Data Evaluation Report on the phototransformation of iodomethane in water

PMRA Submission Number {.....} EPA MRID Number 45593706

Data Requirement: PMRA Data Code:
EPA DP Barcode: D280800
OECD Data Point:
EPA Guideline: 161-2

Test material:
Common name: Iodomethane.
Chemical name
IUPAC:
CAS name: Iodomethane.
CAS No: 74-88-4.
Synonyms: Methyl iodide.
TM-425.
SMILES string: CI

Primary Reviewer: Dana Worcester
Dynamac Corporation

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Company Code: [for PMRA]
Active Code: [for PMRA]
Use Site Category: [for PMRA]
EPA PC Code: 000011

CITATION: McFadden, J.J. A photolysis study of [^{14}C]iodomethane (TM-425) in water. Unpublished study performed by Ricerca, LLC, Metabolism Division, Concord, OH, and sponsored by Arvesta Corporation, San Francisco, CA. [Note: the sponsor is identified as Tomen Agro, Inc., San Francisco, CA on p. 14.] Project Identification Number 012521; Document Number 012521-1. The experimental start and completion dates were September 13, 2000, and November 7, 2001, respectively (p. 14). Final report issued November 27, 2001.

EXECUTIVE SUMMARY

The aqueous phototransformation of [^{14}C]iodomethane was studied at 25 ± 2°C in a sterile aqueous pH 5 buffer (acetate, molarity not specified) solution treated at approximately 11 mg a.i./L. The study was conducted according to USEPA Fate, Transport and Transformation Test Guidelines OPPTS 835.2210 and EC Agrochemical Registration Directive, Annex II, Section 2.9.2 and Section 7.2.1.2. and in compliance with USEPA Good Laboratory Practice standards (40 CFR Part 160). The treated samples were irradiated continuously using a filtered xenon lamp (290-700 nm, light intensity 0.0216 W/cm^2); the intensity of irradiation over a range of 290-400 nm appeared to be comparable to natural summer sunlight at Painesville, Ohio. The test vessels consisted of flint glass vessels (6 cm diameter x 2 cm height; not further described). The dark control samples were covered with aluminum foil. Volatiles were not trapped. The samples were held in a circulating waterbath. Single samples were collected after 0, 1, 3, 5, 8, 11, 14, and 15 days. The buffer solutions were analyzed for total radioactivity using LSC, and for iodomethane and its transformation products using HPLC. Compounds were identified by comparison to unlabeled reference standards and GC/MS.

Total [^{14}C]residue recoveries averaged 100.00 ± 8.68% (range 82.45-110.24%) of the applied in the irradiated samples and 99.99 ± 7.67% (88.31-110.56%) in the dark controls. There was no pattern of loss.

In the irradiated samples, [^{14}C]iodomethane decreased from 99.33% of the recovered at 0 days to 44.90% after 15 days of continuous irradiation. The major transformation products were methanol and formaldehyde, which increased steadily to maximum concentrations of 18.66% and 36.45% of the recovered, respectively, after 15 days of irradiation. There were no minor transformation products.

In the dark control, [^{14}C]iodomethane decreased from 99.33% of the recovered at 0 days to 88.08-90.51% of the applied at 11 through 15 days. The major transformation product was methanol, which was a maximum 10.49% of the recovered at 14 days posttreatment and was 9.61% at 15 days. The only minor transformation product was formaldehyde, which was 0.39-0.59% of the recovered at 8 through 15 days posttreatment.

The study author proposed that iodomethane is hydrolyzed to iodine radicals and to methanol, which in turn oxidizes to formaldehyde.

The **half-life** for iodomethane in the irradiated solution was 13 days (r^2 = 0.9930), based on the continuous irradiation used in this study. The half-life for iodomethane in the dark control solution was 83.5 days (r^2 = 0.8865), which is of uncertain value because it is extrapolated well beyond the study termination.

Using the Excel formula [= -LN(2)/(((LN(2))/dark control half-life)-((LN(2))/irradiated half-life))], the **phototransformation half-life** of iodomethane was determined to be 15.3 days based on the continuous radiation used in the study, or 30.6 days based on a 12-hour light/12-hour dark cycle.

An **environmental photo-transformation half-life** was not provided by the study author. Since the intensity of the artificial light was said to be equivalent to early summer sunlight in Ohio, the environmental photo-transformation half-life is approximately 31 days.

Results Synopsis

Test medium: Acetate (pH 5.0) buffer at pH 5.0 (molarity not specified).
Source of irradiation: Xenon arc lamp.
Half-life for dark control: 83.51 days.
Half-life for irradiated: 12.96 days.
Major transformation product
Dark control: Methanol.
Irradiated: Methanol, formaldehyde.
Minor transformation product
Dark control: Formaldehyde.
Irradiated: None.

Study Acceptability: This study is classified as **supplemental (upgradable)**. Although the study was performed according to Subdivision N Guideline, insufficient information was provided to verify the conclusions.

I. MATERIALS AND METHODS

GUIDELINE FOLLOWED:

COMPLIANCE: This study was conducted in accordance with USEPA Fate, Transport and Transformation Test Guidelines OPPTS 835.2210 and EC Agrochemical Registration Directive, Annex II, Section 2.9.2 and Section 7.2.1.2 (p. 15). Although no significant deviations from Subdivision N Guideline §161-2 were identified, inadequate information (molarity of the buffer solution, a description of the sample containers and sampling procedure, and a description of the confirmatory analytical methods) was provided about the study design and analytical methods to determine if the study is scientifically valid and meets guideline requirements.

