo. Unless otherwise noted, all page numbers refer to the 10/20/94 DER.

The Chloropicrin Manufacturers' Task Force responded to several EPA questions (pp. 37-38 of *Comments on USEPA's Chloropicrin Risk Assessment Phase 3*, February 28, 2007; FRL: 8087-4; EPA-HQ-OPP-2006-0661). EPA concluded that the study provided only limited supplemental information on photohydrolysis of chloropicrin due to problems in the study related to the material balance. The registrant responded that the results of this study were comparable to other available data on aqueous photolysis and reported the following examples. Castro and Belser (1981) determined that the photohydrolytic half-life of a 10^{-3} M solution of chloropicrin was ca. 5 hours (*Castro, C.E., and N.O. Belser. 1981. Photohydrolysis of methyl bromide and chloropicrin. J. Agric. Food Chem. 29:1005-1008*).

I. MATERIALS AND METHODS

GUIDELINE FOLLOWED: Guidelines followed were not reported. A significant deviation from the objectives of Subdivision N guidelines was noted:

It was not possible to ascertain if the material balances were complete (material balances were calculated by the study authors from information provided in summary tables); however, various results within the summary tables differed considerably from the results reported in the raw data.

COMPLIANCE: Compliance with GLP was not reported. Signed and dated Data Confidentiality, GLP, Certificate of Authenticity, and Quality Assurance statements not were provided.

A. MATERIALS:

1. Test Material Chloropicrin.

Chemical Structure: See DER Attachment 1.

Description: Unlabeled.

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Purity:

Radiochemical purity: Radiolabel not reported.
Lot/Batch No.: Not reported.
Analytical purity: 99.7%.
Specific activity: Not applicable.
Location of the radiolabel: Radiolabel not reported.

Storage conditions of test chemicals:

Not reported.

Physico-chemical properties of Chloropicrin:

Parameter	Value	Comment
Molecular weight (g/mol)	Not reported.	
Chemical formula	Not reported.	
Water Solubility	Not reported.	
Vapor Pressure/Volatility	Not reported.	
UV Absorption	Not reported.	
pKa	Not reported.	
K _{ow} /log K _{ow}	Not reported.	
Stability of compound at room temperature, if provided	Not reported.	

2. Buffer Solution

The following buffer solution was prepared:

Table 1: Description of buffer solutions

pH	Type and molarity of buffer	Composition
7	0.05M Phosphate	No information was provided.

Data obtained from p. 2.2 in the 10/20/94 DER.

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3. Details of light source

Table 2: Artificial light source

Property	Details
Nature of light source	Xenon arc lamp (Heraeus Suntest CPS).
Emission wavelength spectrum	300-800 nm.
Light intensity	1290-1310 lumens/m ² .
Filters used	Not reported; however, Appendix II, Figure 1, p. 32 of the study report indicates that irradiance <290 nm was negligible for the artificial light source.
Relationship to natural sunlight	A graphical comparison of the artificial light to sunlight is presented in Appendix II, Figures 1-2, pp. 32-33 of the study report. The average intensity of the artificial light was equivalent to <i>ca.</i> 2 times the intensity of natural sunlight in April in Hollister, California.

Data obtained from pp. 2.2, 2.5 in the 10/20/94 DER and pp. 32-33 in MRID 42900201.

B. EXPERIMENTAL CONDITIONS:

1. Preliminary Study: No preliminary studies were described.

2. Experimental Conditions

Table 3: Experimental Parameters

Parameters		Details
Duration of the study		0-7 days, 12 hour light/dark; Day 8, 24 hours continuous irradiation.
Test concentrations (mg a.i./L) Nominal: Measured:		164. Not reported.
Dark controls used (Yes/No)		Yes.
Replication	Dark	3-5 vials were collected from each treatment at each interval.
	Irradiated	3-5 vials were collected from each treatment at each interval.
Preparation of the test medium:	Volume used/treatment	12 mL.
	Method of sterilization:	Buffers were sterilized by autoclaving.
	Co-solvent (name/concentration), if any:	Not reported.
Test apparatus (Type/Material/Volume)		Kimble vials (material unspecified) were filled completely with no headspace with treated buffer solution (12 mL), pressure-sealed with Teflon-lined screw tops and maintained in a circulating water bath at 25°C in a photochamber. The dark controls were wrapped in aluminum foil and incubated at 25°C.

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Parameters	Details
Details of traps for volatile compounds, if any	No traps were used.
If no traps were used, is the test system closed/open	Closed.
Is there any indication of the test material adsorbing to the walls of the test apparatus?	Not reported. ¹
Experimental Conditions Temperature; Duration of light/darkness:	25°C. 12 hour light/dark at 0-7 days; continuous at day 8.
Other details, if any	None.

Data obtained from pp. 2.2-2.3, 2.5 in the 10/20/94 DER and Table 1, p. 24; Table 4, p. 27 of MRID 42900201.

¹ The possible adsorption of chloropicrin to the Kimble vials was not addressed. The study authors of a hydrolysis study (Accession No. 260211) stated that chloropicrin readily adsorbed to glass surfaces.

3. Supplementary experiments: No supplementary studies were described.

4. Sampling:

Table 4: Sampling details

Observations	Details
Sampling intervals for the parent/transformation products	0, 12, 24, 36, 48, 60, 72, 84 and 108 hours of irradiation. ¹
Sampling method	3-5 vials from each treatment were collected at each interval.
Method of sampling volatile compounds, if any	Not reported.
Sampling intervals/times for: Sterility check pH measurement	Not reported. At each sampling interval.
Sample storage before analysis, if any	Not reported.
Other observation, if any	None.

Data obtained from p. 2.2 in the 10/20/94 DER and Table 1, p. 24; Table 4, p. 27 of MRID 42900201.

¹ The study author reported all results based on hours of irradiation.

C. ANALYTICAL METHODS:

Extraction/clean up/concentration methods: The samples were analyzed directly, without extraction or concentration (p. 2.2).

Volatile residue determination: Aliquots of selected samples were analyzed directly for carbon dioxide using GC/MS in darkness (method not described; p. 2.2).

Total ¹⁴C measurement: Test substance not radiolabeled. A mass balance was performed by summing the concentration of the parent with the individual transformation products (p. 2.4; MRID 42900201, Table 5, p. 28).

Derivatization method, if used: A derivatization method was not employed.

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Identification and quantification of parent compound: Aliquots of the buffer were analyzed by GC/FID using a DB624 megabore column in darkness (not further described; p. 2.2).

Identification and quantification of transformation products: Transformation products were identified as described for the parent compound and using ion-selective electrodes (p. 2.2).

Detection limits (LOD, LOQ) for the parent: Not reported.

Detection limits (LOD, LOQ) for the transformation: Not reported.

