

US EPA ARCHIVE DOCUMENT

DP Barcode: D178410  
 Shaughnessy No.: 090301  
 Case No.: 0028  
 Date Out of EFGWB:

TO: Dennis Jr. Edwards, Chemical Review Manager  
 Insecticide-Rodenticide Branch  
 Registration Division (H7505)

FROM: Emil Regelman  
 Supervisory Chemist, Review Section #2  
 Environmental Fate and Groundwater Branch (H7507C)

THROUGH: Henry Jacoby, Chief  
 Environmental Fate and Groundwater Branch  
 Environmental Fate and Effects Division (H7507C)

*Handwritten:* R 2/23/93

*Handwritten signature:* Henry Jacoby

Attached, please find the EFGWB review of:

Reg./File #(s) : 16752-77-5

Common Name : Methomyl

Chemical Name : S-Methyl N-[(methylcarbamoyl)oxy]thioacetimide

Product Type : Insecticide

Product Name : Lannate, Nudrin, DuPont 1179, IN 1179, Insecticide 1179, Mesomile, SD 14999, WL 18236, Lanox, and Nu-Bait II

Company Name : E. I. du Pont Nemours and Company

Purpose : Review of a terrestrial field dissipation study

Action Code : 320

EFGWB #(s) : 92-0913

EFGWB Guideline/MRID/Status Summary Table:  
 The review in this package contains...

161-1		162-4		164-4		166-1	
161-2		163-1		164-5		166-2	
161-3		163-2		165-1		166-3	
161-4		163-3		165-2		167-1	
162-1		164-1	42288001	S	165-3	167-2	
162-2		164-2		165-4		201-1	
162-3		164-3		165-5		202-1	

Y = Acceptable (Study satisfied the Guideline)/Concur P = Partial (Study partially satisfied the Guideline, but additional information is still needed)  
 S = Supplemental (Study provided useful information, but Guideline was not satisfied) N = Unacceptable (Study was rejected)/Non-Concur W = Waiver granted

/

1. CHEMICAL:

Common name:

Methomyl.

Chemical name(s):

S-Methyl N-[(methylcarbamoyl)oxy]thioacetimide.  
S-Methyl ester N-[(methylcarbamoyl)oxy]thioacetimidic acid.  
Methyl O-(methylcarbamoyl)thiolacetohydroxamate.  
Methyl ester N-[(methylamino)carbonyl]oxyethanimidothioic acid.  
O-(Methylcarbamoyl)oxime-3-thiobutan-2-one.

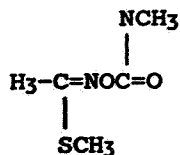
CAS No:

16752-77-5

Trade name(s):

Lannate, Nudrin, DuPont 1179, IN 1179, Insecticide 1179,  
Mesomile, SD 14999, WL 18236, Lanox, and Nu-Bait II.

Structure:



Formulations:

Soluble concentrate/liquid.  
Soluble concentrate/solid.

Physical/Chemical properties:

Molecular formula: C<sub>5</sub>H<sub>10</sub>N<sub>2</sub>O<sub>2</sub>S.  
Molecular weight: 162.2.  
Physical state: White crystalline solid; slight  
sulfurous odor.  
Melting point: 78-79 C.  
Vapor pressure (25 C): 6.65 mPa, 5.0x10<sup>-5</sup> torr.  
Solubility (25 C): 58 g/kg water; 720 g/kg acetone;  
420 g/kg ethanol; 1 kg/kg methanol;  
30 g/kg toluene.

Octanol/Water Partition Coefficient: 0.11 (log)

2. TEST MATERIAL:

Study 1: Soluble concentrate/liquid.

3. STUDY/ACTION TYPE:

Review of a terrestrial field dissipation study.

4. STUDY IDENTIFICATION:

Kennedy, C.M. 1991. Field soil dissipation of Lannate L insecticide - a 1991 study. Du Pont Project No. AMR-1921-91. Morse Project No. ML91-0242-DUP. Harris Project No. 9100135. Unpublished study performed by Morse Laboratories, Inc., Sacramento, CA, and Harris Environmental Technologies, Inc., Lincoln, NE; and submitted by E. I. du Pont de Nemours and Company, Wilmington, DE. (MRID# 42288001)

5. REVIEWED BY:

José L. Meléndez  
Chemist  
EFGWB/EFED/OPP  
Review Section #2

Signature: 

Date: 10/21/92

6. APPROVED BY:

Emil Regelman  
Chief  
EFGWB/EFED/OPP  
Review Section #2

Signature: 

Date: 2/23/93

7. CONCLUSION:

The Soil Field Dissipation (164-1) data requirement was fulfilled by the submission of two acceptable studies; therefore, EFGWB screened this study.

This study provides supplemental information about the soil field dissipation of methomyl.

Methomyl dissipated with a half life of 4-6 days when applied at a rate of 4 lb ai/A to a loam soil planted to cabbage in Mississippi. Methomyl was 0.91-1.1 ppm immediately posttreatment and decreased to  $\leq 0.037$  ppm at day 30 in the upper 15 cm of soil. Methomyl remained primarily in the upper 1-15 cm of the soil. It was only detected in the 15-30 cm soil depth, immediately posttreatment, with 0.040-0.059 ppm.

A wide range of half lives was observed among the studies submitted. Methomyl is moderately persistent in soils, but the persistence appears to be tied to the soil conditions. The aerobic soil metabolism half lives range from 15 to 45 days. One field dissipation study conducted in California shows a half life of 54 days. The registrant attributed the longer half life in this study to the low moisture content of the soil, which reduces its bioactivity.

The study conducted in Mississippi shows a short half-life (4-6 days). The authors of the study attribute this behavior to the bioactive medium of the

soil tested and the climate at the test site. However, no data was provided to support this assumption. The soil averaged 16% moisture over the first 15 days of the study, but the meteorological data provided was incomplete. The registrant should address this inconsistency and provide the missing meteorological information.

#### 8. RECOMMENDATIONS:

Inform the registrant that the submitted Soil Field Dissipation Study (MRID# 42288001) provides supplemental information about the soil field dissipation of methomyl. EFGWB screened the study since the Soil Field Dissipation data requirement had been previously fulfilled. EFGWB thoroughly integrated this information into its files and the One-Liner database.

Inform the registrant that it is required to address all the inconsistent field data results and provide complete meteorological information on the field study conducted in Mississippi.

#### 9. BACKGROUND:

Methomyl is a broad-spectrum insecticide registered for use on a variety of terrestrial food (vegetables, soybeans, cotton, other field crops, and certain fruits) and nonfood crops (tobacco, ornamental plants, and lawn turf). Single active ingredient formulations include soluble concentrate/liquid and soluble concentrate/solid. The general use patterns of methomyl are terrestrial non-food, terrestrial food, and aquatic non-food uses. The status of the data requirements for methomyl appears in the table attached. A LUIS report for this chemical is scheduled for January of 1993.

EFGWB received one package containing a Soil Field Dissipation Study. The study was run to satisfy requirements imposed by the California Groundwater Protection Act. Results of previous studies are as follows:

1. Methomyl, applied at 4 lbs ai/A decreased from 91% at day 0, to 55% at day 15, and to 33% at 30 days. Methomyl decomposed in a sandy loam soil in a greenhouse with a half-life of less than 30 days. The cause of decomposition, microbial or physico-chemical, could not be determined from this study because there was no sterile control soil and no measurement of  $^{14}\text{CO}_2$  evolved. The incubation was presumably in the light in the greenhouse.
2. In light textured soils, methomyl did not leach more than 11 and 15 inches over 3 and 5 months, respectively. Very little surface runoff of methomyl occurred from sandy soils under normal field use

- 
1. Harvey, J., Jr. 1977. Decomposition of  $^{14}\text{C}$  methomyl in a sandy loam soil in the greenhouse. Unpublished study prepared in cooperation with the University of Delaware, Soil Testing Laboratory and submitted by E. I. Du Pont De Nemours and Co., Inc., Wilmington, DE (CDL: 096026-A). Reviewed in the document: Methomyl Task I: Review and evaluation of individual studies. May 21, 1981. MRID# 00008567 (Reviewer H. Boyd)

conditions. Methomyl would likely remain in the upper 6 inches of treated soil.<sup>2</sup>

