

US EPA ARCHIVE DOCUMENT

**DATA EVALUATION RECORD**  
**ACUTE LC<sub>50</sub> TEST WITH AN ESTUARINE/MARINE SHRIMP**  
**§ 72-3(C)**

1. **CHEMICAL:** Ethoprop

PC Code No.: 041101

2. **TEST MATERIAL:** Ethoprop Technical; CAS No. 13194-48-4; Clear liquid;  
O-ethyl S,S-dipropyl phosphorodithioate. Purity: 96.7%

3. **CITATION**

Authors: Mark W. Marchado

Title: Ethoprop Technical - Acute Toxicity to Mysids  
(*Mysidopsis bahia*) Under Flow-Through Conditions.

Study Completion Date: 16 May 1995

Laboratory: Springborn Laboratories, Inc.

Sponsor: Rhone-Poulenc Ag Company

Laboratory Report ID: 95-4-5802; Study No. 10566.1294.6349.515

MRID No.: 436863-03

DP Barcode: D218402

4. **REVIEWED BY:** Regina Hirsch, Wildlife Biologist, EEB, EFED

Signature: 

Date: 12/15/96

5. **APPROVED BY:** Les Touart, Head of Section 1, EEB, EFED

Signature: 

Date: 5-6-96

6. **STUDY PARAMETERS**

<b>Scientific Name of Test Organism:</b>	<i>Mysidopsis bahia</i>
<b>Age or Size of Test Organism:</b>	≤ 24 hours
<b>Definitive Test Duration:</b>	96-hours
<b>Study Method:</b>	Flow-through
<b>Type of Concentrations:</b>	Mean measured.

7. **CONCLUSIONS:**

**Results Synopsis**

LC<sub>50</sub>: 18.78 ppb ai

NOEL: 11 ppb ai

95% C.I.: 15.0 - 22.0 ppb ai

Probit Slope: 16.13

DP Barcode: D2187402

MRID No.: 436863-03

**8. ADEQUACY OF THE STUDY**

A. Classification: Core.

B. Rationale: N/A

C. Repairability: N/A

**9. BACKGROUND**

**10. GUIDELINE DEVIATIONS**

1. Acclimation period was not reported.
2. Size of the test organisms were not reported.
3. Live brine shrimp nauplii (*Artemia salina*) were added to each test vessel containing live organisms twice daily, ad libitum, during the exposure period.
4. Percent mortality, prior to testing was not reported.

**11. SUBMISSION PURPOSE: Reregistration**

**12. MATERIALS AND METHODS**

**A. Test Organisms**

Guideline Criteria	Reported Information
<b>Species</b> Preferred species are <i>Mysidopsis bahia</i> , <i>Penaeus setiferus</i> , <i>P. duorarum</i> , <i>P.</i> <i>aztecus</i> and <i>Palaemonetes sp.</i>	<i>Mysidopsis bahia</i>
<b>Age</b> Juvenile, mysids should be ≤ 24 hours old	≤ 24 hours old

DP Barcode: D2187402

MRID No.: 436863-03

Guideline Criteria	Reported Information
<b>Supplier</b>	Springborn Laboratories Inc., brood stock (Springborn Lot #94A94a) originally purchased from a commercial supplier in Fort Collins, CO
All shrimp are from same source?	Yes
All shrimp are from the same year class?	Yes

**B. Source/Acclimation**

Guideline Criteria	Reported Information
<b>Acclimation Period</b> minimum 10 days	Not reported
Wild caught organisms were quarantined for 7 days?	No
Were there signs of disease or injury?	Not reported
If treated for disease, was there no sign of the disease remaining during the 48 hours prior to testing?	Not reported
<b>Feeding</b> No feeding during the study and no feeding for 24 hour before the beginning of the test if organisms are over 0.5 g each.	Live brine shrimp nauplii ( <i>Artemia salina</i> ) were added to each test vessel containing live organisms twice daily, ad libitum, during the exposure period.
<b>Pretest Mortality</b> < 3% mortality 48 hours prior to testing	Not reported