II. RESULTS AND DISCUSSION

A. TEST CONDITIONS: The temperature was maintained at 25°C (supporting data not provided; p. 2.2). The sterility of the samples was not reported. In the irradiated samples, the pH was 6.774-7.043 and in the dark controls was 6.847-6.998 (MRID 42900201, Table 1, p. 24; Table 4, p. 27).

B. MASS BALANCE: Overall recoveries were only reported for irradiated samples. The material balances ranged from 59.0-112.2% for chloropicrin plus chloride, 63.2-117.3% for chloropicrin plus nitrate and nitrite, and 62.8-112.1% for chloropicrin plus carbon dioxide and bicarbonate (p. 2.4; MRID 42900201, Table 5, p. 28; Reviewer's Comment 1).

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Table 5: Phototransformation of chloropicrin, expressed as concentration (Mol/L), in pH 7 buffer (mean, n= 3,5¹)

Compound		Sampling times (hours of irradiation)								
		0	12	24	36	48	60	72	84	108
Chloropicrin	Irradiated	10.2 x 10 ⁻⁴	10.6 x 10 ⁻⁴	6.82 x 10 ⁻⁴	6.64 x 10 ⁻⁴	3.78 x 10 ⁻⁴	3.06 x 10 ⁻⁴	2.20 x 10 ⁻⁴	2.60 x 10 ⁻⁴	0.90 x 10 ⁻⁴
	Dark		18.5 x 10 ⁻⁴	10.1 x 10 ⁻⁴	9.82 x 10 ⁻⁴	10.7 x 10 ⁻⁴	9.04 x 10 ⁻⁴	10.0 x 10 ⁻⁴	8.36 x 10 ⁻⁴	10.5 x 10 ⁻⁴
Chloride	Irradiated	0.249 x 10 ⁻⁴	1.83 x 10 ⁻⁴	6.99 x 10 ⁻⁴	6.97 x 10 ⁻⁴	9.09 x 10 ⁻⁴	12.3 x 10 ⁻⁴	11.0 x 10 ⁻⁴	19.4 x 10 ⁻⁴	20.5 x 10 ⁻⁴
	Dark		0.294 x 10 ⁻⁴	0.501 x 10 ⁻⁴	0.234 x 10 ⁻⁴	0.408 x 10 ⁻⁴	0.304 x 10 ⁻⁴	0.226 x 10 ⁻⁴	0.094 x 10 ⁻⁴	0.074 x 10 ⁻⁴
Nitrate ²	Irradiated	1.63 x 10 ⁻⁵	1.46 x 10 ⁻⁵	2.35 x 10 ⁻⁵	3.05 x 10 ⁻⁵	3.19 x 10 ⁻⁵	6.13 x 10 ⁻⁵	7.70 x 10 ⁻⁵	9.99 x 10 ⁻⁵	9.23 x 10 ⁻⁵
	Dark		0.577 x 10 ⁻⁵	0.524 x 10 ⁻⁵	1.33 x 10 ⁻⁵	0.617 x 10 ⁻⁵	1.85 x 10 ⁻⁵	1.30 x 10 ⁻⁵	1.16 x 10 ⁻⁵	0.986 x 10 ⁻⁵
Nitrite ²	Irradiated	0.023 x 10 ⁻⁵	1.45 x 10 ⁻⁵	1.89 x 10 ⁻⁵	3.64 x 10 ⁻⁵	3.41 x 10 ⁻⁵	3.73 x 10 ⁻⁵	3.88 x 10 ⁻⁵	3.93 x 10 ⁻⁵	10.6 x 10 ⁻⁵
	Dark		0.242 x 10 ⁻⁵	0.246 x 10 ⁻⁵	0.140 x 10 ⁻⁵	0.130 x 10 ⁻⁵	0.119 x 10 ⁻⁵	0.126 x 10 ⁻⁵	0.127 x 10 ⁻⁵	0.120 x 10 ⁻⁵
CO ₂	Irradiated	0.100 x 10 ⁻⁵	1.20 x 10 ⁻⁵	7.40 x 10 ⁻⁵	6.40 x 10 ⁻⁵	7.46 x 10 ⁻⁵	6.42 x 10 ⁻⁵	12.0 x 10 ⁻⁵	12.7 x 10 ⁻⁵	14.3 x 10 ⁻⁵
	Dark		0	0.810 x 10 ⁻⁵	0	0	0.810 x 10 ⁻⁵	0.408 x 10 ⁻⁵	0	0.810 x 10 ⁻⁵
Bi-carbonate ³	Irradiated	0.400 x 10 ⁻⁵	4.80 x 10 ⁻⁵	29.6 x 10 ⁻⁵	25.6 x 10 ⁻⁵	29.9 x 10 ⁻⁵	25.7 x 10 ⁻⁵	48.2 x 10 ⁻⁵	50.7 x 10 ⁻⁵	57.3 x 10 ⁻⁵
	Dark		0	3.24 x 10 ⁻⁵	0	0	3.24 x 10 ⁻⁵	1.63 x 10 ⁻⁵	0	3.24 x 10 ⁻⁵
Volatile organics	Irradiated	Not reported.								
	Dark	Not reported.								
Total recovery	Irradiated	See Reviewer's Comment 1.								
	Dark	Not reported.								

Reviewer-calculated means using data obtained from Table 1, p. 24; Table 4, p. 27; Appendices III-VI, Tables 6-44, pp. 35-73 in MRID 42900201 (Reviewer's Comment 1-3). The reviewer did not convert the data presented by the study author in terms of Mol/L into % of applied as discrepancies existed in the reported data.

1 At sampling intervals time 0 and 12 hours, n = 3, otherwise, n = 5.

2 Discrepancies between the concentration of the calibration standards reported in the narrative evaluation of the study and those listed in the raw data and discrepancies within the raw data between the cover pages and the individual data pages made it unclear which of the appendices corresponded to the nitrate results and which corresponded to the nitrite results (Reviewer's Comment 3).

3 The concentration of the bicarbonate ion was calculated by multiplying the measured concentration of carbon dioxide by 4 (Reviewer's Comment 4).

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C. TRANSFORMATION OF PARENT COMPOUND: In the irradiated solutions, chloropicrin decreased from 0.00090-0.00134 M (89-132% of the applied) at 0-12 hours of irradiation to 0.00057-0.00077 M (56-76% of the applied) at 24-36 hours of irradiation to 0.00022-0.00036 M (22-35% of the applied) at 60 hours of irradiation and was 0.00004-0.00012 M (4-12% of the applied) at 108 hours of irradiation (MRID 42900201, Appendix III, Tables 6-14, pp. 35-43 and DER Attachment 2). In the dark control, chloropicrin ranged from 0.00075-0.00122 M (74-120% of the applied) with no pattern of decline throughout the study; however, chloropicrin was 0.00159-0.00229 M (156-225% of the applied) at 12 hours of irradiation posttreatment.

