00078042

DATA EVALUATION RECORD

1. Chemical: Ethoprop

2. Formulation: Technical (Exact formulation unknown)
10% Granular Formulation

3. Citation: Weir, R.J. July 21, 1967. Final Report: Acute Aqueous Exposure - Goldfish, Bluegill and Rainbow Trout; Project No. 230-111. Prepared by Hazelton Laboratories, Inc., Falls Church, VA. Submitted to Mobil Chemical Co., Macedon, N.Y.

4. Reviewed by: Elizabeth E. Zucker, Wildlife Biologist
Ecological Effects Branch
Hazard Evaluation Division (TS-769)

5. Date Reviewed: October 28, 1982

6. Test Type: Acute toxicity to freshwater fish species

A. Test Species: Goldfish
Bluegill Sunfish
Rainbow Trout

7. Reported Results:

Species	Formulation	96-hour LC_{50} (95% C.L. mg/l)
Goldfish	Technical	13.6 (9.61 to 19.2)
	10% Granular	7.70 (5.60 to 10.6)*based on a.i.
Bluegill	Technical	2.07 (1.05 to 4.08)
	10% Granular	<1.01 *based on a.i.
Trout	Technical	13.8 (9.73 to 19.7)
	10% Granular	11.2 (8.41 to 15.0)*based on a.i.

8. Reviewer's Conclusions:

These studies relating the acute toxicity of technical and formulated Ethoprop to bluegill sunfish, rainbow trout and goldfish do not fulfill guideline requirements. The following essential information was not included in the test report; percent active ingredient of the technical material, size of test fish, temperature, pH, and D.O. measurements of test waters, as well as water characteristics (alkalinity, hardness, conductivity, etc.) See Results/Discussion section for details.

Materials/Methods

Test Procedures

Fish were obtained from a commercial hatchery and acclimated to lab conditions 7 to 10 days prior to testing. Test specifics of note include:

Test vessels - 5 gallon glass jars containing 15 liters water
Ten fish per vessel - twenty fish per dosage level
Food withheld 72 hours prior to testing
Control group - 20 goldfish, 6 bluegill and 20 trout

Statistical Analysis

The LC_{50}'s were derived using the Litchfield-Wilcoxon method. Results from the tests on the formulated product are based on the concentrations of active ingredient.

Results/Discussion

Mortality Data
Goldfish

Conc. (ppm) Technical	No. fish dead out of 20 tested 24 hrs.	48 hrs.	72 hrs.	96 hrs.
Control	0	0	0	0
0.316	0	1	1	1
1.0	0	0	0	0
3.16	0	0	0	0
10.0	0	4	9	12
31.6	0	9	11	12
100.0	20	20	20	20
Conc. (ppm) 10% Granular				
0.316	1	1	1	1
1.0	0	0	0	0
3.16	1	1	1	1
10.0	0	7	7	10
31.6	4	17	19	20

Other than death, no toxic symptoms were exhibited by goldfish.

Mortality Data
Bluegill

Conc. (ppm) Technical	No. fish dead out of 20 tested 24 hrs.	48 hrs.	72 hrs.	96 hrs.
Control (6 fish)	1	1	1	1
1.0	2	3	5	7
3.16	5	10	14	14
10.0	12	13	19	20
31.6	16	20	20	20
100.0	20	20	20	20
Conc. (ppm) 10% Granular				
1.0	6	8	8	12
3.16	11	18	19	20
10.0	12	20	20	20
31.6	4	20	20	20
100.0	20	20	20	20

At the two highest dosages fish exhibited irregular swimming and discoloration.

Mortality Data
Rainbow Trout

Conc. (ppm) Technical	No. fish dead out of 20 tested 24 hrs.	48 hrs.	72 hrs.	96 hrs.
Control	0	0	0	0
1.0	0	0	0	1
3.16	0	0	1	1
10.0	0	3	5	6
31.6	5	11	16	16
100.0	20	20	20	20
Conc. (ppm) 10% Granular				
1.0	0	0	0	0
3.16	0	0	0	0
10.0	2	3	7	11
31.6	17	19	19	19
100.0	20	20	20	20

Trout at the two highest dosage levels exhibited irregular swimming, spiraling or convulsive movements, and discoloration.