COMPLIANCE: This study was conducted in compliance with USEPA GLP Standards (40 CFR Part 160; p. 3). Signed and dated GLP, Quality Assurance, No Data Confidentiality, and Certificate of Authenticity statements were provided (pp. 2-3, 5, 7).

A. MATERIALS:

1. Test Material [^{14}C]Iodomethane.

Chemical Structure: H_3C^*-I (* location of radiolabel).

Description: Not provided.

Purity: Radiochemical purity: ≥95% (p.16).
Lot No.: 050K9400, 110K9406.
Analytical purity: Not reported.
Specific activity: 6.1 mCi/mMol.
Location of the radiolabel: Methyl carbon.

Storage conditions of test chemicals: The test material was refrigerated at <10°C when not in use (p. 17).

Physico-chemical properties of iodomethane.

Parameter	Values	Comments
Molecular weight	141.94 g/Mol	MRID 45593705
Water solubility	14.2 mg/mL at 25°C	MRID 45593705
Specific gravity	2.8 at 20°C	Material Safety Data Sheet
Vapor pressure	400 mm/Hg at 25°C 50 kPa at 20°C	Material Safety Data Sheet International Occupational Safety and Health Information Centre
Henry's law K_H	0.22	MRID 45593705
UV absorption	Maximum (2.5 absorbance units) at *ca.* 200 nm, with a smaller peak (0.25 au) at *ca.* 250 nm	MRID 45593706
pK_a	Not reported.	
Octanol/Water partition coefficient (log K_{ow})	1.51-1.69	International Occupational Safety and Health Information Centre
Melting point	-66.5°C	International Occupational Safety and Health Information Centre
Boiling point	42.4°C	MRID 45593705
Stability of compound at room temperature, if provided	Not reported.	

Data obtained from Figure 2, p. 44 of the study report unless otherwise noted.

2. Buffer solution: The buffer solution was made with HPLC grade water (p. 68) as follows:

Table 1: Description of buffer solution.

pH	Type of buffer and final molarity	Composition
5	Acetate buffer (molarity could not be determined)	Sodium acetate was dissolved in about 500 mL water and adjusted to pH 5 with 0.1N HCl.

Data obtained from p. 20 of the study report.

3. Details of light source:

Table 2: Artificial light source.

Property	Details
Nature of light source	Xenon arc lamp.
Emission wavelength spectrum	290-700 nm.
Light intensity	0.0216 W/cm^2.
Filters used	Cellulose triacetate filter, AM1 filter.
Relationship to natural sunlight	The artificial light appeared to be similar in intensity and wavelength distribution to natural sunlight measured in the range of 250-400 nm at 0825 and 1335 hours at Painesville, Ohio on June 5, 1991. The relationship is illustrated graphically in Appendix D, Figure 2, p. 95.

Data obtained from Appendix D, pp. 92-95, of the study report. Light intensity was calculated by the reviewer using data presented in Table 5, pp. 38-42.

B. EXPERIMENTAL CONDITIONS:

1. Preliminary Study: Preliminary studies were conducted to obtain information on the rate of degradation and the recovery of radioactive residues. No description of the studies were provided, and no results were reported.

2. Experimental Conditions

Table 3: Experimental Parameters.

Parameters		Details
Duration of the study		15 days.
Test concentrations (mg a.i./L) Nominal: Measured:		 11 mg a.i./L Approximately 11 mg a.i./L
Dark controls used (Yes/No)		Yes
Replication	Dark:	One sample per time point was analyzed.
	Irradiated:	One sample per time point was analyzed.
Preparation of the test medium:	Volume used/treatment:	50 mL aliquots of the treated buffer were placed in the irradiation vessels and 14 mL aliquots were placed in the dark control vessels.
	Method of sterilization:	The untreated buffer solution and all glassware used in the study was steam-sterilized (121°C) prior to use.

Parameters		Details
	Co-solvent (name/concentration):	None. Iodomethane was dissolved in water.
Test apparatus (Type/Material/Volume)	Irradiated	Four flint glass vessels (6 cm diameter x 2 cm height) containing 50 mL of treated buffer solution were placed *ca.* 48 inches from the reflecting mirror of the xenon arc lamp in a circulating water bath maintained at 25 ± 2°C. From a photograph, the vessels appear to be capped with a screw-cap lid with a septum. The sample vessels and photolysis apparatus are illustrated on pp. 43 and 94, respectively.
	Dark control	Five control vessels (not described) containing 14 mL of treated buffer were wrapped in aluminum foil and placed in the photolysis apparatus.
Details of traps for volatile compounds, if any	Irradiated	Volatiles were not trapped.
	Dark control	Volatiles were not trapped.
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?		Flask rinsate contained <0.2% of the test substance at study termination.
Experimental Conditions Temperature: Duration of light/darkness:		 25 ± 2°C 15 days of continuous irradiation.
Other details, if any		None.

Data obtained from pp. 16, 20-21, 24, 26; Figure 5, p. 43; Appendix A, p. 70; and Appendix D, pp. 92-95; of the study report.

3. Supplementary experiments: Five control vessels, each containing 14 mL of treated buffer solution, were placed in the refrigerator (<10°C) to serve as refrigerated controls (pp. 21, 25).