HALF-LIFE/DT50/DT90: Based on first order linear regression analysis (Excel 2003), chloropicrin dissipated from the irradiated samples with a reviewer-calculated half-life of 30 hours, based on the 12-hour light/12-hour dark cycle used in the study (DER Attachment 2). The observed DT50 was *ca.* 40 hours. Chloropicrin was stable in the dark controls.

The study author calculated a half-life of 31.1 hours (p. 2.3).

Half-lives/DT50/DT90

Treatment	First order linear ¹			DT50 ² (hours)	DT90 (days)
	Half-life (hours)	Regression equation	r ²		
Irradiated	30.0	y = -0.0231x + 4.8087	0.8755	31.1	---
Dark	Stable			---	---

1 Calculated by the reviewer using individual % applied data reviewer-calculated using data obtained from MRID 42900201, Appendix III, Tables 6-14, pp. 35-43 and DER Attachment 2.

2 Calculated by the study author using mean molar concentration data first order linear regression techniques (MRID 42900201, Table 3, p. 26).

Since chloropicrin was stable in the dark control, the phototransformation half-life is equivalent to the half-life observed in the irradiated samples. The **phototransformation half-life** of chloropicrin is 30 days based on the 12-hour light/12-hour dark cycle used in this study.

The study author stated that irradiation with the artificial light was approximately twice the intensity of natural sunlight in April in Hollister, California (p. 2.2). Assuming, one day of artificial light is equivalent to two days of natural sunlight, the **environmental phototransformation half-life** of chloropicrin is expected to be *ca.* 60 days.

TRANSFORMATION PRODUCTS: In the irradiated samples, two major transformation products were identified as chloride and bicarbonate and two minor transformation products were identified as nitrate and nitrate. In the dark controls, chloride, bicarbonate, nitrate and nitrate were identified as minor transformation products.

In the irradiated samples, chloride increased from 0.214-0.287 x 10⁻⁴ M (0.7-1.0% of the applied) at time 0 to 12.5-24.0 x 10⁻⁴ M (42-80% of the applied) at 108 hours of irradiation (study termination; p. 2.3; MRID 42900201, Appendix IV, Tables 15-23, pp. 45-53). Bicarbonate,

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estimated from carbon dioxide concentration, increased from 0.04×10^{-4} M at time 0 to 5.73×10^{-4} M at 108 hours of irradiation (MRID 42900201, Table 1, p. 24). Nitrate increased from $0.131\text{-}0.194 \times 10^{-4}$ M at 0-12 hours of irradiation to $0.654\text{-}1.12 \times 10^{-4}$ M at 108 hours of irradiation (MRID 42900201, Appendix V, Tables 24-32, pp. 55-63). Nitrite increased from $0.001\text{-}0.003 \times 10^{-4}$ M at time 0 to $0.776\text{-}1.87 \times 10^{-4}$ M at 108 hours of irradiation (MRID 42900201, Appendix VI, Tables 33-44, pp. 65-73).

In the dark controls, chloride ranged from $1.33\text{-}9.34 \times 10^{-5}$ M (0.4-3.1% of the applied) at 12-72 hours of irradiation and was $0.7\text{-}1.1 \times 10^{-5}$ M (0.2-0.4% of the applied) at 84-108 hours of irradiation (p. 2.3; MRID 42900201, Appendix IV, Tables 15-23, pp. 45-53). Bicarbonate, estimated from carbon dioxide concentration, was $\leq 3.24 \times 10^{-5}$ M throughout the study (MRID 42900201, Table 4, p. 27). Nitrate ranged from $0.524\text{-}1.85 \times 10^{-5}$ M throughout the study (MRID 42900201, Appendix V, Tables 24-32, pp. 55-63). Nitrite ranged from $0.225\text{-}2.46 \times 10^{-6}$ M throughout the study (MRID 42900201, Appendix VI, Tables 33-44, pp. 65-73).

Table 6: Chemical names and CAS numbers for the transformation products of chloropicrin.

Applicants Code Name	CAS Number	Chemical Name	Chemical Formula	Molecular Weight (g/mol)	Smiles String
Chloride	--	--	--	--	--
Nitrate	--	--	--	--	--
Nitrite	--	--	--	--	--
Bicarbonate ¹	--	--	--	--	--

Data obtained from p. 2.3 in the 10/20/94 DER.

¹ Estimated from carbon dioxide concentration.

--: Not reported.

VOLATIZATION: In the irradiated samples, CO_2 totaled $1.20\text{-}1.43 \times 10^{-4}$ M (12.0-14.3% of the applied) at 72-108 hours of irradiation (p. 2.3; MRID 42900201, Table 1, p. 24). In the dark controls, CO_2 was $\leq 0.81 \times 10^{-5}$ M (≤ 0.81 of the applied) throughout the study (MRID 42900201, Table 4, p. 27). Volatile organics were not reported.

TRANSFORMATION PATHWAY: A transformation pathway was not presented by the study authors. Chloropicrin degrades into chloride, nitrate, nitrite, bicarbonate and carbon dioxide.

D. SUPPLEMENTARY EXPERIMENT-RESULTS: No supplementary experiments were described.

III. STUDY DEFICIENCIES

It was not possible to ascertain if the material balances were complete (material balances were calculated by the study authors from information provided in summary tables); however, various results within the summary tables differed considerably from the results reported in the raw data.

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IV. REVIEWER'S COMMENTS

1. Based on the information provided in the study, it was not possible to verify that the material balance was complete. Material balances reported by the study authors in Table 5 (p. 28) reflect the sums of the parent with the individual degradates and were reported only for the irradiated samples. However, since the material balances reported were calculated from the summary tables and various results within the summary tables differed considerably from the results reported in the raw data (see points below), the reviewer did not include total recovery in the data table.
2. Some of the average chloropicrin and chloride results reported in the summary tables differed considerably from the average results reported within the raw data; therefore, the reviewer presented means calculated from the raw data. The study authors did not provide explanation for these discrepancies.
3. Due to discrepancies between the raw data and the summary tables for nitrate and nitrite results, the reviewer presented means calculated from the raw data. The results reported in Mol/L in the raw data were calculated from the numerical results designated in units of mg of nitrogen per L, while results reported in the summary tables were calculated from the same numerical results designated in units of mg of nitrate or nitrite per L. Additionally, discrepancies between the concentration of the calibration standards reported in the narrative evaluation of the study and those listed in the raw data and discrepancies within the raw data between the cover pages and the individual data pages made it unclear which of the appendices corresponded to the nitrate results and which corresponded to the nitrite results.
4. The concentration of the bicarbonate ion was calculated from the measured concentration of free carbon dioxide and was based on the equilibrium relationship between pH and the percent of total carbon dioxide as the bicarbonate ion, the carbonate ion and free carbon dioxide (MRID 42900201, Figure 2, p. 16). Based on this relationship, at pH 7, at 20% concentration of free carbon dioxide is in equilibrium with 80% bicarbonate. The concentration of the bicarbonate ion was apparently not confirmed by directly analysis at any sampling interval.
5. The reviewer calculated percent of chloropicrin applied with the formula: concentration recovered on day X/concentration recovered on day 0.
6. The reviewer also calculated the half-life using only the first 7 day (0-84 hours) 12 hour light/dark cycle and excluding the last 24 hour continuous irradiation between 84 and 108 hours. Based on first-order linear regression analysis, the half-life was 34.1 hours ($r^2 = 0.8577$), which is very similar to the half-life using all data (30.0 hours).