Reviewer's Evaluation

A. Test Procedures

This study was performed under conditions that generally complied with current guidelines with the following exceptions:

1. The percent a.i. of the technical material was not reported.

2. Species latin names were not mentioned.

3. Control fish for each species were utilized for both the technical and formulation tests.

4. Only six bluegill fish were used as controls. One died during the study which constitutes a 16% mortality.

5. Characteristics of diluent water were not reported (alkalinity, hardness, pH, D.O. and temperature).

6. Size and weight of fish were not reported.

7. The goldfish is not a recommended species.

8. Solvent, if used, was not described.

B. Statistical Analysis

Results of Stephan's Computer Program are appended.

C. Results/Discussions

Because two formulations were tested, the number of control animals should have been increased. Control mortality in the bluegill study was 16%.

It should be noted that for all three species tested, the active ingredient as part of the 10% formulated product was more toxic than the technical. Also the 96-hr. LC_{50} (technical) reported for trout in this study (13.8 ppm) is much higher than the 96-hr. LC_{50} as reported for trout by the EPA lab in Beltsville (1.15 ppm). The 10% granular LC_{50}'s were similiar - this study was about 10.25 ppm and from the EPA lab it was also about 10 ppm. It may be that the technical product was not completely soluble at the higher dosage levels and precipitated out in this study. The EPA lab used acetone as a solvent in all their Ethoprop assays.

Recalucated 96-hour LC_{50}'s (from Stephan's Program)

Goldfish -

Technical - 8.7 ppm
10% Granular - 10 ppm (based on a.i.)
100 ppm of granular product

Bluegill -

Technical - 1.58 ppm
10% Granular - < 1.01 (based on a.i.)
< 10.10 granular product

Trout -

Technical - 15.68 ppm
10% Granular - 10.26 ppm (based on a.i.)
102.6 ppm granular product

D. Conclusions

1. Category: Invalid

2. Rationale: The following information was not included in the report:

A. Precent active ingredient of the technical material.

B. Temperature, pH and dissolved oxygen levels in test vessels during study period.

C. Size and weight of test fish.

D. Characteristics (alkalinity, hardness, conductivity) of diluent water.

E. If a solvent was not used, did a precipitate occur?

3. Repairability: If the above information is provided and found acceptable, then the studies may be upgraded. The goldfish studies cannot be upgraded because the species is not among those recommended for this type of study.

The bluegill study on the 10% granular cannot be upgraded because 96-hr. LC_{50}'s cannot be calculated from the mortality data. However the LC_{50} is less than 1.01 ppm on an a.i. basis.

ZUCKER ETHOPROP GOLDFISH TECH.

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
100	20	20	100	9.536743E-05
31.6	20	12	60	25.17223
10	20	12	60	25.17223
3.16	20	0	0	9.536743E-05
1	20	0	0	9.536743E-05
0.316	20	1	5	0.002002716

THE BINOMIAL TEST SHOWS THAT 3.16 AND 100 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 8.66507

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
4	0.05140897	15.09658	10.68617	22.30182

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
4	1.199254	6.466914	0

A PROBABILITY OF 0 MEANS THAT IT IS LESS THAN 0.001

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

SLOPE = 1.707616
95 PERCENT CONFIDENCE LIMITS =-0.1624024 AND 3.577634

LC50 = 13.15598
95 PERCENT CONFIDENCE LIMITS = 0 AND +INFINITY

LC10 = 2.373537
95 PERCENT CONFIDENCE LIMITS = 0 AND 10.57335

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ZUCKER ETHOPROP GOLDFISH 10% GRANULAR

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
31.6	20	20	100	9.536743E-05
10	20	10	50	58.80985
3.16	20	1	5	0.002002716
1	20	0	0	9.536743E-05
0.316	20	1	5	0.002002716

THE BINOMIAL TEST SHOWS THAT 3.16 AND 31.6 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 10

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
3	0.05132547	8.743281	6.519398	12.29981

