

US EPA ARCHIVE DOCUMENT

TDMS

DATA EVALUATION RECORD

PAGE 1 OF

CASE GS _____

PM ____/____/____

CHEM 105001

TERBUFOS

BRANCH EEB

DISC _____

FORMULATION

Technical 88.6% a.i.

FICHE/MASTER ID

FEØTERØ3

CITATION:

Boudreau, R., A.D. Forbis, L. Franklin, W.P. Mullen, and L.D. Johnson. (1982). Acute toxicity of Counter terbufos to Daphnia magna. Static Acute Bioassay Rep. No. 28686. (Unpublished study received April 20, 1982 under Reg. No. 241-238; prepared by Analytical Biochemistry Laboratories, Inc.; submitted by American Cyanamid Company, Princeton, N.J.; CDL:

SUBST. CLASS=

OTHER SUBJECT DESCRIPTORS

PRIM:

DIRECT REVIEW TIME=

20 min.

(MH) START DATE

10/4/82

END DATE

11/29/82

REVIEWED BY:

James D. Felkel

TITLE:

Wildlife Biologist

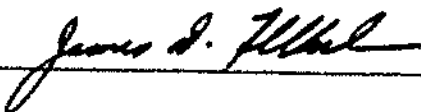
ORG:

Ecological Effects Branch, Hazard Evaluation Division (TS-769)

LOC./TEL:

CM#2, RM 1128, 703-557-7667

SIGNATURE:



DATE:

12/13/82

APPROVED BY:

TITLE:

ORG:

LOC/TEL:

SIGNATURE:

DATE:

Addition to W. Rabert's Conclusions block: The confirmed LC₅₀ value of 0.31 ppb indicates that terbufos is very highly toxic to D. magna.

DATA EVALUATION RECORD

1. CHEMICAL: Terbufos

S-[[[(1,1-Dimethylethyl)thio]methyl] o,o-diethyl phosphorodithioate

2. FORMULATION: Technical — 88.6 percent

3. CITATION:

Boudreau, P., A. D. Forbis, L. Franklin, W. P. Mullen, and L. D. Johnson. (1982). Acute toxicity of Counter® terbufos to Daphnia magna. Static Acute Bioassay Rep. No. 28686. (Unpublished study received April 20, 1982 under Reg. No. 241-238; prepared by Analytical Biochemistry Laboratories, Inc.; submitted by American Cyanamid Company, Princeton, N.J.; CDL:).

4. REVIEWED BY: W. S. Rabert
Biologist
EEB/HED
557-7696

5. DATE REVIEWED: 5/13/82

6. TEST TYPE: Aquatic Invertebrate 48-hour EC50

A. Test Species: Waterflea
(Daphnia magna)

7. REPORTED RESULTS:

The 48-hour nominal results of the aquatic invertebrate EC₅₀ tests conducted with technical terbufos on daphnia were reported to be 0.00031 (0.00027 - 0.00036) mg/l (ppm). The no observed effect level was 0.00018 mg/l (ppm).

8. REVIEWER'S CONCLUSIONS:

The test procedures conformed to the recommended test protocols proposed in the Federal Register on July 10, 1978. The 48-hour EC₅₀ was confirmed by the probit method using Stephan's program. The 24-hour EC₅₀ was calculated as 0.0016 mg/l using the probit method, but the data did not adequately meet the criteria. Since 5 percent died at 0.0032 mg/l and only 40 percent died at 0.0010 mg/l, the only confident conclusion is that the 24-hour EC₅₀ is greater than 0.0010 mg/l (ppm).

This study on daphnia is scientifically sound and will support the guideline requirement for an aquatic invertebrate 48-hour EC₅₀ study.

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Materials/Methods

Test Material

The liquid test material, terbufos, was not identified as to percent purity. The sample was received on 16 February 1982. A letter from Lynne Melville Gregory, Registrations Coordinator for American Cyanamid Company, dated 28 May 1982 indicated the test material to be of technical grade terbufos (88.6 percent a.i.) from Lot No. SPS-11430.

Test Species

The waterflea, Daphnia magna, used in this test were cultured at the ABC facilities.

Test Procedures

The test procedures generally followed the protocols set forth in "Methods for Acute Toxicity Tests with Fish, Macroinvertebrates, and Amphibians" (EPA, 1975). Some test specifics of note include:

<u>age</u>	- first instar less than 24 hours old;
<u>treatment levels</u>	- 0.00010, 0.00018, 0.00032, 0.00056, and 0.0010 mg/l (ppm) and an acetone control;
<u>measured levels</u>	- initially - 0.000082, 0.00016, 0.00028, 0.00044, and 0.00081 mg/l;
<u>number of organisms</u>	- 2 replicates of 10 daphnia each per concentration;
<u>test temperature</u>	- 20 (+ 2.0) °C;
<u>test container</u>	- 250 ml beakers containing 200 milliliters;
<u>oxygen levels</u>	- ranged from 8.0 to 8.8 mg/l or 86 and 95 percent saturation;
<u>pH values</u>	- ranged from 8.2 to 8.6 units;
<u>water hardness</u>	- (CaCO ₃) - 255 ppm;

Statistical Analysis

The EC50 and its confidence interval were calculated using a computerized LC50 program developed by Stephan et al. The nominal concentrations were used for the calculations.

Results/Disussion

No 24-hour EC50 value was reported. The 48-hour EC50 value for the freshwater invertebrate daphnia tests conducted with terbufos on Daphnia magna was reported to be 0.00031 (0.00027 - 0.00036) mg/l.

Initial measured concentrations closely approximated the nominal levels, but at 48 hours the concentrations were only about 1/10th of the nominal levels. Hydrolysis was offered as a possibly explanation for the decline.

Reviewer's Evaluation

A. Test Procedures

The test procedures generally followed the recommended test protocols proposed in the Federal Register on July 10, 1978.

B. Statistical Analysis

The probit method using the Stephan's program confirmed the reported 48-hour EC50 value. The 24-hour EC50 was calculated as 0.0016 mg/l using the probit method, but the data did not adequately meet the criteria. Since 5 percent died at 0.0032 mg/l and only 40 percent died at 0.0010 mg/l, the only confident conclusion is that the 24-hour EC50 is greater than 0.0010 mg/l (ppm).

C. Discussion

With the inclusion of the letter describing the percent active of the test material, all aspects of the study were acceptable as reported.

D. Conclusions

1. Validation Category: Core.
2. Rationale: Not applicable.
3. Repairability: Not applicable.

William S. Rabert

William S. Rabert, Biologist
Section 2, EEB, HED

Date:

May 14, 1982

David J. Coppage

David Coppage, Section Head
Section 3, EEB, HED

Date:

June 10, 1982

Clayton Bushong

Clayton Bushong, Chief
Ecological Effects Branch, HED

Date:

6/14/82

RABERT

TERBUFOS

DAPHNIA MAGNA

24-HOUR EC50

NOTE TO REVIEWER: THIS DATA SET DOES NOT MEET THE CRITERIA ESTABLISHED BY THE COMMITTEE ON METHODS FOR TOXICITY TESTS WITH AQUATIC ORGANISMS BECAUSE NO PERCENT DEAD IS GREATER THAN 65 PERCENT.

NEITHER THE BINOMIAL TEST NOR THE MOVING AVERAGE METHOD CAN GIVE ANY RESULTS FOR THIS DATA SET. EITHER THE HIGHEST CONCENTRATION KILLED LESS THAN 50 PERCENT OR THE LOWEST KILLED MORE THAN 50. IF THE PROBIT SLOPE IS NEGATIVE, ENTER DATA AGAIN USING NUMBER ALIVE INSTEAD OF NUMBER DEAD.

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
6	4.275048	4.207546	0.005527981

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = 1.937517
95 PERCENT CONFIDENCE LIMITS = -2.06853 AND 5.943565

LC50 = 0.00162951
95 PERCENT CONFIDENCE LIMITS = 0 AND +INFINITY

LC10 = 0.0003602294
95 PERCENT CONFIDENCE LIMITS = 0 AND +INFINITY

RABERT TERBUFOS OAPHNIA MAGNA 48-HOUR EC50

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
0.001	20	20	100	9.536743E-05
0.00056	20	19	95	0.002002716
0.00032	20	13	65	13.1588
0.00018	20	0	0	9.536743E-05
0.0001	20	0	0	9.536743E-05

THE BINOMIAL TEST SHOWS THAT 0.00018 AND 0.00056 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 0.0002890487

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
4	0.05498217	0.0003192681	0.0002664739	0.0003826388

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
7	0.1747392	1	0.4898021

SLOPE = 7.963783
 95 PERCENT CONFIDENCE LIMITS = 4.634777 AND 11.29279

LC50 = 0.0003073869
 95 PERCENT CONFIDENCE LIMITS = 0.0002653761 AND 0.0003552358

LC10 = 0.0002129185
 95 PERCENT CONFIDENCE LIMITS = 0.0001550171 AND 0.0002497597

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American Cyanamid Company
Agricultural Research Division
P.O. Box 400
Princeton, NJ 08540
(609) 799-0400

May 28, 1982

Mr. William Miller
Product Manager (16)
Registration Division
Office of Pesticide Programs
U. S. Environmental Protection Agency
Crystal Mall, Bldg. #2
1921 Jefferson Davis Highway
Arlington, Virginia 22202

Re: COUNTER® 15-G soil insecticide-
nematicide
EPA Reg. No. 241-238
Cyanamid Letter of April 15, 1982
1) Sorghum Petition No. 1F2540
2) Soybeans Petition No. 2F2608

Dear Mr. Miller:

Mr. William Rabert, EPA Ecological Effects Branch, has asked me to verify the percent active ingredient used in the 48 hour LC₅₀ on Daphnia magna. The technical terbufos used had a purity of 88.6%, and the Lot Number for this material was SPS-11430.

Should you have any further questions concerning this study, please contact me at (609) 799-0400, Ext. 2363.

Very truly yours,

Lynne Melville Gregory

Lynne Melville Gregory
Registrations Coordinator
Plant Industry Registrations

LMG: eas

cc: Mr. William Rabert
Ecological Effects Branch

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