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Table 7: Phototransformation of chloropicrin, expressed as percentage of the applied, in pH 7 buffer (mean \pm sd, n= 3,5¹)

Compound		Sampling times (hours)								
		0	12	24	36	48	60	72	84	108
Chloropicrin	Irradiated	100.0 \pm 8.9	104.3 \pm 23.9	67.1 \pm 7.7	65.3 \pm 5.3	37.2 \pm 6.2	30.1 \pm 7.3	21.6 \pm 3.8	25.6 \pm 3.0	8.9 \pm 3.7
	Dark		182.0 \pm 37.7	99.2 \pm 3.6	96.6 \pm 4.6	105.3 \pm 14.5	88.9 \pm 7.7	98.4 \pm 16.7	82.2 \pm 6.4	102.9 \pm 3.6

Data obtained from Appendix III, Tables 6-14, pp. 35-43 in MRID 42900201.

¹ At sampling intervals time 0 and 12 hours, n = 3, otherwise, n = 5.

V. REFERENCES

1. U.S. Environmental Protection Agency. 1982. Pesticide Assessment Guidelines, Subdivision N, Chemistry: Environmental Fate, Section 161-2. Photolysis studies. Office of Pesticide and Toxic Substances, Washington, DC. EPA 540/9-82-021.
2. U.S. Environmental Protection Agency. 1989. FIFRA Accelerated Reregistration, Phase 3 Technical Guidance. Office of the Prevention, Pesticides, and Toxic Substances, Washington, DC. EPA 540/09-90-078.
3. U.S. Environmental Protection Agency. 1993. Pesticide Registration Rejection Rate Analysis - Environmental Fate. Office of the Prevention, Pesticides, and Toxic Substances, Washington, DC. EPA 738-R-93-010.

Data Evaluation Record on the photolysis of chloropicrin in water

PMRA Submission Number {.....}

EPA MRID Number 42900201

Attachment 1: Structures of Parent Compound and Transformation Products

Data Evaluation Record on the photolysis of chloropicrin in water

PMRA Submission Number {.....}

EPA MRID Number 42900201

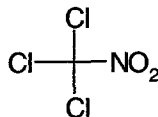
Chloropicrin

IUPAC Name: Trichloronitromethane.

CAS Name: Trichloronitromethane.

CAS Number: 76-06-2.

SMILES String: O=N(=O)C(Cl)(Cl)Cl (EPI Suite, v3.12 SMILES).



Data Evaluation Record on the photolysis of chloropicrin in water

PMRA Submission Number {.....}

EPA MRID Number 42900201

Identified Compounds

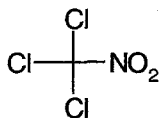
Data Evaluation Record on the photolysis of chloropicrin in water

PMRA Submission Number {.....}

EPA MRID Number 42900201

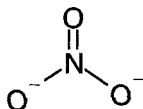
Chloropicrin

IUPAC Name: Trichloronitromethane.
CAS Name: Trichloronitromethane.
CAS Number: 76-06-2.
SMILES String: O=N(=O)C(Cl)(Cl)Cl (EPI Suite, v3.12 SMILES).



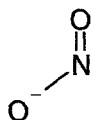
Nitrate

IUPAC Name: Not reported.
CAS Name: Not reported.
CAS Number: Not reported.



Nitrite

IUPAC Name: Not reported.
CAS Name: Not reported.
CAS Number: Not reported.



Data Evaluation Record on the photolysis of chloropicrin in water

PMRA Submission Number {.....}

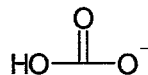
EPA MRID Number 42900201

Bicarbonate

IUPAC Name: Not reported.

CAS Name: Not reported.

CAS Number: Not reported.



Chloride

IUPAC Name: Not reported.

CAS Name: Not reported.

CAS Number: Not reported.

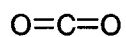


Carbon Dioxide

IUPAC Name: Not reported.

CAS Name: Not reported.

CAS Number: Not reported.



Data Evaluation Record on the photolysis of chloropicrin in water

PMRA Submission Number {.....}

EPA MRID Number 42900201

Attachment 2: Excel Spreadsheets

Data Evaluation Record on the photolysis of chloropicrin in water

PMRA Submission Number {.....}

EPA MRID Number 42900201

Chemical: Chloropicrin
 PC Code: 081501
 MRID: 42900201
 Guideline: 161-2

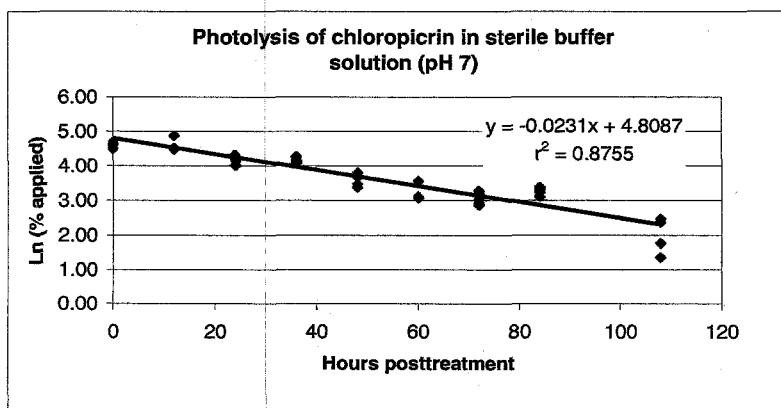
Irradiated

Half life (hours): 30.0

Hours posttreatment	Chloropicrin % applied	Ln (% applied)
0	101.31	4.6182
0	90.49	4.5052
0	108.2	4.6840
12	88.52	4.4832
12	92.46	4.5268
12	131.8	4.8813
24	69.84	4.2462
24	62.95	4.1423
24	56.07	4.0266
24	70.82	4.2601
24	75.74	4.3273
36	63.93	4.1578
36	71.8	4.2739
36	60	4.0943
36	60.98	4.1105
36	69.84	4.2462
48	29.51	3.3847
48	39.34	3.6722
48	39.34	3.6722
48	32.46	3.4800
48	45.25	3.8122
60	21.64	3.0745
60	22.62	3.1188
60	35.41	3.5670
60	35.41	3.5670
60	35.41	3.5670
72	20.66	3.0282
72	24.59	3.2023
72	17.7	2.8736
72	26.56	3.2794
72	18.69	2.9280
84	25.57	3.2414
84	27.54	3.3156
84	29.51	3.3847
84	22.62	3.1188
84	22.62	3.1188
108	11.8	2.4681
108	11.8	2.4681
108	5.9	1.7750
108	3.93	1.3686
108	10.82	2.3814

Data imported from calcs worksheet.