4. Sampling:

Table 4: Sampling details

Observations	Details
Sampling intervals	0, 1, 3, 5, 8, 11, 14, and 15 days.
Sampling method	Not described.
Method of collection of CO_2 and volatile organic compounds	Volatiles were not trapped.
Sampling intervals/times for: Sterility check pH measurement	The sterility of the test solutions was determined at 0 and 15 days. The pH of the test solutions was not measured during the study.
Sample storage before analysis, if any	Samples were analyzed as soon as possible after removal from the photolysis apparatus. If a delay occurred before analysis, samples were frozen immediately.
Other observation, if any	None

Data obtained from p. 25; Table 1, p. 34; and Appendix A, p. 71; of the study report.

C. ANALYTICAL METHODS:

Extraction/clean up/concentration methods, if used: Samples were analyzed by LSC and HPLC without manipulation or modification (p. 21).

Volatile residue determination: Volatiles were not trapped.

Total ^{14}C measurement: Total radioactivity was determined using LSC (Appendix A, p. 71). The study author reported total radioactivity in terms of "percent of applied" by comparing the measured concentration of a sample at a given interval to the average recovery concentration for the sample group over the 15-day study (p. 26). The average concentration for the irradiated samples ("Test Vessels"), Refrigerated Controls, and dark controls ("Photolysis Controls") were 1136, 1001, and 907 dpm/µL, respectively. The study author stated that this was necessary because volatilization had occurred during the dosing period between dosing each sample group and capping the vessels.

Derivatization method, if used: An aliquot of the 15-day irradiated sample was reduced by adding 0.2 mL of $LiBH_4$ in 0.1N NaOH directly to the sample (p. 28).

Identification and quantification of parent compound: Identification and quantification of [^{14}C]iodomethane was performed by HPLC using the following operating conditions: Aminex HPX 87H column (not described); an isocratic run with 0.005 N sulfuric acid; flow rate 1 mL/minute; column temperature 40°C; and UV (220 nm) and radioactive flow detection (pp. 18-

19). Iodomethane was identified by comparison to a reference standard; its HPLC Rt in this system is about 35 minutes (Tables 2-4, pp. 35-37). HPLC column recoveries were reported to be >90% (p. 26).

Confirmation of the identification of iodomethane was done using headspace analysis using SPME (not defined; possibly Solid Phase Microextraction) and GC/MS with Electron Spray Ionization (pp. 19-20, 27). The methodology was not described, with the exception of the GC/MS equipment.

Identification and quantification of transformation products: Transformation products were quantified by HPLC as described for the parent. The HPLC Rts in this system are 13.5-13.6 minutes for methanol and 10.2-10.3 minutes for formaldehyde (Tables 2-4, pp. 35-37).

The identification of methanol was confirmed using headspace GC/MS analysis (pp. 27-28). Formaldehyde was identified by comparing the HPLC analyses of the 15-day irradiated nonreduced and reduced (with $LiBH_4$) samples (p. 28). According to the study author, the disappearance of the unknown peak with an equivalent increase in the methanol peak indicated that formaldehyde was reduced to methanol. This reaction was confirmed by reversing the oxidative transformation of methanol to formaldehyde.

Detection limits (LOD, LOQ) for parent compound: Limits of Detection and Quantitation were not reported for any method.

Detection limits (LOD, LOQ) for the transformation products: Limits of Detection and Quantitation were not reported for any method.

II. RESULTS AND DISCUSSION:

A. TEST CONDITIONS: The reaction temperature was reported to be 25 ± 2°C; however, supporting data were not provided (p. 93). The pH of the test solution was apparently never measured after the addition of the test substance. The sterility of the samples was confirmed prior to and at the termination of the study (p. 24).

B. MASS BALANCE: Total [^{14}C]residue recoveries averaged 100.00 ± 8.68% (range 82.45-110.24%) of the applied in the irradiated samples and 99.99 ± 7.67% (88.31-110.56%) in the dark controls (Table 1, p. 34). There was no pattern of loss.

Table 6: Phototransformation of iodomethane at pH 5.0, expressed as a percentage of the applied radioactivity (mean ± s.d.).

Compound		Sampling times (days)							
		0	1	3	5	8	11	14	15
Iodomethane	irradiated	The data table as it appears in the harmonized format for photodegradation in water could not be completed because: Only a single sample was collected at each sampling interval. Although not identified as such by the study author, data for iodomethane, methanol, and formaldehyde appear to be reported in terms of percent of recovered from the HPLC column. The data were not converted because it was not certain how the study author arrived at the reported values. Total % recovery data in terms of "percent of applied" was calculated by comparing the measured concentration at a given interval to the respective average recovery concentration for the sample group. Reported data are presented in Table 6a.							
	dark								
Methanol	irradiated								
	dark								
Formaldehyde	irradiated								
	dark								
Volatile compounds	irradiated								
	dark								
Total % recovery	irradiated								
	dark								