3. No residues were detected in muck soil (52% organic matter; pH 5.4) 7-32 days after application.<sup>3</sup>
  4. Methomyl dissipated with a half-life of 54 days when it was applied at a rate of 9 lb ai/A to a sandy loam soil planted to cabbage in Madera, CA. Methomyl remained primarily in the top 15 cm of soil, with deepest consistent soil penetration of 15-30 cm.<sup>4</sup>
10. DISCUSSION OF INDIVIDUAL TESTS OR STUDIES:
- Refer to attached review.
11. COMPLETION OF ONE-LINER:
- EFGWB updated the One-Liner data base with this report.
12. CBI APPENDIX:
- The registrant does not consider all data reviewed here as "company confidential."

rev26  
jlm

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2. Harvey, J. Jr., and Pease, H. L. 1971. Decomposition of Methomyl in soil. Unpublished study submitted by E. I. Du Pont De Nemours and Co., Inc., Wilmington, DE (CDL: 229711-D). Included in the document: Methomyl Task 1: Review and evaluation of individual studies. May 21, 1981 MRID# 00009324 (Reviewer: H. Boyd)
  3. 1971. Methomyl Decomposition In Muck Soil, A Field Study. E.I. Du Pont De Nemours and Co., Inc., Wilmington, DE (CDL: 222971-F). Included in the document Methomyl Task 1: Review and evaluation of individual studies. May 21, 1981. MRID# 00009326. (Reviewer: H. Boyd)
  4. Kennedy, S. Marcus. 1989. Field Soil Dissipation of Lannate<sup>R</sup> Insecticide. Study performed by Morse Laboratories, Inc., Sacramento, CA (Lab. Project ID ML88-0078-DUP) and submitted by E. I. Du Pont De Nemours and Co., Inc., Wilmington, DE (Du Pont Project ID AMR-1215-88) MRID# 41623901  
Kennedy, S. Marcus. 1989. Supplement to Field Soil Dissipation of Lannate<sup>R</sup> Insecticide. Study performed by Morse Laboratories, Inc., Sacramento, CA (Lab. Project ID ML88-0078-DUP) and submitted by E. I. Du Pont De Nemours and Co., Inc., Wilmington, DE (Du Pont Project ID AMR-1215-88) MRID# 41623902

Data Requirements for Methomyl

<u>Data Requirements and Guidelines Reference No.</u>	<u>Status of Data Requirement</u>
<u>Degradation - Lab.:</u>	
161-1 Hydrolysis	Satisfied <sup>1</sup>
161.2 Photolysis in Water	Satisfied <sup>2</sup>
161.3 Photolysis in Soil	Satisfied <sup>3</sup>
161-4 Photodegradation in Air	Waived <sup>4</sup>
<u>Metabolism Studies - Lab.</u>	
162-1 Aerobic Soil Metabolism	Satisfied <sup>5</sup>
162-2 Anaerobic Soil Metabolism	Satisfied <sup>6</sup>
<u>Mobility Studies - Lab.</u>	
163-1 Mobility in Soil	Satisfied <sup>7</sup>
163-2 Volatility from Soil (Lab.)	Waived <sup>4</sup>
163-3 Volatility from Soil (Field)	Waived <sup>4</sup>
<u>Field Dissipation Studies</u>	
164-1 Terrestrial (Short-term)	Satisfied <sup>8</sup>
164-5 Terrestrial (Long-Term)	Waived <sup>9</sup>
<u>Accumulation Studies</u>	
165-1 In Confined Rotational Crops	Satisfied <sup>10</sup>
165-4 In Fish	Waived <sup>11</sup>
<u>Other</u>	
166-1/-2/-3 Ground Water Monitoring Studies	Not Satisfied <sup>12</sup>

FOOTNOTES:

1. Methomyl was relatively stable in pH 5 and 7 solutions at 25°C. A half-life of 30 days was observed for the pH 9 solution. The only degradate was S-methyl-N-hydroxythioacetimidate (MRID# 00131249).
2. Methomyl photodegraded with a half-life of 1 day in sterile aqueous pH 5 solution. The major degradate was acetonitrile, the minor degradate is S-methyl-N-hydroxythioacetimidate (MRID# 00161885).
3. Methomyl photodegraded with a half-life of 34 days on silty clay loam soil irradiated with natural sunlight at 24-28°C. The major degradate was acetonitrile (MRID# 00163745).
4. The vapour pressure of methomyl is  $5.4 \times 10^{-6}$ , EFGWB concurs with a waiver for the data requirement (EFGWB# 90765).
5. Methomyl degraded with a half-life of 30-45 days in silt loam soil incubated at 25°C. The major degradate was  $^{14}\text{CO}_2$ . A minor degradate was S-methyl-N-hydroxythioacetimidate (MRID# 00008568).
6. Methomyl degraded fast under anaerobic soil conditions. In the early stages methomyl was not detected and acetonitrile was the initial degradation product.  $^{14}\text{CO}_2$  was the final degradation product with more than 90% of the applied radioactivity at 8 days posttreatment (MRID# 00073214).
7. Methomyl and its degradate S-methyl-N-hydroxythioacetimidate were very mobile on sandy loam, silty clay loam, and silt loam soil TLC plates, with  $R_f$  values ranging from 0.64 to 0.93. In batch equilibrium studies, methomyl was very mobile in two sandy loams, a silt loam, and a silt soil with  $K_{ds}$  values from 0.5 to 2.8 (MRID#'s 00044306 and 00161884).
8. Validated results show methomyl does not leach more than 15 inches over 5 months. In a muck soil no residues of methomyl were detected (MRID#'s 00009324 and 00009326). Supplementary studies show that in California at an application rate of 9 lb ai/A, methomyl dissipated with a registrant calculated half-life of 54 days (MRID#'s 41623901 and 41623902). In Mississippi, at an application rate of 4 lb ai/A, methomyl dissipated with a half life of 4-6 days. Methomyl remained primarily in the upper 0-15 cm of soil (MRID# 42288001).
9. Waived based upon results of satisfactory short term studies.
10. Beets and cabbage planted 30 and 120 days posttreatment had total radioactivity ranging from 0.04 to 0.15 ppm. Sunflower seeds ranged from 1.5 to 2.0 ppm. The application rate was four times the maximum single use rate (MRID# 00019947).
11. The octanol/water partition coefficient ( $K_{ow}$ ) for methomyl ranges from 1.29 to 1.33. This value is significantly less than 1000. Chemicals with this low  $K_{ow}$  are not expected to bioconcentrate. EFGWB concurs with a waiver of the Bioaccumulation in Fish data requirement for methomyl.
12. Required because the detection of methomyl in ground water has been confirmed, but data are insufficient to assess the extent and degree of groundwater contamination (EFGWB 90-0410).



DP BARCODE: D178410

CASE: 047860  
SUBMISSION: S418040

DATA PACKAGE RECORD  
BEAN SHEET

DATE: 12/17/92  
Page 1 of 1.

\* \* \* CASE/SUBMISSION INFORMATION \* \* \*

CASE TYPE: REGISTRATION ACTION: 320 AMD-LBL REV-DAT REQ H/E R  
CHEMICALS: 090301 Methomyl 24.0000%

ID#: 000352-00370 DU PONT LANNATE L METHOMYL INSECTICIDE  
COMPANY: 000352 E. I. DU PONT DENEMOURS AND CO, INC  
PRODUCT MANAGER: 19 DENNIS JR EDWARDS 703-305-6386 ROOM: CM2 207  
PM TEAM REVIEWER: RITA KUMAR 703-305-5416 ROOM: CM2 200  
RECEIVED DATE: 04/21/92 DUE OUT DATE: 08/09/92

\* \* \* DATA PACKAGE INFORMATION \* \* \*

DP BARCODE: 178410 EXPEDITE: N DATE SENT: 05/21/92 DATE RET.: / /  
CHEMICAL: 090301 Methomyl  
DP TYPE: 001 Submission Related Data Package  
ADMIN DUE DATE: 07/30/92 CSF: N LABEL: N

ASSIGNED TO	DATE IN	DATE OUT
DIV : EFED	05/28/92	/ /
BRAN: EFGB	/ /	/ /
SECT:	/ /	/ /
REVR :	/ /	/ /
CONTR:	/ /	/ /

\* \* \* DATA REVIEW INSTRUCTIONS \* \* \*

Please review submitted data.

\* \* \* ADDITIONAL DATA PACKAGES FOR THIS SUBMISSION \* \* \*

DP BC	BRANCH/SECTION	DATE OUT	DUE BACK	INS	CSF	LABEL
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8

DATA EVALUATION RECORD

STUDY 1

CHEM 090301

Methomyl

S164-1

FORMULATION--15--SOLUBLE CONCENTRATE/LIQUID (SC/L)

STUDY ID 42288001

Kennedy, C.M. 1991. Field soil dissipation of Lannate L insecticide - a 1991 study. Du Pont Project No. AMR-1921-91. Morse Project No. ML91-0242-DUP. Harris Project No. 9100135. Unpublished study performed by Morse Laboratories, Inc., Sacramento, CA, and Harris Environmental Technologies, Inc., Lincoln, NE; and submitted by E. I. du Pont de Nemours and Company, Wilmington, DE.

DIRECT REVIEW TIME = 16

REVIEWED BY: N. Shishkoff

TITLE: Staff Scientist

EDITED BY: W. Martin  
W. Hurtt

TITLE: Staff Scientist  
Staff Scientist

APPROVED BY: W. Spangler

TITLE: Project Manager

ORG: Dynamac Corporation  
Rockville, MD  
TEL: 301-417-9800

APPROVED BY: José L. Meléndez

TITLE: Chemist

ORG: EFGWB/EFED/OPP

TEL: 703-305-7495

SIGNATURE:

*José Luis Meléndez*  
*Dec 22, 1992*

## CONCLUSIONS:

### Field Dissipation - Terrestrial

1. This study provides supplemental information about the soil field dissipation of methomyl.
2. Methomyl (Lannate L, 1.8 lb ai/gal) dissipated with a half-life of 4-6 days following one application at 4 lb ai/A to loam soil in Mississippi. Samples were not analyzed for methomyl degradates. Methomyl was generally found only in the upper 15 cm of the soil.

## METHODOLOGY:

Methomyl (S-methyl N-[(methylcarbamoyl)oxy]thioacetimide; Lannate L, 1.8 lb ai/gal, du Pont) was applied using a CO<sub>2</sub> sprayer at 4 lb ai/A to three replicate plots (50 x 12.68 ft) of loam soil (43% sand, 45% silt, 12% clay, 1-1.2% organic matter, pH 6.2-6.4, CEC 10.9-14.7 meq/100 g) on May 13, 1991; the plots had been planted to cabbage and were located in Greenville, Mississippi. The cabbage was 53 days old and 6-8 inches in diameter at time of methomyl application. An untreated plot (30 X 38 feet) located 8 feet from the treated plots served as a control. For sampling purposes, the plots were divided into ten subplots. Soil samples were collected 11 days prior to application, immediately post-application (6 hours posttreatment), and 1, 3, 7, 15, 30, 45, 60, 74, and 91 days posttreatment. Soil cores were collected to a depth of 90 cm with a "zero-contamination" soil probe (1.25-inch diameter). Ten soil cores were collected prior to application, two from each odd-numbered subplot, for residue analysis and soil characterization. After treatment, a total of five soil cores were collected from each plot; at each sampling interval, single soil cores were collected from either the odd-numbered or even-numbered subplots. Soil cores were divided into 0- to 45- and 45- to 90-cm segments and stored at -20°C until shipment to the analytical laboratory. The soil cores were stored up to 4.5 months before analysis. Prior to analysis, the soil cores were further divided into 0- to 15-, 15- to 30-, 30- to 45-, 45- to 60-, and 60- to 90-cm segments and composited by plot, sampling interval, and soil depth. The samples were then homogenized (method not reported).

Deionized water was added to the soil samples, and the samples were extracted three times by shaking with ethyl acetate. The organic layers were decanted, filtered, combined, and concentrated to dryness using a combination of rotary evaporation, evaporation over a steambath, and a nitrogen stream. The residues were redissolved in water:acetonitrile:glacial acetic acid (85:14:1). Aliquots of the extracts were analyzed by HPLC on a Zorbax RX column eluted with a mobile phase of water:acetonitrile (85:15) with UV (233 nm) detection. Analytical-grade methomyl was used as a reference standard. Recoveries from soil samples fortified with methomyl at 0.02-1.00 ppm were 78-95%. The quantitation limit was 0.020 ppm.

DATA SUMMARY:

Methomyl (S-methyl N-[(methylcarbamoyl)oxy]thioacetimide) dissipated with a half-life of 4-6 days from loam soil that was planted to cabbage and located in Mississippi following one application of methomyl (Lannate L, 1.8 lb ai/gal) at 4 lb ai/A in May 1991 (Figures 1-3). In the upper 15 cm of the soil, methomyl was 0.91-1.1 ppm immediately posttreatment, 0.57-0.94 ppm at 1-3 days, 0.076-0.61 ppm at 7-15 days,  $\leq 0.037$  at 30 days, and  $< 0.023$  ppm at all later sampling intervals (Table II). Methomyl was not detected in the deeper soil samples, except was 0.040-0.059 ppm in the 15- to 30-cm soil depth immediately posttreatment.

The mean monthly minimum and maximum temperatures over the study period were 68-94 F. Total rainfall was 9.6 inches and total irrigation was 2.1 inches.

COMMENTS:

1. The soil samples were only analyzed for methomyl. The degradate S-methyl-N-hydroxythioacetimide was identified in an aerobic soil metabolism study (MRID 00008568, Dynamac Report dated 9/29/87). The study author cited internal du Pont documents that indicated methomyl was the only compound detected in field studies. These documents should have been provided for review so the adequacy of the method could be evaluated.
2. The meteorological data were incomplete. Only the high and low monthly average temperatures were reported, and the rainfall and irrigation was presented as monthly totals. These data should be reported on a daily basis so that the temperature and rainfall may be correlated with the sampling intervals and methomyl dissipation. Additionally, the soil temperatures were not reported. These data should be collected at the study site since large variations may occur between meteorological stations in close proximity.
3. Methomyl was detected only in the upper 15 cm of the soil, with the exception of 0.040-0.059 ppm found in the 15- to 30-cm soil depth immediately posttreatment (6 hours posttreatment). The study author considered these values to be the result of contamination.
4. In 1988, the study site was a peach orchard, and was treated with monosodium methanearsonate (MSMA) at 2 lb ai/A, glyphosate (Roundup) at 2% v/v, and lime at 2 tons/A. In 1989, the plot was fallow. In 1990, the plot was planted to peanuts, corn, soybeans and sorghum; the plot was treated with metribuzin (Lexone) at 0.6 lb/A, fluometuron ("Cotovan") at 1 lb ai/A, pendimethalin (Prowl) at 2 pt/A, alachlor (Lasso) at 4 qt/A, atrazine (Aatrex) at 2.4 pt/A, potash fertilizer at 60 lb/A, phosphate at 30 lb/A, NFERT at 60 lb/A, dicotophos at 0.25 lb ai/A, oxamyl at 0.5 lb ai/A, esfenvalerate (Asana XL) at 8 oz/A, methyl parathion at 2 pt/A, Fert (6-18-6) at 1 qt/A and propargite (Comite) at 2 pt/A.

5. During the study period, the only pesticide applied to the study plots was chlorthal dimethyl (Dacthal W75) at 10 lb/A.
6. The study author cited a storage stability study performed with methomyl in sandy loam soil from California. Methomyl was reported to be stable for up to 19 months at  $-20 \pm 5$  C; however, no data were provided. The study author also mentioned an ongoing study using the test soil, but gave no additional information.

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Methomyl

RIN: 8036-92

Page      is not included in this copy.

Pages 13 through 32 are not included.

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The material not included contains the following type of information:

- Identity of product inert ingredients.
  - Identity of product impurities.
  - Description of the product manufacturing process.
  - Description of quality control procedures.
  - Identity of the source of product ingredients.
  - Sales or other commercial/financial information.
  - A draft product label.
  - The product confidential statement of formula.
  - Information about a pending registration action.
  - FIFRA registration data.
  - The document is a duplicate of page(s)         .
  - The document is not responsive to the request.
- 

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.

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Environmental Fate & Effects Division  
 PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY  
**METHOMYL**

Last Update on December 22, 1992

[V] = Validated Study    [S] = Supplemental Study    [U] = USDA Data

. LOGOUT	Reviewer: <i>[Signature]</i>	Section Head:	Date: <i>12/23/92</i>
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Common Name: METHOMYL

Smiles Code: S(C)C(=NOC(=O)NC)C

PC Code # : 90301

CAS #: 16752-77-5

Caswell #:

Chem. Name : S-METHYL-N-[(METHYLCARBAMOYL)OXY]THIOACETIMIDATE

Action Type: Insecticide

Trade Names: LANNATE, LANOX 90, LANOX 216, DPX-X1179, SD-14999, NUDRIN  
 (Formul'tn): GRANULAR; DUST; WATER SOL. POWDER;

Physical State: CLRSS CRY; SULFUROUS ODR

Use : FIELD CROPS; VEGETABLES; FRUITS; ORNAMENTALS  
 Patterns :  
 (% Usage) :

Empirical Form: C<sub>5</sub>H<sub>10</sub>O<sub>2</sub>N<sub>2</sub>S

Molecular Wgt.: 162.21

Vapor Pressure: 5.00E -5 Torr

Melting Point : 78-79 °C

Boiling Point: NA °C

Log Kow : 0.11

pKa: @ °C

Henry's : E Atm. M3/Mol (Measured)

1.84E-10 (calc'd)

Solubility in ...

Comments

Water	5.80E	4	ppm	@20.0	°C	
Acetone	E		ppm	@	°C	
Acetonitrile	E		ppm	@	°C	
Benzene	E		ppm	@	°C	
Chloroform	E		ppm	@	°C	
Ethanol	E		ppm	@	°C	
Methanol	E		ppm	@	°C	?
Toluene	E		ppm	@	°C	
Xylene	E		ppm	@	°C	
	E		ppm	@	°C	
	E		ppm	@	°C	

Hydrolysis (161-1)

- [V] pH 5.0: STABLE
- [V] pH 7.0: STABLE
- [V] pH 9.0: 30 DAYS
- [ ] pH 10.0: 3 HRS
- [ ] pH 1.0: 21 HRS
- [V] pH 4.0: STABLE

*33*

Environmental Fate & Effects Division  
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY  
METHOMYL

Last Update on December 22, 1992

[V] = Validated Study [S] = Supplemental Study [U] = USDA Data

Photolysis (161-2, -3, -4)

[V] Water:1 DAY IN ARTIFL LIGHT, AT  
[ ] :25 C, pH 5  
[ ] :  
[ ] :

[V] Soil :SiClLm, SUNLIGHT, 34 DAYS  
[S] Air :NO DECOMP IN SUN, 120 DA

Aerobic Soil Metabolism (162-1)

[V] SdLm 15-30 DAYS  
[V] MUCK AND SiLm 45 DAYS  
[V] IN STERILE FLANAGAN SiLm, 89%  
[ ] STILL PRESENT AFTER 45 DAYS  
[V] AT 4 PPM, IN SiLm, IN DARK, AT  
[ ] 25 C AND 70% WHC; 30-45 DAYS  
[ ]

Anaerobic Soil Metabolism (162-2)

[V] TOTAL CONVERSION TO CO2 IN  
[ ] ABOUT 8 DAYS  
[ ]  
[ ]  
[ ]  
[ ]  
[ ]

Anaerobic Aquatic Metabolism (162-3)

[ ]  
[ ]  
[ ]  
[ ]  
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Aerobic Aquatic Metabolism (162-4)

[ ]  
[ ]  
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Environmental Fate & Effects Division  
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY  
METHOMYL

Last Update on December 22, 1992

[V] = Validated Study    [S] = Supplemental Study    [U] = USDA Data

Soil Partition Coefficient (Kd) (163-1)

[ ]	Kads	Kdes
[S]	0.72	1.0
[S]	1.0	1.6
[S]	1.4	2.8
[S]	0.23	0.5
[ ]	See Composition Under Rf	

Soil Rf Factors (163-1)

[ ]	Sd	Si	Cl	%OM	pH	Rf
[S]	61	21	18	2.1	6.5	0.53
[S]	2	81	17	4.3	5.4	0.82
[S]	12	83	5	7.5	5.2	0.52
[S]	60	33	7	1.1	6.6	0.46
[ ]						

Laboratory Volatility (163-2)

[ ]  
[ ]

Field Volatility (163-3)

[ ]  
[ ]

Terrestrial Field Dissipation (164-1)

[V] IN SiLm 98% METHOMYL DISSIPATES WITHIN 1 MONTH; IN LmSd 85%  
[ ] DISSIPATES AFTER 5 MONTHS; NO RESIDUE IN MUCK AFTER 7-32 DA.  
[V] AT 4 LBS AI/A, DECREASED FROM 91% AT DAY 0 TO 55% AT DAY 15,  
[ ] AND TO 33% AT 30 DAYS IN SdLm SOIL IN A GREENHOUSE.  
[V] AT 9 LBS AI/A, IN SdLm, 1/2 LIFE 54 DAYS OVER A 9 MONTH  
[ ] PERIOD (IN CABBAGE).  
[S] AT 4 LB AI/A, IN LOAM SOIL, 1/2 LIFE 4-6 DAYS, METHOMYL REMAINED  
[ ] PRIMARILY IN THE UPPER 0-15 CM (IN CABBAGE)  
[ ]  
[ ]

Aquatic Dissipation (164-2)

[ ]  
[ ]  
[ ]  
[ ]  
[ ]  
[ ]

Forestry Dissipation (164-3)

[ ]  
[ ]

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METHOMYL

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Long-Term Soil Dissipation (164-5)

[ ]  
[ ]

Accumulation in Rotational Crops, Confined (165-1)

[V] AT APPL RATE 4X MAX USE, BEETS AND CABBAGE PLANT-  
[ ] ED 30- AND 120 DAYS LATER, CONTAINED .04-.15 PPM

Accumulation in Rotational Crops, Field (165-2)

[ ]  
[ ]

Accumulation in Irrigated Crops (165-3)

[ ]  
[ ]

Bioaccumulation in Fish (165-4)

[V] 96-HR LC50 FOR WARMWATER FISH = 1.05-1.88 PPM; FOR COLDWATER  
[ ] FISH = 1.6 PPM.

Bioaccumulation in Non-Target Organisms (165-5)

[V] 48-HR LC50 FOR DAPHNIA = 31.7 PPB.  
[ ]

Ground Water Monitoring, Prospective (166-1)

[ ] Protocol reviewed for study in Cook County, GA (12/92).  
[ ] Protocol partially acceptable.  
[ ]  
[ ]

Ground Water Monitoring, Small Scale Retrospective (166-2)

[ ]  
[ ]  
[ ]  
[ ]

Ground Water Monitoring, Large Scale Retrospective (166-3)

[ ]  
[ ]  
[ ]  
[ ]

Ground Water Monitoring, Miscellaneous Data (158.75)

[S] NEW YORK: 1-20 PPB; NEW JERSEY: TR - 1 PPB; FLORIDA: 1-20 PPB;  
[ ] GEORGIA: 3-5 PPB; MISSOURI: 8.1 PPB  
[ ]

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Field Runoff (167-1)

[ ]  
[ ]  
[ ]  
[ ]

Surface Water Monitoring (167-2)

[ ]  
[ ]  
[ ]  
[ ]

Spray Drift, Droplet Spectrum (201-1)

[ ]  
[ ]  
[ ]  
[ ]

Spray Drift, Field Evaluation (202-1)

[ ]  
[ ]  
[ ]  
[ ]

Degradation Products

Acetonitrile

CO2

(methomyl per se is the only residue of concern in plants)

S-methyl-N-hydroxythioacetimidate

methomyl oxime

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Comments

- In plants, methomyl is absorbed by roots and translocated to leaves.
  - Slightly toxic to avian wildlife.
  - Degradation in soil is primarily a microbial process. Repeated applications within 19 day period may result in prolonged period of reduced nitrification.
  - Can be a hazard to honeybees and other beneficial insects.
  - Health advisory level is 175 ppb.
  - Adsorption is directly related to org. content of soil; adsorption to org. matter is similar to that of terbacil.
- Koc = 72 (U)

References: EPA REVIEWS  
Writer : PJH, MIR, EW