Chemical: Chloropicrin
 PC Code: 081501
 MRID: 42900201
 Guideline: 161-2



Data Evaluation Record on the photolysis of chloropicrin in water

PMRA Submission Number {.....}

EPA MRID Number 42900201

Chemical: Chloropicrin
 PC Code: 081501
 MRID: 42900201
 Guideline: 161-2

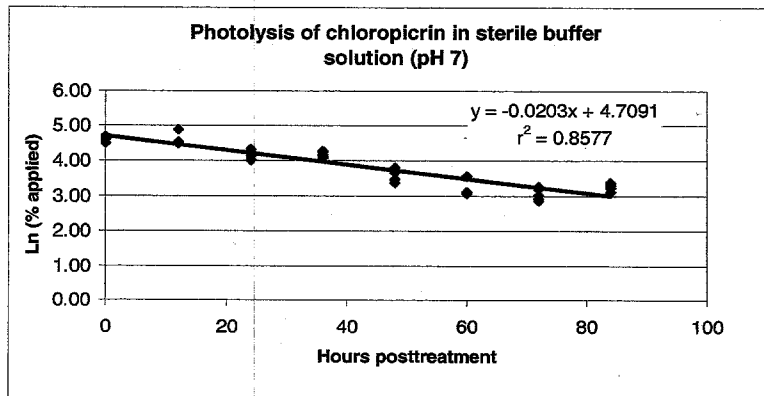
Irradiated

Half life (hours): 34.1

Hours posttreatment	Chloropicrin % applied	Ln (% applied)
0	101.31	4.6182
0	90.49	4.5052
0	108.2	4.6840
12	88.52	4.4832
12	92.46	4.5268
12	131.8	4.8813
24	69.84	4.2462
24	62.95	4.1423
24	56.07	4.0266
24	70.82	4.2601
24	75.74	4.3273
36	63.93	4.1578
36	71.8	4.2739
36	60	4.0943
36	60.98	4.1105
36	69.84	4.2462
48	29.51	3.3847
48	39.34	3.6722
48	39.34	3.6722
48	32.46	3.4800
48	45.25	3.8122
60	21.64	3.0745
60	22.62	3.1188
60	35.41	3.5670
60	35.41	3.5670
60	35.41	3.5670
72	20.66	3.0282
72	24.59	3.2023
72	17.7	2.8736
72	26.56	3.2794
72	18.69	2.9280
84	25.57	3.2414
84	27.54	3.3156
84	29.51	3.3847
84	22.62	3.1188
84	22.62	3.1188

Data imported from calcs worksheet.

Chemical: Chloropicrin
 PC Code: 081501
 MRID: 42900201
 Guideline: 161-2



Data Evaluation Record on the photolysis of chloropicrin in water

PMRA Submission Number {.....}

EPA MRID Number 42900201

Chemical: Chloropicrin
 PC Code: 081501
 MRID: 42900201
 Guideline: 161-2

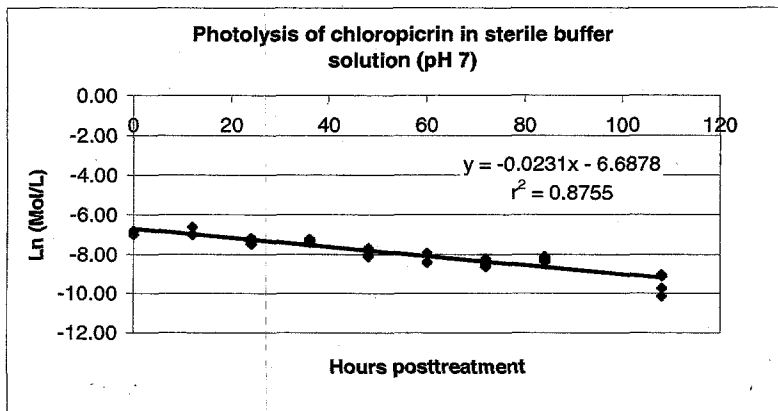
Irradiated

Half life (hours): 30.0

Hours posttreatment	Chloropicrin	
	Mol/L	Ln (Mol/L)
0	0.00103	-6.8782
0	0.00092	-6.9911
0	0.0011	-6.8124
12	0.0009	-7.0131
12	0.00094	-6.9696
12	0.00134	-6.6151
24	0.00071	-7.2502
24	0.00064	-7.3540
24	0.00057	-7.4699
24	0.00072	-7.2363
24	0.00077	-7.1691
36	0.00065	-7.3385
36	0.00073	-7.2225
36	0.00061	-7.4021
36	0.00062	-7.3858
36	0.00071	-7.2502
48	0.0003	-8.1117
48	0.0004	-7.8240
48	0.0004	-7.8240
48	0.00033	-8.0164
48	0.00046	-7.6843
60	0.00022	-8.4219
60	0.00023	-8.3774
60	0.00036	-7.9294
60	0.00036	-7.9294
60	0.00036	-7.9294
72	0.00021	-8.4684
72	0.00025	-8.2940
72	0.00018	-8.6226
72	0.00027	-8.2171
72	0.00019	-8.5685
84	0.00026	-8.2548
84	0.00028	-8.1807
84	0.0003	-8.1117
84	0.00023	-8.3774
84	0.00023	-8.3774
108	0.00012	-9.0280
108	0.00012	-9.0280
108	0.00006	-9.7212
108	0.00004	-10.1266
108	0.00011	-9.1150

Data imported from calcs worksheet.

Chemical: Chloropicrin
 PC Code: 081501
 MRID: 42900201
 Guideline: 161-2



Data Evaluation Record on the photolysis of chloropicrin in water

PMRA Submission Number {.....}

EPA MRID Number 42900201

Chemical: Chloropicrin
MRID: 42900201
PC Code: 081501
Guideline: 161-2

Chloropicrin
Irradiated

Hours	Mol/L	% applied
0	0.001017	100.00
12	0.00106	104.23
24	0.000681	66.96
36	0.000664	65.29
48	0.000378	37.17
60	0.000306	30.09
72	0.000222	21.83
84	0.000259	25.47
108	0.000033	3.24

Chloropicrin
Dark

Hours	Mol/L	% applied
0	0.001017	100.00
12	0.001849	181.81
24	0.001005	98.82
36	0.000984	96.76
48	0.001067	104.92
60	0.000906	89.09
72	0.000999	98.23
84	0.000838	82.40
108	0.001044	102.65

Data Evaluation Record on the photolysis of chloropicrin in water

PMRA Submission Number {.....}

EPA MRID Number 42900201

Chemical: Chloropicrin
MRID: 42900201
PC Code: 081501
Guideline: 161-2

Chloropicrin Hours	Mol/L	Average
0	0.00103	0.001017
0	0.00092	
0	0.0011	

Chloropicrin Irradiated Hours	Mol/L	% applied	% applied Average	SD
0	0.00103	101.31	100.00	8.93
0	0.00092	90.49		
0	0.0011	108.20		
12	0.0009	88.52	104.26	23.93
12	0.00094	92.46		
12	0.00134	131.80		
24	0.00071	69.84	67.08	7.66
24	0.00064	62.95		
24	0.00057	56.07		
24	0.00072	70.82		
24	0.00077	75.74		
36	0.00065	63.93	65.31	5.28
36	0.00073	71.80		
36	0.00061	60.00		
36	0.00062	60.98		
36	0.00071	69.84		
48	0.0003	29.51	37.18	6.24
48	0.0004	39.34		
48	0.0004	39.34		
48	0.00033	32.46		
48	0.00046	45.25		
60	0.00022	21.64	30.10	7.28
60	0.00023	22.62		
60	0.00036	35.41		
60	0.00036	35.41		
60	0.00036	35.41		
72	0.00021	20.66	21.64	3.81
72	0.00025	24.59		
72	0.00018	17.70		
72	0.00027	26.66		
72	0.00019	18.69		
84	0.00026	25.57	25.57	3.03
84	0.00028	27.54		
84	0.0003	29.51		
84	0.00023	22.62		
84	0.00023	22.62		
108	0.00012	11.80	8.85	3.68
108	0.00012	11.80		
108	0.00006	5.90		
108	0.00004	3.93		
108	0.00011	10.82		

Chloropicrin Irradiated Hours	Mol/L	Average	SD
0	0.00103	1.02E-03	0.00
0	0.00092		
0	0.0011		
12	0.0009	1.06E-03	0.00
12	0.00094		
12	0.00134		
24	0.00071	6.82E-04	0.00
24	0.00064		
24	0.00057		
24	0.00072		
24	0.00077		
36	0.00065	6.64E-04	0.00
36	0.00073		
36	0.00061		
36	0.00062		
36	0.00071		
48	0.0003	3.78E-04	0.00
48	0.0004		
48	0.0004		
48	0.00033		
48	0.00046		
60	0.00022	3.06E-04	0.00
60	0.00023		
60	0.00036		
60	0.00036		
60	0.00036		
72	0.00021	2.20E-04	0.00
72	0.00025		
72	0.00018		
72	0.00027		
72	0.00019		
84	0.00026	2.60E-04	0.00
84	0.00028		
84	0.0003		
84	0.00023		
84	0.00023		
108	0.00012	9.00E-05	0.00
108	0.00012		
108	0.00006		
108	0.00004		
108	0.00011		

Data obtained from Appendix III, Tables 6-14, pp. 35-43 of MRID 42900201

Chemical: Chloropicrin
MRID: 42900201
PC Code: 081501
Guideline: 161-2

Chloropicrin Hours	Mol/L	Average
0	0.00103	0.001017
0	0.00092	
0	0.0011	

Chloropicrin Dark Hours	Mol/L	% applied	% applied Average	SD
0	0.00103	101.31	100.00	8.93
0	0.00092	90.49		
0	0.0011	108.20		
12	0.00229	225.25	181.97	37.69
12	0.00167	164.26		
12	0.00159	156.39		
24	0.001	98.36	99.15	3.64
24	0.00101	99.34		
24	0.00107	105.25		
24	0.00098	96.39		
24	0.00098	96.39		
36	0.00091	89.51	96.59	4.58
36	0.00098	96.39		
36	0.00099	97.38		
36	0.00099	97.38		
36	0.00104	102.30		
48	0.00122	120.00	105.25	14.47
48	0.00107	105.25		
48	0.00108	106.23		
48	0.00115	113.11		
48	0.00083	81.64		
60	0.00082	80.66	88.92	7.67
60	0.00098	96.39		
60	0.00096	94.43		
60	0.00082	80.66		
60	0.00094	92.46		
72	0.00112	110.16	96.36	16.69
72	0.00076	74.75		
72	0.00096	94.43		
72	0.00096	94.43		
72	0.0012	118.03		
84	0.00084	82.62	82.23	6.40
84	0.00075	73.77		
84	0.0008	78.69		
84	0.00087	85.57		
84	0.00082	80.49		
108	0.00107	105.25	102.89	3.59
108	0.001	98.36		
108	0.00109	107.21		
108	0.00102	100.33		
108	0.00105	103.28		

Chloropicrin Dark Hours	Mol/L	Average	SD
0	0.00103	1.02E-03	0.00
0	0.00092		
0	0.0011		
12	0.00229	1.85E-03	0.00
12	0.00167		
12	0.00159		
24	0.001	1.01E-03	0.00
24	0.00101		
24	0.00107		
24	0.00098		
24	0.00098		
36	0.00091	9.82E-04	0.00
36	0.00098		
36	0.00099		
36	0.00099		
36	0.00104		
48	0.00122	1.07E-03	0.00
48	0.00107		
48	0.00108		
48	0.00115		
48	0.00083		
60	0.00082	9.04E-04	0.00
60	0.00098		
60	0.00096		
60	0.00082		
60	0.00094		
72	0.00112	1.00E-03	0.00
72	0.00076		
72	0.00096		
72	0.00096		
72	0.0012		
84	0.00084	8.36E-04	0.00
84	0.00075		
84	0.0008		
84	0.00087		
84	0.00082		
108	0.00107	1.05E-03	0.00
108	0.001		
108	0.00109		
108	0.00102		
108	0.00105		

Data obtained from Appendix III, Tables 6-14, pp. 35-43 of MRID 42900201

Data Evaluation Record on the photolysis of chloropicrin in water

PMRA Submission Number {.....}

EPA MRID Number 42900201

Chemical: Chloropicrin
MRID: 42900201
PC Code: 081501
Guideline: 161-2

Chloride Irradiated Hours	Mol/L	Average	SD
0	0.0000214	2.49E-05	0.00
0	0.0000247		
0	0.0000287		
12	0.000183	1.83E-04	0.00
12	0.000189		
12	0.000178		
24	0.00072	6.99E-04	0.00
24	0.000724		
24	0.000534		
24	0.000849		
24	0.000668		
36	0.000751	6.97E-04	0.00
36	0.000802		
36	0.000732		
36	0.000601		
36	0.000601		
48	0.00096	9.09E-04	0.00
48	0.000917		
48	0.000946		
48	0.00088		
48	0.000841		
60	0.001027	1.24E-03	0.00
60	0.001038		
60	0.001418		
60	0.001274		
60	0.001418		
72	0.001042	1.10E-03	0.00
72	0.001031		
72	0.001047		
72	0.001463		
72	0.000933		
84	0.002039	1.94E-03	0.00
84	0.002039		
84	0.00174		
84	0.001992		
84	0.001889		
108	0.002136	2.05E-03	0.00
108	0.002213		
108	0.002402		
108	0.001251		
108	0.002252		

Data obtained from Appendix IV, Tables 15-23, pp. 45-53 of MRID 42900201

Chemical: Chloropicrin
MRID: 42900201
PC Code: 081501
Guideline: 161-2

Chloride Dark Hours	Mol/L	Average	SD
0	0.0000214	2.49E-05	0.00
0	0.0000247		
0	0.0000287		
12	0.0000285	2.94E-05	0.00
12	0.0000235		
12	0.0000363		
24	0.0000241	5.01E-05	0.00
24	0.0000289		
24	0.0000403		
24	0.000064		
24	0.0000934		
36	0.0000133	2.34E-05	0.00
36	0.0000142		
36	0.0000244		
36	0.0000386		
36	0.0000264		
48	0.000026	4.08E-05	0.00
48	0.000025		
48	0.000035		
48	0.000038		
48	0.00008		
60	0.000029	3.04E-05	0.00
60	0.000028		
60	0.000033		
60	0.000031		
60	0.000031		
72	0.000017	2.26E-05	0.00
72	0.000016		
72	0.000018		
72	0.000019		
72	0.000043		
84	0.000009	9.40E-06	0.00
84	0.000009		
84	0.000009		
84	0.000001		
84	0.000001		
108	0.000007	7.40E-06	0.00
108	0.000008		
108	0.000007		
108	0.000007		
108	0.000008		

Data obtained from Appendix IV, Tables 15-23, pp. 45-53 of MRID 42900201

Data Evaluation Record on the photolysis of chloropicrin in water

PMRA Submission Number {.....}

EPA MRID Number 42900201

Chemical: Chloropicrin
MRID: 42900201
PC Code: 081501
Guideline: 161-2

Nitrate Irradiated Hours	Mol/L	Average	SD
0	0.0000194	1.63E-05	0.00
0	0.0000161		
0	0.0000133		
12	0.0000171	1.46E-05	0.00
12	0.0000136		
12	0.0000131		
24	0.0000208	2.35E-05	0.00
24	0.0000256		
24	0.00002		
24	0.0000261		
24	0.000026		
36	0.0000271	3.05E-05	0.00
36	0.0000263		
36	0.0000247		
36	0.0000291		
36	0.0000452		
48	0.0000358	3.19E-05	0.00
48	0.0000326		
48	0.0000276		
48	0.0000305		
48	0.000033		
60	0.0000574	6.13E-05	0.00
60	0.0000499		
60	0.0000654		
60	0.000065		
60	0.0000698		
72	0.0000675	7.70E-05	0.00
72	0.0000675		
72	0.0000724		
72	0.0000887		
72	0.0000887		
84	0.000105	9.99E-05	0.00
84	0.000109		
84	0.000102		
84	0.0000797		
84	0.000104		
108	0.000109	9.23E-05	0.00
108	0.000112		
108	0.0000805		
108	0.0000654		
108	0.0000948		

Data obtained from Appendix V, Tables 24-32, pp. 55-63 of MRID 42900201

Chemical: Chloropicrin
MRID: 42900201
PC Code: 081501
Guideline: 161-2

Nitrate Dark Hours	Mol/L	Average	SD
0	0.0000194	1.63E-05	0.00
0	0.0000161		
0	0.0000133		
12	0.00000624	5.77E-06	0.00
12	0.00000559		
12	0.00000548		
24	0.00000566	5.24E-06	0.00
24	0.00000497		
24	0.00000503		
24	0.0000053		
24	0.00000523		
36	0.0000131	1.33E-05	0.00
36	0.000012		
36	0.0000138		
36	0.000013		
36	0.0000146		
48	0.00000806	6.17E-06	0.00
48	0.00000511		
48	0.0000052		
48	0.00000645		
48	0.00000603		
60	0.0000221	1.85E-05	0.00
60	0.0000175		
60	0.0000191		
60	0.0000152		
60	0.0000188		
72	0.0000166	1.30E-05	0.00
72	0.0000134		
72	0.0000115		
72	0.0000122		
72	0.0000112		
84	0.0000175	1.16E-05	0.00
84	0.0000106		
84	0.00000997		
84	0.0000103		
84	0.00000956		
108	0.00000986	9.86E-06	0.00
108	0.0000104		
108	0.0000102		
108	0.00000906		
108	0.00000976		

Data obtained from Appendix V, Tables 24-32, pp. 55-63 of MRID 42900201

Data Evaluation Record on the photolysis of chloropicrin in water

PMRA Submission Number {.....}

EPA MRID Number 42900201

Chemical: Chloropicrin
MRID: 42900201
PC Code: 081501
Guideline: 161-2

Nitrite Irradiated		Average	SD
Hours	Mol/L		
0	0.00000276	2.25E-07	0.00
0	0.00000123		
0	0.00000276		
12	0.0000144	1.45E-05	0.00
12	0.0000147		
12	0.0000144		
24	0.0000186	1.89E-05	0.00
24	0.000017		
24	0.0000226		
24	0.0000183		
24	0.000018		
36	0.0000394	3.64E-05	0.00
36	0.0000374		
36	0.0000334		
36	0.0000389		
36	0.0000329		
48	0.0000351	3.41E-05	0.00
48	0.000029		
48	0.0000448		
48	0.0000334		
48	0.0000281		
60	0.0000265	3.73E-05	0.00
60	0.0000391		
60	0.0000418		
60	0.000034		
60	0.0000449		
72	0.0000406	3.88E-05	0.00
72	0.0000398		
72	0.0000328		
72	0.000043		
72	0.0000377		
84	0.0000425	3.93E-05	0.00
84	0.0000496		
84	0.0000238		
84	0.000052		
84	0.0000286		
108	0.0000776	1.06E-04	0.00
108	0.0000776		
108	0.0000794		
108	0.000107		
108	0.000187		

Data obtained from Appendix VI, Tables 33-44, pp. 65-73 of MRID 42900201
Chemical: Chloropicrin
MRID: 42900201
PC Code: 081501
Guideline: 161-2

Nitrite Dark		Average	SD
Hours	Mol/L		
0	0.00000276	2.25E-07	0.00
0	0.00000123		
0	0.00000276		
12	0.0000022	2.42E-06	0.00
12	0.0000022		
12	0.00000286		
24	0.00000286	2.46E-06	0.00
24	0.0000022		
24	0.00000253		
24	0.00000253		
24	0.0000022		
36	0.00000135	1.40E-06	0.00
36	0.00000135		
36	0.00000135		
36	0.0000016		
36	0.00000135		
48	0.00000148	1.30E-06	0.00
48	0.00000126		
48	0.00000126		
48	0.00000126		
48	0.00000126		
60	0.00000126	1.19E-06	0.00
60	0.00000126		
60	0.00000126		
60	0.00000103		
60	0.00000114		
72	0.00000128	1.26E-06	0.00
72	0.00000101		
72	0.00000101		
72	0.00000115		
72	0.00000183		
84	0.00000141	1.27E-06	0.00
84	0.00000127		
84	0.00000127		
84	0.00000127		
84	0.00000114		
108	0.00000124	1.20E-06	0.00
108	0.00000124		
108	0.00000114		
108	0.00000124		
108	0.00000114		

Data obtained from Appendix VI, Tables 33-44, pp. 65-73 of MRID 42900201

Data Evaluation Record on the photolysis of chloropicrin in water

PMRA Submission Number {.....}

EPA MRID Number 42900201

Chemical: Chloropicrin
MRID: 42900201
PC Code: 081501
Guideline: 161-2

Carbon dioxide
Irradiated

Hours	Mol/L
0	1.00E-06
12	1.20E-05
24	7.40E-05
36	6.40E-05
48	7.46E-05
60	6.42E-05
72	1.20E-04
84	1.27E-04
108	1.43E-04

Data obtained from Table 1, p. 24 of MRID 42900201

Carbon dioxide
Dark

Hours	Mol/L
0	1.00E-06
12	0.00E+00
24	8.10E-06
36	0.00E+00
48	0.00E+00
60	8.10E-06
72	4.08E-06
84	0.00E+00
108	8.10E-06

Data obtained from Table 4, p. 27 of MRID 42900201

Data Evaluation Record on the photolysis of chloropicrin in water

PMRA Submission Number {.....}

EPA MRID Number 42900201

Chemical: Chloropicrin
MRID: 42900201
PC Code: 081501
Guideline: 161-2

Bicarbonate
Irradiated

Hours	Mol/L
0	4.00E-06
12	4.80E-05
24	2.96E-04
36	2.56E-04
48	2.99E-04
60	2.57E-04
72	4.82E-04
84	5.07E-04
108	5.73E-04

Data obtained from Table 1, p. 24 of MRID 42900201

Bicarbonate
Dark

Hours	Mol/L
0	4.00E-06
12	0.00E+00
24	3.24E-05
36	0.00E+00
48	0.00E+00
60	3.24E-05
72	1.63E-05
84	0.00E+00
108	3.24E-05

Data obtained from Table 4, p. 27 of MRID 42900201

Data Evaluation Record on the photolysis of chloropicrin in water

PMRA Submission Number {.....}

EPA MRID Number 42900201

Attachment: Comparison of Artificial Light to Natural Sunlight

BR389.1:93

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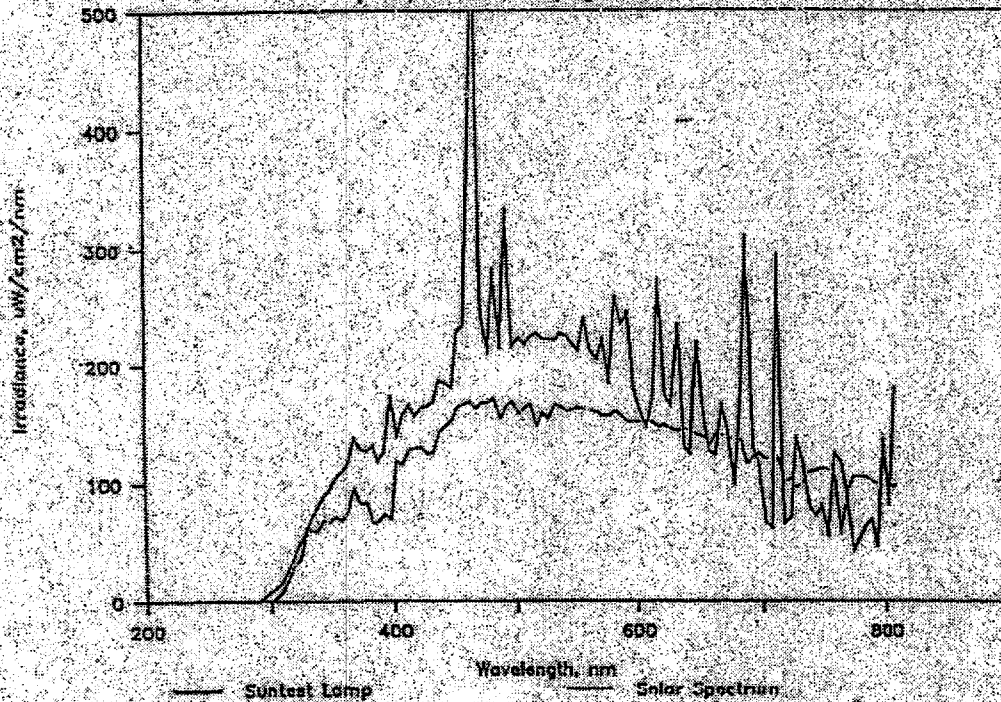
APPENDIX II

Suntest Xenon Lamp Spectral Distribution

Figure 1

SUNTEST CPS vs AM 1.2 SOLAR SPECTRUM

Suprox Filter, Lamp Aged 240 Hr



-212-

BR389.1.93

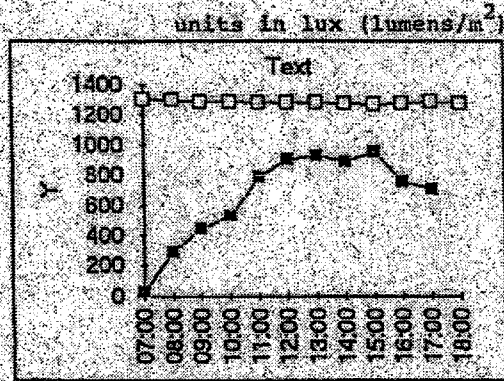
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APPENDIX II

Figure 2

Photolysis of Chloropicrin
 Natural Irradiance compared with the sun machine

Time	AVG	Machine
07:00	31	1208
08:00	288	1253
09:00	444	1263
10:00	525	1263
11:00	786	1276
12:00	902	1282
13:00	926	1279
14:00	890	1273
15:00	952	1265
16:00	755	1273
17:00	707	1283
18:00		1276



- Suntest Machine light intensity
- Outdoor sunlight (average for April 3 to 10, 1993)