## C. Test System

Guideline Criteria	Reported Information
<p><b>Source of dilution water</b> Soft reconstituted water or water from a natural source, not dechlorinated tap water</p>	Cape Cod Canal, Bourne, Massachusetts. Once in the laboratory the seawater was passed through a series of polypropylene core filters and then recirculated within an epoxy-lined concrete reservoir prior to use.
<p><b>Does water support test animals without observable signs of stress?</b></p>	Yes
<p><b>Salinity</b> 30-34 ‰ for marine (stenohaline) shrimp and 10-17 ‰ for estuarine (euryhaline) shrimp, weekly range &lt; 6 ‰</p>	31 to 32 ‰
<p><b>Water Temperature</b> Approx. 22 ± 1 °C</p>	24 °C
<p><b>pH</b> 8.0-8.3 for marine (stenohaline) shrimp, 7.7-8.0 for estuarine (euryhaline) shrimp, monthly range &lt; 0.8</p>	7.8 to 7.9
<p><b>Dissolved Oxygen</b> Static: ≥ 60% during 1<sup>st</sup> 48 hrs and ≥ 40% during 2<sup>nd</sup> 48 hrs, Flow-through: ≥ 60%</p>	102% saturation
<p><b>Total Organic Carbon</b></p>	Not reported

Guideline Criteria	Reported Information
<p><b>Test Aquaria</b></p> <p>1. <b>Material:</b> Glass or stainless steel</p> <p>2. <b>Size:</b> 19.6 L is acceptable for organisms <math>\geq 0.5</math> g (e.g. pink shrimp, white shrimp, and brown shrimp), 3.9 L is acceptable for smaller organisms (e.g. mysids and grass shrimp).</p> <p>3. <b>Fill volume:</b> 15 L is acceptable for organisms <math>\geq 0.5</math> g, 2-3 L is acceptable for smaller organisms.</p>	<p>Glass</p> <p>39 x 20 x 25 cm</p> <p>11 L</p>
<p><b>Type of Dilution System</b> Must provide reproducible supply of toxicant</p>	<p>A constant-flow serial diluter (Benit t. l., 1982) was used during the definitive test.</p>
<p><b>Flow Rate</b> Consistent flow rate of 5-10 vol/24 hours, meter systems calibrated before study and checked twice daily during test period</p>	<p>6.5 volume replacements/24 hours</p>
<p><b>Biomass Loading Rate</b> Static: <math>\leq 0.8</math> g/L at <math>\leq 17^\circ\text{C}</math>, <math>\leq 0.5</math> g/L at <math>&gt; 17^\circ\text{C}</math>; flow-through: <math>\leq 1</math> g/L/day</p>	<p>0.00014 g biomass/L</p>
<p><b>Photoperiod</b> 16 hours light, 8 hours dark</p>	<p>16 h light, 8 h dark.</p>
<p><b>Solvents</b> Not to exceed 0.5 ml/L for static tests or 0.1 ml/L for flow-through tests</p>	<p>Solvent: acetone Maximum conc.: 0.092 ml/L.</p>

**D. Test Design**

Guideline Criteria	Reported Information
<p><b><u>Range Finding Test</u></b> If <math>LC_{50} &gt; 100</math> mg/L with 30 shrimp, then no definitive test is required.</p>	<p>Preliminary test performed with concentrations 3.2, 5.4, 9.0, 15.0, and 25 ug ai/L.</p>
<p><b><u>Nominal Concentrations of Definitive Test</u></b> Control &amp; 5 treatment levels; a geometric series in which each concentration is at least 60% of the next higher one.</p>	<p>6.5, 11.0, 18.0, 30.0, 50.0 ug ai/L.</p>
<p><b><u>Number of Test Organisms</u></b> Minimum 20/level, may be divided among containers</p>	<p>20/treatment level</p>
<p><b>Test organisms randomly or impartially assigned to test vessels?</b></p>	<p>Yes</p>
<p><b>Biological observations made every 24 hours?</b></p>	<p>Yes</p>
<p><b><u>Water Parameter Measurements</u></b> 1. <u>Temperature</u> Measured constantly or, if water baths are used, every 6 hrs, may not vary <math>&gt; 1^{\circ}C</math> 2. <u>DO and pH</u> Measured at beginning of test and ever 48 h in the high, medium, and low doses and in the control</p>	<p>Test solution temperature was continuously monitored in one replicate (B) of the dilution water control throughout the study and once daily in each replicate solution.  DO, pH, and salinity were measured once daily in each replicate solution.</p>
<p><b><u>Chemical Analysis</u></b> needed if solutions were aerated, if chemical was volatile, insoluble, or known to absorb, if precipitate formed, if containers were not steel or glass, or if flow-through system was used</p>	<p>Water samples were removed from both replicate test solutions of each treatment level and the controls at 0 and 96 hours for analysis.</p>