Table 6a: Phototransformation of iodomethane at pH 5.0.*

Compound		Sampling times (days)							
		0	1	3	5	8	11	14	15
Although not identified as such by the study author, data for iodomethane, methanol, and formaldehyde appear to be reported in terms of percent of recovered from the HPLC column.									
Iodomethane	irradiated	99.33	94.92	84.56	78.31	69.09	56.90	46.07	44.90
	dark	99.33	98.98	97.27	96.00	93.54	88.08	87.44	90.51
Methanol	irradiated	—	2.71	6.91	9.14	11.23	14.63	17.49	18.66
	dark	—	1.02	2.73	4.11	5.58	9.87	10.49	9.61
Formaldehyde	irradiated	—	2.37	8.53	12.55	18.94	28.30	35.08	36.45
	dark	—	—	—	—	0.59	0.42	0.39	0.47
Total volatiles	Volatiles were not trapped.								
Total % recovery data in terms of "percent of applied" was calculated by comparing the measured concentration at a given interval to the respective average recovery concentration for the sample group.									
Total % recovery	irradiated	95.43	82.45	102.87	99.27	110.24	99.85	100.69	109.18
	dark	NA	94.11	88.31	104.18	110.56	103.38	95.17	104.20

* Data obtained from Table 1, p. 34, and Tables 3-4, pp. 36-37, of the study report. Only one sample was analyzed at each sampling interval.
— was not defined. It was assumed to mean not detected; the detection limit was not reported.
NA Not analyzed.

C. TRANSFORMATION OF PARENT COMPOUND: In the irradiated samples, [^{14}C]iodomethane decreased from 99.33% of the recovered at 0 days to 44.90% after 15 days of continuous irradiation (Table 4, p. 37). In the dark control, [^{14}C]iodomethane decreased from 99.33% of the recovered at 0 days to 88.08-90.51% of the applied at 11 through 15 days (Table 3, p. 36).

HALF-LIVES: The half-lives for iodomethane in the irradiated and dark control solutions were determined by the reviewer to be 13 and 83.5 days, respectively, using linear regression analysis based on first-order kinetics as calculated by Excel 2000. The half-life for iodomethane in the dark control is of uncertain value since the data are extrapolated well beyond the termination of the study.

Half-lives of iodomethane

Test system	First order linear			DT50	DT90
	Half-life	Regression equation	r^2		
Dark	83.51 days	y = -0.0083x + 4.6001	0.8865	ND	ND
Irradiated	12.96 days	y = -0.0535x + 4.6137	0.993	ND	ND

Half-lives calculated using 0-15 day data obtained from Tables 3-4, pp. 36-37, of the study report.
ND = Not determined.

Using the Excel formula:

=-LN(2)/(((LN(2))/dark control half-life)-((LN(2))/irradiated half-life))

the **phototransformation half-life** of iodomethane was determined to be 15.3 days based on the continuous radiation used in the study, or 30.6 days based on a 12-hour light/12-hour dark cycle.

An **environmental phototransformation half-life** was not provided by the study author. Since the intensity of the artificial light was said to be equivalent to early summer sunlight in Ohio, the environmental phototransformation half-life is approximately 31 days.

TRANSFORMATION PRODUCTS: In the irradiated samples, the major transformation products were methanol and formaldehyde, which increased steadily to maximum concentrations of 18.66% and 36.45% of the recovered, respectively, after 15 days of irradiation (Table 4, p. 37). There were no minor transformation products.

In the dark controls, the major transformation product was methanol, which was a maximum 10.49% of the recovered at 14 days posttreatment and was 9.61% at 15 days (Table 3, p. 36). The only minor transformation product was formaldehyde, which was 0.39-0.59% of the recovered at 8 through 15 days posttreatment.

VOLATILIZATION: Volatiles were not trapped.

TRANSFORMATION PATHWAY: The study author proposed that iodomethane is hydrolyzed to iodine radicals and to methanol, which in turn oxidizes to formaldehyde (p. 31).

Table 7: Chemical names and CAS numbers for the transformation product of iodomethane.

Applicant's Code Name	CAS Number	CAS Chemical Name	Chemical formula	Molecular weight	SMILES string
Methanol	67-56-1	Methanol	CH_3OH	32.04 g/Mol	CO
Formaldehyde	50-00-0	Formaldehyde	CH_2O	31.03 g/Mol	C=O

Data obtained from p. 17 of the study report.

D. SUPPLEMENTARY EXPERIMENT-RESULTS: The material balance of the refrigerated controls averaged 100.00 ± 6.02% (range 89.76-106.03%) of the applied (Table 1, p 34). Iodomethane was relatively stable (reviewer-calculated half-life 3.8 years), decreasing from 99.33% of the applied at 0 days to 98.45% at 15 days posttreatment (Table 2, p. 35).

III. STUDY DEFICIENCIES: This study methodology is incomplete and is so poorly written and organized that it is not possible to determine if the study is scientifically valid and meets guideline requirements. Critical information is either not presented or is too general to be useful:

The molarity of the buffer solution is not reported. The reagents used to make the buffer are identified, but their concentrations are not reported so the molarity cannot be determined (p. 20).

The sample vessels are not described. Mention is made of flint glass jars (p. 93) and Figure 1 (p. 43) is a poor quality photograph of the test vessel with dimensions. From this photograph and the dimensions, the test vessel resembles a petri dish with a screw-cap vial attached to the lid. The screw cap appears to have a septum. This is clearly not standard laboratory glassware, and should have been described in the text.

The intensity of the artificial light at each wavelength is reported, but it is not specified when the intensity was measured and the average total intensity of the light throughout the study is not reported. The study author stated that the spectral distribution of the lamp was made at the beginning and end of the study, but only one set of data are presented (p. 93).

The sampling procedure is not described. There are four "test vessels", five dark "control vessels", and five refrigerated "control vessels", but 7 or 8 (counting time 0) sampling intervals. The study author states that only one sample per time point was analyzed due to the volatility of iodomethane (p. 16). Logically, it would appear that a subsample was drawn from one of the 4-5 vessels in each group at each sampling interval.

HPLC, GC/MS and LSC equipment is described but the methodology, such as sample size, was not reported (pp. 18-20). The HPLC description is not sufficiently detailed; the dimensions of the column and the particle size are not reported, and the run time is not reported. The fact that the samples were analyzed for total radioactivity using LSC was included only in the study protocol (p. 71).

The concentration data for individual compounds appear to be reported in terms of percent of the recovered from the HPLC column rather than in terms of percent of applied. Because the data were highly manipulated and raw data were not provided, this could not be confirmed.

Confirmation of the identification of iodomethane was done using headspace analysis using SPME and GC/MS with Electron Spray Ionization (pp. 19-20, 27). The methodology was not described, with the exception of the GC/MS equipment. SPME was not defined and may stand for Solid Phase Microextraction, which is frequently combined with GC/MS.

In addition, the study author states that the study was conducted according to the protocol with the exception of the protocol amendments included in this report. However, there are clearly deviations from the protocol that the study author does not identify, raising doubts about whether the study design presented in the protocol was actually followed. For example, the protocol specifies that the study will be conducted at pH 7, but the study was conducted at pH 5 and there is no amendment addressing this change.

IV. REVIEWER'S COMMENTS:

1. The material balances of the test solutions varied by >20% of the applied, although a bulk buffer solution had been treated and dispensed into sample vials. Total [^{14}C]residue recoveries ranged from 82.45 to 110.24% of the applied in the irradiated samples and 88.31 to 110.56% in the dark controls (Table 1, p. 34). The study author attributed the differences in recoveries to differences in initial concentrations, apparently in part because of volatilization prior to capping.

   Also, material balances were reported in terms of "percent of applied" by comparing the measured concentration of a sample at a given interval to the average recovery concentration for the sample group over the 15-day study (p. 26). Raw data were not provided, so the reported values could not be confirmed. Since there is no apparent trend to the recovery data, this appears to be a valid approach to compensate for volatilization.

2. In this study, the treated buffer solution is called the dosing solution. Normally "dosing solution" refers to the solution containing the test substance that is used to treat the buffer solutions.

3. The incubation temperature was 25 ± 2°C, which was more variable than the 25 ± 1°C specified by Subdivision N guidelines.

4. The pH of the buffer solution was apparently not measured at any time after the addition of iodomethane. The pH of buffer solutions should be monitored to ensure that the buffering is adequate and the pH remains stable.

5. A description of the AM1 filter was not provided, and was not found during a search for the specifications of the Spectral Energy Corporation irradiation apparatus.

6. The study author calculated a half-life of 13.1 days for iodomethane in the irradiated buffer solution (p. 28). A half-life was not calculated for iodomethane in the dark control. Also, by comparing the rate of degradation of iodomethane to the rate of formation of methanol and formaldehyde, the study author calculated a half-life of 3.2 days for methanol in the irradiated solution (Appendix C, pp. 89-91). Calculations were made using Microsoft Excel for MS Office 97 and Sigma Plot v.5.0 (p. 22).

7. The quantum yield for iodomethane was determined to be 0.41% (p. 30).

8. The Limits of Detection and Quantitation for the LSC and HPLC analyses were not reported. Limits of Detection and Quantitation should be reported to allow the reviewer to evaluate the adequacy of the test method.

9. Iodomethane, methanol, and formaldehyde are the only peaks that appear on the sample HPLC chromatograms (Figures 6-9, pp. 48-51).

V. REFERENCES: The following references were cited in the study:

Davis, D.; Crawford, J.; Liu, S.; McKeen, S.; Bandy, A.; Thornton, D.; Rowland, F.; and Blake, D. (1996) Potential impact of iodine on tropospheric levels of ozone and other critical oxidizing species. *J. Geophys. Res.* 101, 2135-2147.

Draper, W. and Wakeham, D. (1993) Rate constants for metam-sodium cleavage and photodecomposition in water. *J. Agric. Food Chem* 41, 1129-1133.

Roehl, C.; Burkholder, J.; Moortgat, G.; Ravishankara, A.; and Crutzen, P. (1997) Temperature dependence of UV absorption cross sections and atmospheric implications of several alkyl iodides. *J. Geophys. Res.* 102, 12819-12829.

Swanson, M.B.; Ivancic, W.A.; Saxena, A.M.; Allton, J.D.; O'Brien, G.K.; Suzuki, T.; Nishizawa, H.; and Nokata, M. (1995) Direct photolysis of fenpyroximate in a buffered aqueous solution under a Xenon lamp. *J. Agric. Food Chem* 43, 513-518.

Wujcik, C., (2001) Aqueous Hydrolysis of [^{14}C]Iodomethane (TM-425) in Buffer, Ricerca, LLC Document Number 12520-1.

Attachment 1

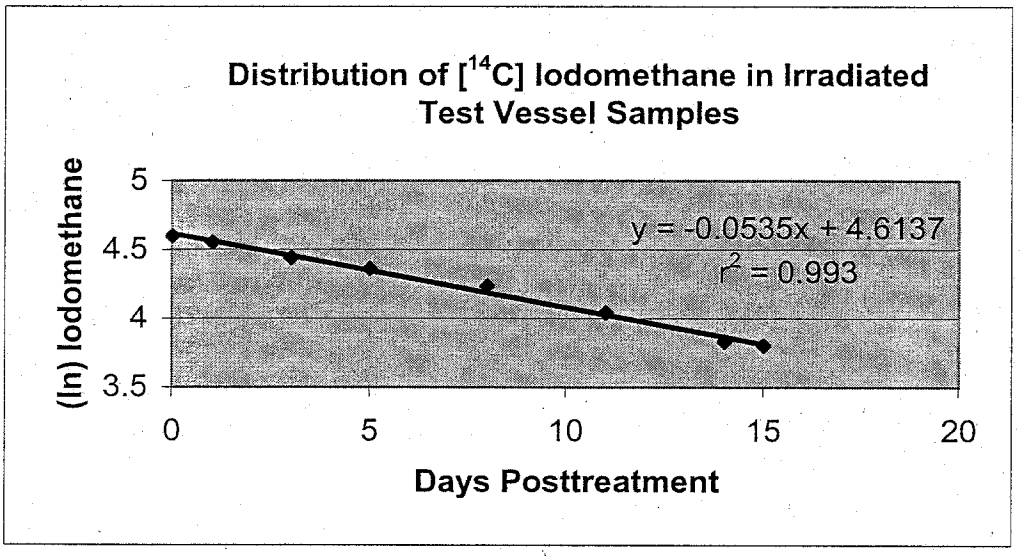
Excel Spreadsheets

Chemical Name: Iodomethane
MRID: 455937-06
Guideline No.: 161-2

Table 4: [^{14}C]Iodomethane in test vessel samples

Half-life:	12.96 Days

Days	% iodomethane	ln (% parent)
0	99.33	4.59844764
1	94.92	4.553034432
3	84.56	4.437461342
5	78.31	4.360675309
8	69.09	4.235410003
11	56.90	4.041295341
14	46.07	3.830161979
15	44.90	3.804437795

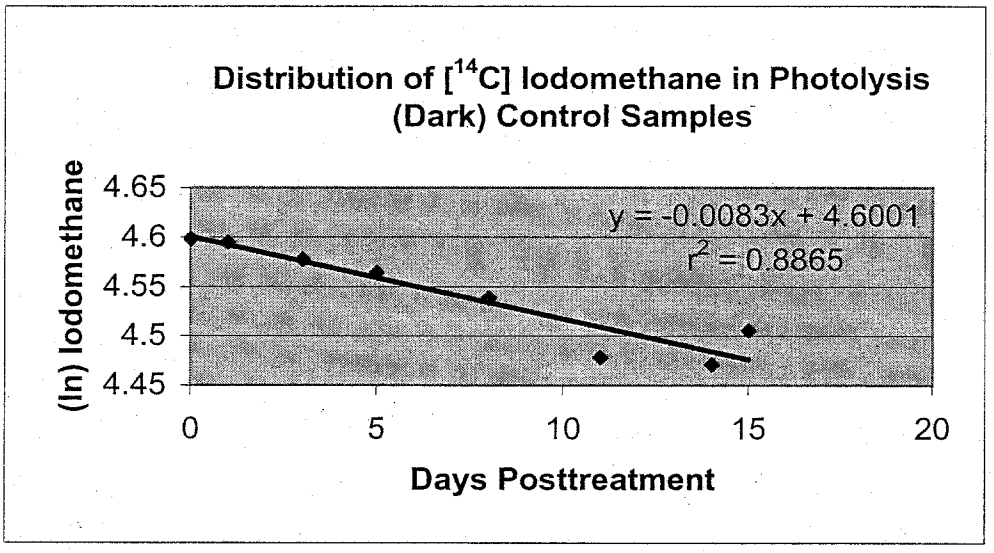


Chemical Name: Iodomethane
MRID: 455937-06
Guideline No.: 161-2

Table 3: [^{14}C]Iodomethane in photolysis (dark) control samples

Half-life:	83.51 Days

Days	% iodomethane	ln (% parent)
0	99.33	4.59844764
1	98.98	4.59491781
3	97.27	4.577490617
5	96.00	4.564348191
8	93.54	4.538389152
11	88.08	4.478245492
14	87.44	4.470952844
15	90.51	4.505460342

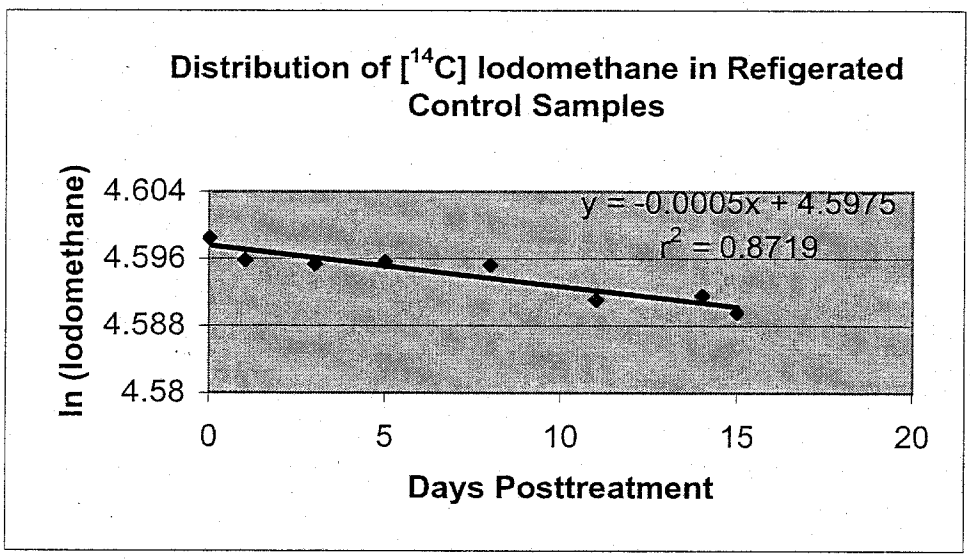


Chemical Name: Iodomethane
MRID: 455937-06
Guideline No.: 161-2

Table 2: [^{14}C]Iodomethane in refigerated control samples

Half-life:	1386.29 Days

Days	% iodomethane	ln (% parent)
0	99.33	4.59844764
1	99.07	4.595826671
3	99.02	4.59532185
5	99.05	4.595624773
8	99.01	4.595220855
11	98.60	4.591071262
14	98.65	4.591578232
15	98.45	4.589548805



Chemical Name: Iodomethane
MRID: 455937-06
Guideline No.: 161-2

Table 1

Days	Irradiated Test Vessels	Refigerated Controls	Photolysis (dark) Controls
0	95.43	NA	NA
1	82.45	89.76	94.11
3	102.87	102.76	88.31
5	99.27	106.03	104.18
8	110.24	102.41	110.56
11	99.85	100.96	103.38
14	100.69	93.57	95.17
15	109.18	104.55	104.2
Average	99.9975	100.0057143	99.98714286
STDEV	8.679086111	6.022360714	7.667315293

Attachment 2

Transformation Pathway Presented by Registrant
Illustration of Test System
Comparison of ArtificialLight to Natural Sunlight

Scheme: Mechanism of Photolysis of Iodomethane

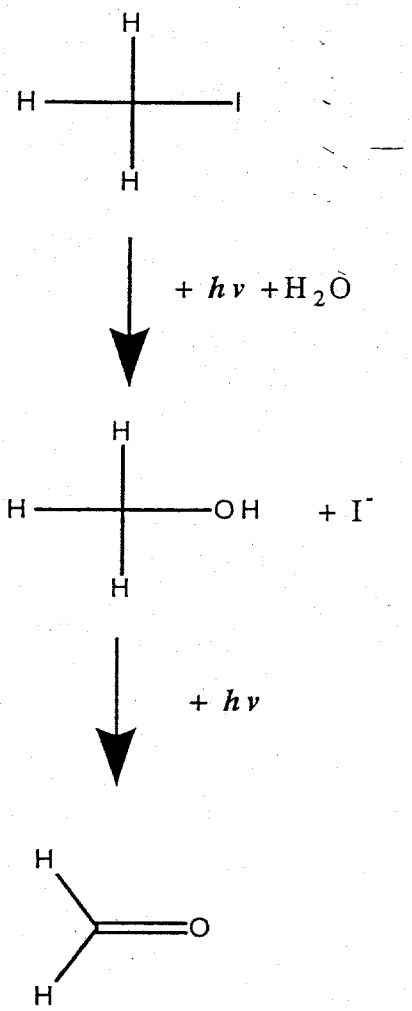
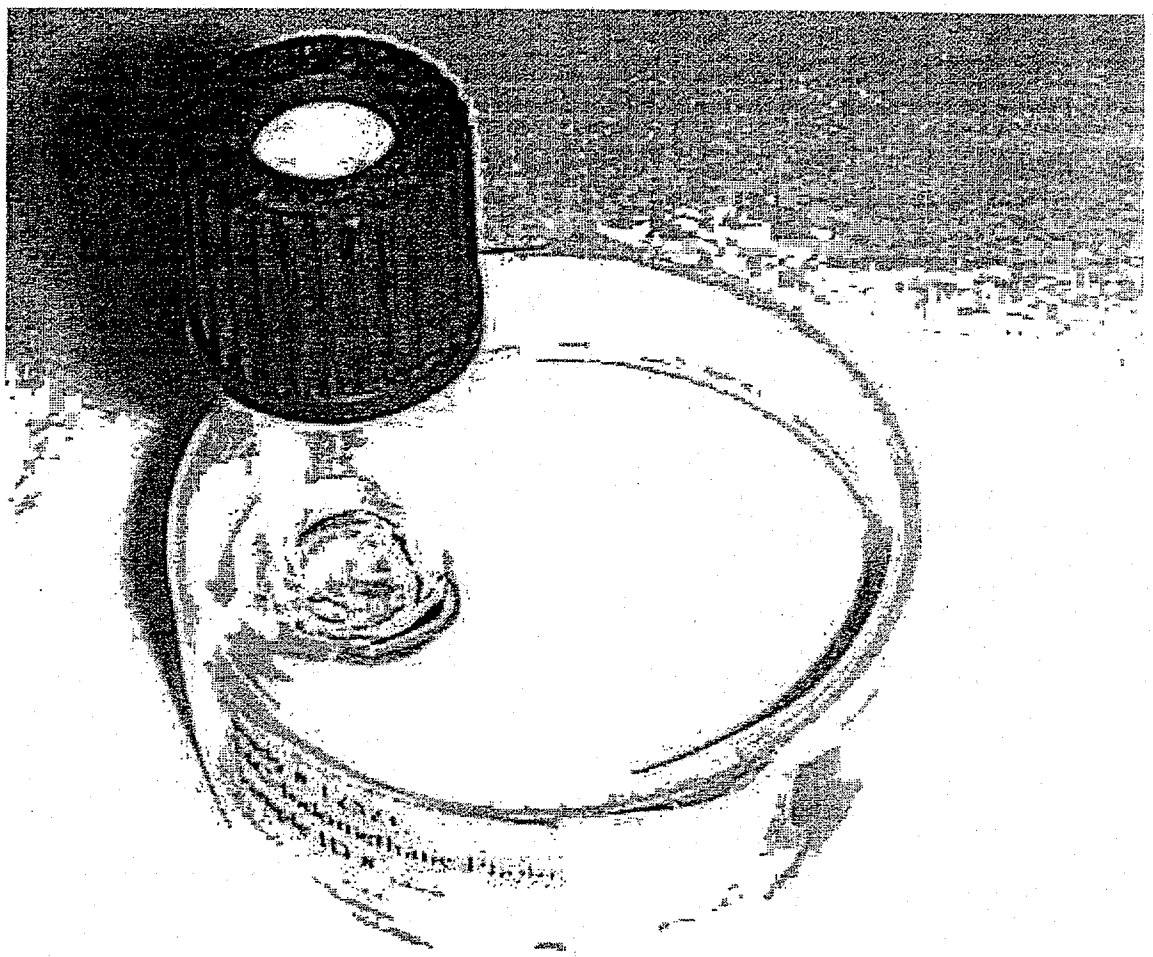