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
8	7.633415	23.48305	0

A PROBABILITY OF 0 MEANS THAT IT IS LESS THAN 0.001

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

SLOPE = 2.225684
95 PERCENT CONFIDENCE LIMITS =-3.923577 AND 8.374944

LC50 = 8.460525
95 PERCENT CONFIDENCE LIMITS = 0 AND +INFINITY

LC10 = 2.273977
95 PERCENT CONFIDENCE LIMITS = 0 AND +INFINITY

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ZUCKER ETHOPROP BLUEGILL TECNICAL

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
100	20	20	100	9.536743E-05
31.6	20	20	100	9.536743E-05
10	20	20	100	9.536743E-05
3.16	20	14	70	5.765915
1	20	7	35	13.1588

THE BINOMIAL TEST SHOWS THAT 3.16 AND 10 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 1.63201

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
1	0.8069823	1.63201	0.3297952	3.951915

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
7	0.2092488	1	0.7491832

SLOPE = 2.468342
95 PERCENT CONFIDENCE LIMITS = 1.33923 AND 3.597453

LC50 = 1.579367
95 PERCENT CONFIDENCE LIMITS = 0.9349512 AND 2.281172

LC10 = 0.4830226
95 PERCENT CONFIDENCE LIMITS = 0.1262 AND 0.8444115

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ZUCKER ETHOPROP TROUT TECHNICAL

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
100	20	20	100	9.536743E-05
31.6	20	16	80	0.5908966
10	20	6	30	5.765915
3.16	20	1	5	0.002002716
1	20	1	5	0.002002716

THE BINOMIAL TEST SHOWS THAT 3.16 AND 31.6 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 15.68226

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
4	0.06582047	13.75905	9.306216	21.27921

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
6	0.1036852	1	0.0828253

SLOPE = 2.158062
95 PERCENT CONFIDENCE LIMITS = 1.463162 AND 2.852962

LC50 = 13.55015
95 PERCENT CONFIDENCE LIMITS = 9.25541 AND 19.95681

LC10 = 3.495047
95 PERCENT CONFIDENCE LIMITS = 1.623827 AND 5.531111

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ZUCKER ETHOPROP TROUT 10% Granular

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
100	20	20	100	9.536743E-05
31.6	20	19	95	0.002002716
10	20	11	55	41.19015
3.16	20	0	0	9.536743E-05
1	20	0	0	9.536743E-05

THE BINOMIAL TEST SHOWS THAT 3.16 AND 31.6 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 9.267588

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
4	0.05144123	10.97132	7.729936	15.72988

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
8	0.1759157	1	0.7499967

SLOPE = 3.940435
95 PERCENT CONFIDENCE LIMITS = 2.287726 AND 5.593144

LC50 = 10.2598
95 PERCENT CONFIDENCE LIMITS = 7.636668 AND 13.7804

LC10 = 4.884718
95 PERCENT CONFIDENCE LIMITS = 2.580477 AND 6.73388

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(TDR03R) DATA EVALUATION RECORD PAGE 1 OF

CASE GS0106 ETHOPROP PM 300 08/20/82

CHEM 041101 Ethoprop (O-ethyl S,S-dipropyl phospho

BRANCH EEB DISC 40 TOPIC 05054543

FORMULATION 01 - TECHNICAL CHEMICAL

FICHE/MASTER ID 00078042 CONTENT CAT 01

Weir, R.J. (1967) Final Report: Acute Aqueous Exposure--Goldfish, Bluegill, and Rainbow Trout: Project No. 230-111. (Unpublished study received Nov 25, 1968 under 9F0750; prepared by Hazleton Laboratories, Inc., submitted by Mobil Chemical Co., Macedon, N.Y.; CDL:091295-J)

SUBST. CLASS = S.

DIRECT RVW TIME = 4hrs. (MH) START-DATE 10/28/82 END DATE 10/28/82

REVIEWED BY: Elizabeth E. Zucker
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ORG: EEB/HED
LOC/TEL: CM2 557-7666
SIGNATURE: Elizabeth E. Zucker DATE: 10/28/82

APPROVED BY:
TITLE:
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LOC/TEL:
SIGNATURE: DATE: