

US EPA ARCHIVE DOCUMENT

11-6-84

006315  
SHAUGHNESSY NO.

REVIEW NO.

EEB BRANCH REVIEW

DATE: IN 10/17/84 OUT 11/6/84

FILE OR REG. NO. 8959-UU

PETITION OR EXP. PERMIT NO. \_\_\_\_\_

DATE OF SUBMISSION 10/11/84

DATE RECEIVED BY HED 10/12/84

RD REQUESTED COMPLETION DATE 11/13/84

EEB ESTIMATED COMPLETION DATE 11/10/84

RD ACTION CODE/TYPE OF REVIEW 161/Old Chemical

TYPE PRODUCT(S): I, D, H, F, N, R, S Microbiocide

DATA ACCESSION NO(S). \_\_\_\_\_

PRODUCT MANAGER NO. A.E. Castillo (32)

PRODUCT NAME(S) Brominating Compounds for Spas & Hot Tubs

COMPANY NAME Applied Biochemists, Inc.

SUBMISSION PURPOSE Proposed registration of uses in spas and hot tubs

SHAUGHNESSY NO.	CHEMICAL & FORMULATION	% A.I.
<u>006315</u>	<u>1-Bromo-3-chloro-5,5-dimethylhydantoin</u>	<u>99.0</u>

100. Submission Purpose and Label Information

100.1 Submission Purpose and Pesticide Use

Proposed registration of uses is spas and hot tubs. Brominating Compound is use as a disinfectant in spas and hot tubs.

100.2 Formulation Information

1-Bromo-3-Chloro-5,5-Dimethylhydantoin	96.0%
Inert Ingredients	4.0%

100.3 Application Methods Directions, Rates

Maintain a bromine residual of 0.5-2.0 ppm at all times. Operate spa or hot tub circulation and filtration system a minimum of 2 hours per day when not in use.

100.4 Target Organisms

Microbiocide and Algaecide

100.5 Precautionary Labeling

Humans and Domestic Animals

Corrosive-Causes eye damage and burns skin. Causes irritation of nose and throat. Harmful if swallowed. Do not get on skin or clothing. Use clean dry utensils and wear goggles or face shield and rubber gloves when handling. Avoid breathing dust or fumes.

Environmental Hazard

This product is toxic to fish. Do not discharge into lakes, streams, ponds or public waters unless in accordance with NPDES permits. For guidance, contact the regional office of EPA.

101. Hazard Assessment

101.1 Discussion

Bromine Residual: Maintain a bromine residual of 0.5-2.0 ppm at all times. Add one SPA-trine Bromine Pak to your spa or hot tub, for each 250 gallons capacity, or fill

your bromine feeder with SPA-trine Bromine and adjust as per the feeder manufacturer's directions. Operate your spa or hot tub circulation and filtration system a minimum of 2 hours per day when not in use. Under normal use, spa or hot tub should be drained and refilled with fresh water at least once every two months. Heavy use will require draining and refilling spas or hot tubs monthly.

101.2 Likelihood of Adverse Effects to Non-target Organisms

Based upon the available data 1-bromo-3-chloro-5,5-dimethylhydantoin is slightly toxic to bobwhite, practically non-toxic to mallard duck, highly toxic to both bluegill sunfish and rainbow trout and moderately toxic to Daphnia magna. The treatment will range from 0.5-2.0 ppm.

Based upon the use pattern, 1-bromo-3-chloro-5,5-dimethylhydantoin should pose a minimal acute hazard to terrestrial wildlife. However, there are potentials for exposure and possible risks to both rainbow trout and bluegill sunfish. The treatment and discharge levels of Brominating Compound will range from 0.5 to 2.0 ppm, which will exceed the bluegill sunfish LC<sub>50</sub> of 0.36 ppm at all times and the rainbow trout LC<sub>50</sub> when the concentration exceeds 0.75 ppm.