Figure 1: Diagram of Test Vessel

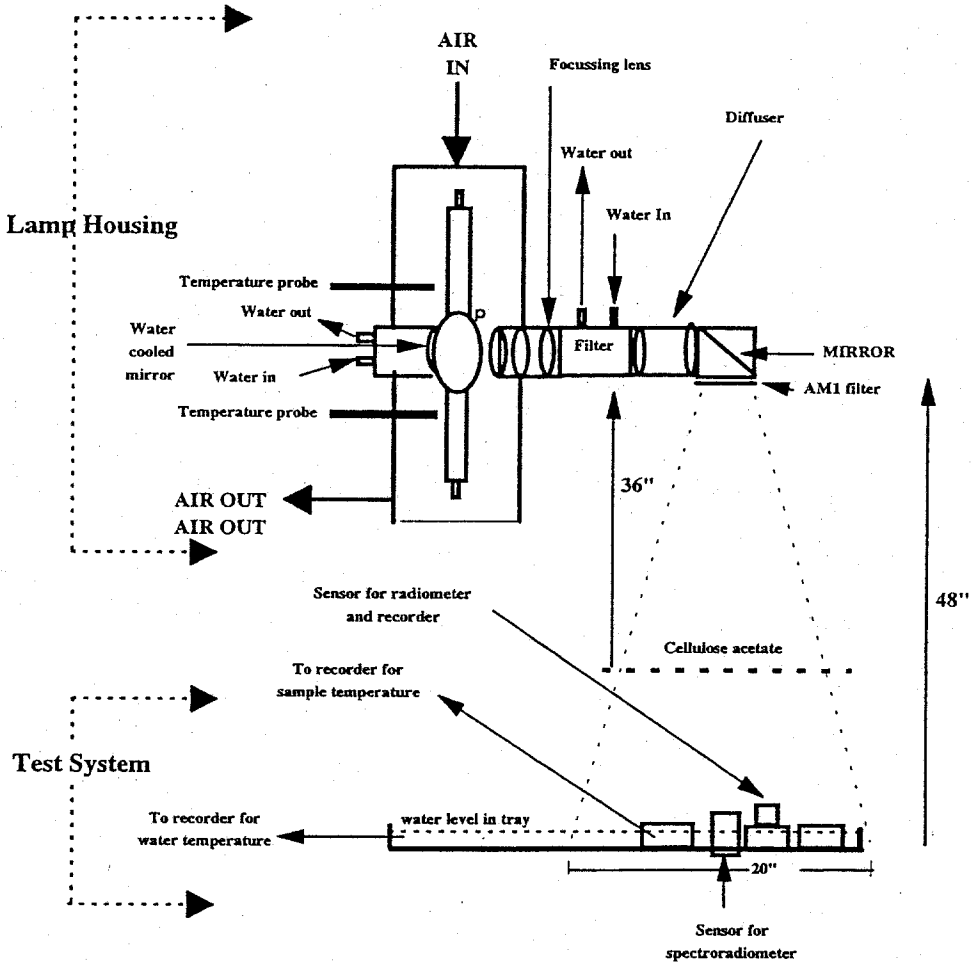


Vessel diameter = 6 cm
Vessel body height = 2 cm
Total height with cap = 7.2 cm

(20.32 cm) over the samples.

A schematic diagram of the apparatus is presented in Figure 1.

Figure 1: Schematic Diagram of Photolysis Apparatus



Comparison of Natural Sunlight with Filtered Light from the Xenon Arc Lamp

The intensity and wavelength distribution of natural sunlight were measured over the range 250-400 nm at 0825 and 1335 hours at Painesville, Ohio on June 5, 1991. A comparison of these measurements of natural sunlight with the cellulose acetate filtered light from the xenon arc lamp for selected days is presented in

Figure 2. The filter cutoff light < 290 nm.

The comparison shows that the light-exposed samples in this study were exposed to light with a similar intensity and wavelength distribution as natural sunlight.

Figure 2: Comparison of Natural Sunlight with Light from the Xenon Arc Lamp filtered through Cellulose Acetate - pH 5