However, NPDES permits are usually required prior to discharge of this product into lakes, ponds, streams, public water supplies or wetlands. Considering this and the dilution factor of receiving waterways, it is unlikely that significant hazards exist for nontarget aquatic organisms.

101.3 Endangered Species Consideration

Because of dilution in receiving waterways and the fact that NPDES permits are usually required, it is not anticipated that significant exposure or risks exist for endangered species.

101.4 Adequacy of Toxicity Data

<u>Species</u>	<u>Result</u>	<u>Date</u>	<u>Status</u>
Bobwhite quail	1070 mg/kg	10-18-84	Core
Bobwhite quail	>5620 ppm	10-19-84	Core
Mallard duck	>5620 ppm	10-19-84	Core
Rainbow trout	0.75 ppm	10-17-84	Core
Bluegill sunfish	0.36 ppm	10-18-84	Core
<u>Daphnia magna</u>	2.3 ppm	10-18-84	Core

101.5 Adequacy of Labeling

The label statement should be changed to read:

Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or public waters unless this product is specifically identified and addressed in an NPDES permit. Do not discharge effluent containing this product to sewer systems without previously notifying the sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA.

102.0 Classifications

None at this time.

103.0 Conclusions

EEB has reviewed the proposed registration of 1-bromo-3-chloro-5,5-dimethylhydantoin for use in spas and hot tubs. Based upon the available data, EEB concludes that the proposed uses provide for no significant increase in exposure and risks to nontarget organisms.

Note to PM

Based upon a telephone conversation with Mr. Neil Stillman of Applied Biochemists, Inc., on 10-22-84, stating that "all the fish and wildlife studies were conducted with 1-bromo-3-chloro-5,5-dimethylhydantoin, instead of 1-bromo-3-chloro-5-dimethylhydantoin as submitted in the studies." The reviewer asked Mr. Stillman for a letter stating the fish and wildlife studies were conducted with 1-bromo-3-chloro-5,5 dimethylhydantoin to be attached to the fish and wildlife review and placed in EEB's files.

Curtis E. Laird  
Fishery Biologist  
EEB/HED

*Norman Cook* 11-5-84  
Norman Cook  
Head, Section 2  
EEB/HED

*Clayton Bushong* 11-5-84  
Clayton Bushong  
Chief  
EEB/HED

DATA EVALUATION REPORT

1. CHEMICAL: 1-Bromo-3-chloro-5,5-dimethylhydantoin
2. TEST MATERIAL: 99.0% (technical a.i.) a white powder
3. STUDY IDENTIFICATION: An Acute Oral Study in the Bobwhite with 1-bromo-3-chloro-5,5-dimethylhydantoin; Prepared by Wildlife International Ltd.; Project # 196-103; Study date 5-29-84; Submitted by Applied Biochemists, Inc. Mequon, Wisconsin 53092.
4. STUDY TYPE: Avian Acute Oral LD<sub>50</sub>
  - A. Test Species: Bobwhite quail
5. REVIEWED BY: Curtis E. Laird  
Fishery Biologist  
EEB/HED  
10/18/84  
Review Time 3 hours
6. REPORTED CONCLUSIONS: The acute oral LD<sub>50</sub> value is 1070/mg/kg with confidence limits (95%) of 781 mg/kg to 1542 mg/kg. The test birds were approximately six months old.
7. REVIEWER'S CONCLUSIONS: This study indicates 1-bromo-3-chloro-5,5-dimethylhydantoin is slightly toxic to bobwhite quail with an LD<sub>50</sub> of 1070 mg/kg. This study does fulfill the requirement in support of registration.

8. MATERIAL AND METHODS EMPLOYED:

Approximately six-month-old bobwhite quail were used in this study. The study consisted of 5 treatment levels and a distilled water control. The study was conducted in Georgia Farm Breeder Units (78 X 51 X 23 cm) with ten birds per unit or concentration and a control (five cocks and five hens).

9. DISCUSSION/RESULTS:

Control - There was no mortality in the control. All birds were normal in appearance and behavior throughout the test period.

1-Bromo-3-chloro-5,5-dimethylhydantoin - There was no mortality at dosages of 125 or 250 mg/kg. There was 10% mortality (1 of 10) at 500 mg/kg, 40% mortality (4 of 10) at 1000 mg/kg and 90% mortality (9 of 10) at 2000 mg/kg. There were no overt signs of toxicity or abnormal behavior at 125 or 250 mg/kg at any time during the test. However, at 500, 1000 and 2000 mg/kg birds began to display lethargy within two hours of dosing time. Signs of toxicity included lethargy or depression, reduced reaction to external stimuli, a ruffled appearance, wing droop, etc.

10. STATISTICAL ANALYSIS:

Probit analysis.

11. REVIEWER'S EVALUATION:

a. TEST PROCEDURE

The test procedure complied with the recommended EPA protocol of October 1982 (Part 158).

b. Statistical Analysis

The statistics were verified with the probit analysis program.

c. The acute oral LD<sub>50</sub> value is 1070 mg/kg with 95% confidence limits of 799 to 1533 mg/kg.

CONCLUSIONS

- a. Category: Core
- b. Rationale: N/A
- c. Repairability: N/A



1-100000-3 Chl...s

LAIRD DIMETHYLHYDAANTOIN ACUTE ORAL LD50 FOR BOBWHITE OUAIL 47.6  
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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
2000	10	9	90	1.07422
1000	10	4	40	37.6953
500	10	1	10	1.07422
250	10	0	0	.0976563
125	10	0	0	.0976563

THE BINOMIAL TEST SHOWS THAT 500 AND 2000 CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 1134.64

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
2	.26942	1080.29	768.8	1606.98

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
6	.286914	1	.969116

SLOPE = 4.36676  
95 PERCENT CONFIDENCE LIMITS = 2.02773 AND 6.70578

LC50 = 1070.66  
95 PERCENT CONFIDENCE LIMITS = 779.022 AND 1533.56

LC10 = 548.049  
95 PERCENT CONFIDENCE LIMITS = 240.823 AND 758.312

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DATA EVALUATION REPORT

1. CHEMICAL: 1-Bromo-3-Chloro-5,5-Dimethylhydantoin
2. TEST MATERIAL: 99.0% (technical a.i.) a white powder
3. STUDY IDENTIFICATION: A Dietary LC<sub>50</sub> Study in the Bobwhite with 1-Bromo-3-Chloro-5,5-Dimethylhydantoin; Report # 196-101; Study Date 6-8-84; Prepared by Wildlife International Ltd.; Submitted by Applied Biochemists, Inc. Mequon, Wisconsin 53092.
4. STUDY TYPE: Avian Eight-Day Dietary LC<sub>50</sub>
  - A. Test Species: Bobwhite Quail
5. REVIEWED BY: Curtis E. Laird  
Fishery Biologist  
EEB/HED  
10/19/84  
Review Time 3 hours
6. REPORTED CONCLUSIONS: The LC<sub>50</sub> value in the study was determined to be greater than 5620 ppm, the highest concentration tested. The no-observed effect concentration was at least 1000 ppm, based on a possible reduction in body weight gain during the exposure phase (Day 1-5) of the study at concentrations of 1780 ppm and greater. There was one mortality in 1000 and 3160 ppm concentration.
7. REVIEWER'S CONCLUSIONS: This study indicates 1-bromo-3-chloro-5,5-dimethylhydantoin is practically non-toxic to bobwhite quail with an LC<sub>50</sub> >5620 ppm. This study does fulfill the requirement in support registration.

8. MATERIAL AND METHODS EMPLOYED:

Apparently healthy 11-day-old bobwhite chicks were assigned to the treatment groups by random draw without regard to sex. Ten birds were utilized per group, with 5 treatment and control groups. The temperature in the brooding compartment during the course of the study was  $100^{\circ}\text{F} \pm 2^{\circ}\text{F}$ . The experimental material was dispersed in corn oil and incorporated into the standard game bird starter ration utilizing a Hobart Mixer (Model # AS200T).

9. DISCUSSION/RESULTS:

The eight-day dietary  $\text{LC}_{50}$  value was determined by inspection to be greater than 5620 ppm.

10. STATISTICAL ANALYSIS:

No statistics were performed due to lack of mortality.

11. REVIEWER'S EVALUATION:

a. TEST PROCEDURE

This study test procedure complied the EPA recommended protocol of October 1982 (Part 158), except there were mortalities in the control groups (8 of 50 or 16%).

b. Statistical Analysis

No statistics were performed due to lack of mortality.

c. Discussion/Results

The eight-day dietary  $\text{LC}_{50}$  value was determined by inspection to be greater than 5620 ppm. There were eight mortalities in the control groups, six of which were attributed to various forms of cannibalism. One bird was found dead with both legs caught in wire under the feeder and one was found dead with no external lesions evident.

CONCLUSIONS

a. Category: Core

b. Rationale: Although the number of mortalities in the control groups ( $8/50 = 16\%$ ) exceeded 10% (the maximum control mortality generally accepted by this branch), EEB accepts this study because the material tested is minimally toxic: i.e., (1) the mortality observed in the bobwhite test groups exposed to the pesticide was minimal:

562 ppm	.....	0% mortality
1000 ppm	.....	10% mortality
1780 ppm	.....	0% mortality
3160 ppm	.....	10% mortality
5620 ppm	.....	0% mortality

and (2) the mortality observed in the mallard duck dietary LC<sub>50</sub> study was 0 % for all test levels (LC<sub>50</sub> = >5620 ppm), thereby, supporting the conclusion that the LC<sub>50</sub> for bobwhite is >5620 ppm.

c. Repairability: N/A

DATA EVALUATION REPORT

1. CHEMICAL: 1-Bromo-3-Chloro-5,5-Dimethylhydantoin
2. TEST MATERIAL: 99.0% (technical a.i.) a white powder
3. STUDY IDENTIFICATION: A Dietary LC<sub>50</sub> Study in the mallard with 1-Bromo-3-Chloro-5,5-Dimethylhydantoin; Project # 196-102; Study Date 10-19-84; Prepared by Wildlife International Ltd.; Submitted by Applied Biochemists, Inc. Mequon, Wisconsin 53092.
4. STUDY TYPE: Avian Eight-Day Dietary LC<sub>50</sub>
  - A. Test Species: Mallard Duck
5. REVIEWED BY: Curtis E. Laird  
Fishery Biologist  
EEB/HED  
10/19/84  
Review Time 3 hours
6. REPORTED CONCLUSIONS: The dietary LC<sub>50</sub> value of 1-bromo-3-chloro-5,5-dimethylhydantoin to the mallard was greater than 5620 ppm; the highest concentration tested. There were no mortalities, overt signs of toxicity or behavioral abnormalities at concentrations up to 5620 ppm. The no-observed-effect concentration was less than 562 ppm, the lowest concentration tested, based upon a reduction in body weight gain compared to controls.
7. REVIEWER'S CONCLUSIONS: This study indicates 1-bromo-3-chloro-5,5-dimethylhydantoin is practically non-toxic to mallard with an LC<sub>50</sub> >5620 ppm.

8. MATERIAL AND METHODS EMPLOYED:

Apparently healthy 9-day-old mallards were assigned to the treatment groups by random draw without regard to sex. Ten birds were utilized per group, with 5 treatment and 5 control groups. Ambient temperature during the course of the study was  $72^{\circ}\text{F} \pm 3^{\circ}\text{F}$ . The photoperiod was fourteen hours of light per day. The experimental material was dispersed in corn oil and incorporated into Wildlife International Ltd.'s game bird starter ration utilizing a Hobart Mixer (Model # AS200T).

9. DISCUSSION/RESULTS:

Control - There were no mortalities in the control group. All birds were normal in behavior and appearance throughout the study.

1-Bromo-3-chloro-5,5-dimethylhydantoin - There were no mortalities, overt signs of toxicity or behavioral abnormalities at any test concentration. Compared to controls, there did appear to be some effect on body weight gain during the exposure period (Day 0-5) at all test concentrations.

10. STATISTICAL ANALYSIS:

No statistics were performed due to lack of mortality.

11. REVIEWER'S EVALUATION:

a. TEST PROCEDURE

The test procedure complied with the recommended EPA protocol of October 1982 (Part 158).

b. Statistical Analysis

No statistics were performed due to lack of mortality.

c. Discussion/Results

The eight-day dietary  $\text{LC}_{50}$  value is  $>5620$  ppm.

CONCLUSIONS

- a. Category: Core
- b. Rationale: N/A
- c. Repairability: N/A

DATA EVALUATION REPORT

1. CHEMICAL: 1-Bromo-3-Chloro-5,5-Dimethylhydantoin
2. TEST MATERIAL: 99.0% (technical a.i.) a white powder
3. STUDY IDENTIFICATION: Acute Toxicity of 1-Bromo-3-Chloro-5,5-Dimethylhydantoin to Rainbow Trout (Salmo gairdneri); Study #31577; Study date 4-10-84; Prepared by Analytical Biochemistry Laboratories, Inc., 5300 W. County Lane Road, 96 North, Mequon, Wisconsin 53092. ID # 8959 UU.
4. STUDY TYPE: 96-Hour LC<sub>50</sub>
  - A. Test Species: Rainbow Trout
5. REVIEWED BY: Curtis E. Laird  
Fishery Biologist  
EEB/HED  
10/17/84  
Review Time 4 hours
6. REPORTED CONCLUSIONS: The 96-hour LC<sub>50</sub> value is 0.75 ppm with a no-observed effect concentration of 0.56 ppm.
7. REVIEWER'S CONCLUSIONS: This study indicates 1-bromo-3-chloro-5,5-dimethylhydantoin is highly toxic to rainbow trout with an LC<sub>50</sub> of 0.75 ppm. This study does fulfill the requirement in support of registration.

8. MATERIAL AND METHODS EMPLOYED:

The 0.93 g rainbow trout used in this study were obtained from the Spring Creek Trout Hatchery in Lewistown, Montana. The test was conducted in a 5 gallon glass vessel with 5 concentrations and a water control.

9. DISCUSSION/RESULTS:

The 96-hour LC<sub>50</sub> value is 0.75 ppm and the no-observed effect is 0.56 ppm, which was based on the lack of mortality and abnormal effects.

10. STATISTICAL ANALYSIS:

Stephan et al. program.

11. REVIEWER'S EVALUATION:

a. TEST PROCEDURE

The test procedure complied with the recommended EPA protocol of October 1982 (Part 158).

b. Statistical Analysis

The statistics were verified with Stephan's computer program.

c. Discussion/Results

The 96-hour LC<sub>50</sub> is 0.75 ppm based on binomial test results.

CONCLUSIONS

a. Category: Core

b. Rationale: N/A

c. Repairability: N/A



LAIRD 1-BROMO-3-CHLORO-5-DIMETHYLHYDANTOIN 99.0% 96-HOUR LC50 FOR RAINBOW TROUT

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
1	10	10	100	.0976563
.56	10	0	0	.0976563
.32	10	0	0	.0976563
.18	10	0	0	.0976563
.1	10	0	0	.0976563

THE BINOMIAL TEST SHOWS THAT .56 AND 1 CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .748332

WHEN THERE ARE LESS THAN TWO CONCENTRATIONS AT WHICH THE PERCENT DEAD IS BETWEEN 0 AND 100, NEITHER THE MOVING AVERAGE NOR THE PROBIT METHOD CAN GIVE ANY STATISTICALLY SOUND RESULTS.

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DATA EVALUATION REPORT

1. CHEMICAL: 1-Bromo-3-Chloro-5,5-Dimethylhydantoin
2. TEST MATERIAL: 99.0% (technical a.i.) a white powder
3. STUDY IDENTIFICATION: Acute Toxicity of 1-Bromo-3-Chloro-5,5-Dimethylhydantoin to Bluegill Sunfish (Lepomis macrochirus); Prepared by Analytical Bio-chemistry Laboratories, Inc. Study # 31576; Date of study 4-12-84; Submitted by Applied Bio-chemists, Inc.; 5300 W. County Lane Road, 96 North, Mequon, Wisconsin 53092.
4. STUDY TYPE: 96-Hour LC<sub>50</sub>
  - A. Test Species: Bluegill Sunfish
5. REVIEWED BY: Curtis E. Laird  
Fishery Biologist  
EEB/HED  
-10/18/84  
Review Time 3 hours
6. REPORTED CONCLUSIONS: The 96-hour LC<sub>50</sub> value is 0.36 ppm with the 95% confidence limits of 0.18 to 0.56 ppm. Ten fish per concentration with the average weight of 0.31 (+0.10) g were used in this study. The study was conducted in five-gallon glass vessels.
7. REVIEWER'S CONCLUSIONS: This study indicates 1-bromo-3-chloro-5,5-dimethylhydantoin is highly toxic to bluegill sunfish with an LC<sub>50</sub> of 0.36 ppm. This study does fulfill the requirement in support of registration.

8. MATERIAL AND METHODS EMPLOYED:

The 0.31 g fish used in this study were obtained from Mac's Catfish Farm in Opelika, Ala. The study was conducted in a 5-gallon glass vessel with 5 concentrations and a water control and ten fish per concentration.

9. DISCUSSION/RESULTS:

The 96-hour LC<sub>50</sub> value is 0.36 ppm and the no-observed effect concentration was 0.18 ppm, which was based on the lack of mortality and abnormal effects. There were mortalities in the 0.32 ppm and 0.56 ppm concentrations.

10. STATISTICAL ANALYSIS:

Stephan et al.

11. REVIEWER'S EVALUATION:

a. TEST PROCEDURE

The test procedure complied with the recommended EPA protocol of October 1982 (Part 158).

b. Statistical Analysis

The statistics were verified with Stephan's computer program.

c. Discussion/Results

The binomial test shows the 96-hour LC<sub>50</sub> to be approximately 0.36 ppm.

CONCLUSIONS

- a. Category: Core
- b. Rationale: N/A
- c. Repairability: N/A

1-A. name - 3 chloro - 5

LAIRD DIMETHYLHYDAANTOIN 96-HOUR LC50 FOR BLUEGILL SUNFISH  
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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
.56	10	10	100	.0976563
.32	10	3	30	17.1875
.18	10	0	0	.0976563
.1	10	0	0	.0976563
.056	10	0	0	.0976563

THE BINOMIAL TEST SHOWS THAT .18 AND .56 CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .363605

WHEN THERE ARE LESS THAN TWO CONCENTRATIONS AT WHICH THE PERCENT DEAD IS BETWEEN 0 AND 100, NEITHER THE MOVING AVERAGE NOR THE PROBIT METHOD CAN GIVE ANY STATISTICALLY SOUND RESULTS.

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DATA EVALUATION REPORT

1. CHEMICAL: 1-Bromo-3-Chloro-5,5-Dimethylhydantoin
2. TEST MATERIAL: 99.0% (technical a.i.) a white powder
3. STUDY IDENTIFICATION: Acute Toxicity of 1-Bromo-3-Chloro-5,5-Dimethylhydantoin to Daphnia magna; Report # 31578; Study date 4-9-84; Prepared by Analytical Bio-Chemistry Laboratories, Inc. for Applied Biochemists, Inc.; 5300 W. County Lane Road, 96 North, Mequon, Wisconsin 53092.
4. STUDY TYPE: 48-Hour LC<sub>50</sub>
  - A. Test Species: Daphnia Magna
5. REVIEWED BY: Curtis E. Laird  
Fishery Biologist  
EEB/HED  
10/18/84  
Review Time 3 hours
6. REPORTED CONCLUSIONS: The 48-hour LC<sub>50</sub> value is 2.3 ppm and the no-effect level is 1.0 ppm based on the lack of mortality and abnormal effects. The abnormal effects of mortality, surfacing, clumping and daphnids lying on the bottom of test chambers were observed in 10, 5.6, 3.2 and 1.8 ppm test concentrations.
7. REVIEWER'S CONCLUSIONS: This study indicates 1-Bromo-3-chloro-5,5-dimethylhydantoin is moderately toxic to Daphnia magna with an LC<sub>50</sub> of 2.3 ppm. This study does fulfill the requirement in support of registration.

8. MATERIAL AND METHODS EMPLOYED:

The first instar (less < 24 hour old) Daphnia magna used in this study were of ABC culture. This study was conducted with five concentrations in duplicate of the test compound with ten Daphnia per beaker. The bioassay was conducted in 250 ml glass beakers.

9. DISCUSSION/RESULTS:

The 48-hour LC<sub>50</sub> value is 2.3 ppm and the no-effect level is 1.0 ppm.

10. STATISTICAL ANALYSIS:

Stephan et al.

11. REVIEWER'S EVALUATION:

a. TEST PROCEDURE

The test procedure complied with the recommended EPA protocol of October 1982 (Part 158).

b. Statistical Analysis

The statistics were verified with Stephan's computer program.

c. Discussion/Results

The 48-hour LC<sub>50</sub> value is 2.3 ppm.

CONCLUSIONS

a. Category: Core

b. Rationale: N/A

c. Repairability: N/A

1-Promer-3-chloro.s.s-

LAIRD DIMETHYLHYDAANTOIN 48-HOUR LC50 FOR DAPHNIA MAGNA 99.0%

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
10	20	20	100	9.53674E-05
5.6	20	20	100	9.53674E-05
3.2	20	20	100	9.53674E-05
1.8	20	2	10	.0201225
1	20	0	0	9.53674E-05

THE BINOMIAL TEST SHOWS THAT 1.8 AND 3.2 CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 2.25489

WHEN THERE ARE LESS THAN TWO CONCENTRATIONS AT WHICH THE PERCENT DEAD IS BETWEEN 0 AND 100, NEITHER THE MOVING AVERAGE NOR THE PROBIT METHOD CAN GIVE ANY STATISTICALLY SOUND RESULTS.

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006315

Shaughnessy Number

Completed Date: 10-22-84  
Reviewer Initials: C.E.L.

EEA Chemical Profile

100.0 Pesticide Name: Brominating Compound

100.1 Fish and Wildlife Toxicology

<u>Species</u>	<u>Test Material</u>	<u>Result</u>	<u>Category</u>
Bobwhite quail	BCDH	1070 mg/kg	Core
Bobwhite quail	BCDH	>5620 ppm	Core
Mallard duck	BCDH	>5620 ppm	Core
Rainbow trout	BCDH	0.75 ppm	Core
Bluegill sunfish	BCDH	0.36 ppm	Core
<u>Daphnia magna</u>	BCDH	2.3 ppm	Core

BCDH = 1-Bromo-3-chloro-5,5-dimethylhydantoin 99.0% a.i.

100.2 Additional Terrestrial Laboratory Tests

None

100.3 Additional Aquatic Laboratory Tests

None

102. Physical and Chemical Properties

102.1 Chemical Name

1-Bromo-3-chloro-5,5-dimethylhydantoin

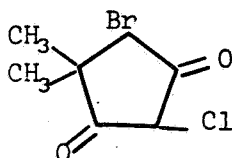
102.2 Common Name

Brominating Compound

102.6 Physical State

A white powder

102.7 Structural Formula





103. Behavior in the Environment

No fate data were submitted.

104. Uses and Special Concerns

For use in spas and hot tubs as a disinfectant.