**13. REPORTED RESULTS**

**A. General Results**

Guideline Criteria	Reported Information
Quality assurance and GLP compliance statements were included in the report?	Yes
Recovery of Chemical	72-102%
<u>Control Mortality</u> Not more than 10% of control organisms may die or show abnormal behavior.	0%
Raw data included?	No
Signs of toxicity (if any) were described?	Yes

Mortality

Concentration (ppb)		Number of Shrimp	Cumulative Number Dead			
Nominal	Mean Measured		Hour of Study			
			24	48	72	96
Control	0	20	0	0	0	0
Solvent Control	0	20	0	0	0	0
6.5	6.6	20	0	0	0	0
11.0	11.0	20	0	0	0	0
18.0	15.0	20	0	0	0 <sup>dfgh</sup>	1 <sup>deij</sup>
30.0	22.0	20	0	4 <sup>cd</sup>	11 <sup>ce</sup>	17 <sup>c</sup>
50.0	40.0	20	6 <sup>bc</sup>	20	20	20

<sup>a</sup> All surviving mysids exhibited a complete loss of equilibrium.

<sup>b</sup> One surviving mysid exhibited a partial loss of equilibrium and was observed at the surface of the



DP Barcode: D2187402

MRID No.: 436863-03

test solution.

- <sup>c</sup> Several surviving mysids exhibited a complete loss of equilibrium.
- <sup>d</sup> Several surviving mysids exhibited erratic swimming behavior.
- <sup>e</sup> One surviving mysid exhibited a complete loss of equilibrium and was observed at the surface of the test solution.
- <sup>f</sup> One surviving mysid was observed to be lethargic.
- <sup>g</sup> One surviving mysid exhibited complete loss of equilibrium.
- <sup>h</sup> One surviving mysid exhibited a partial loss of equilibrium.
- <sup>i</sup> One surviving mysid was lethargic and exhibited darkened pigmentation.
- <sup>j</sup> Two surviving mysid exhibited a partial loss of equilibrium.

**Other Significant Results:**

**B. Statistical Results**

Method: Nonlinear interpolation, 95% confidence interval determined by binomial probability

96-hr LC<sub>50</sub>: 19 ppb ai

95% C.I.: 18-20 ppb ai

Probit Slope: N/A

NOEC: 11 ppb ai

**14. VERIFICATION OF STATISTICAL RESULTS**

Parameter	Result
Binomial Test LC <sub>50</sub> (C.I.)	18.78 (15 - 22) ppb ai
Moving Average Angle LC <sub>50</sub> (95% C.I.)	20.18 (18.08 - 22.84) ppb ai
Probit LC <sub>50</sub> (95% C.I.)	18.97 (17.35 - 20.61) ppm ai
Probit Slope	16.13
NOEC	11 ppb ai

**15. REVIEWER'S COMMENTS:**

REGINA HIRSCH ETHOPROP ACUTE TOXICITY TO MYSID SHRIMP

\*\*\*\*\*

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
40	20	20	100	9.536742E-05
22	20	17	85	.1288414
15	20	1	5	2.002716E-03
11	20	0	0	9.536742E-05
6.6	20	0	0	9.536742E-05

THE BINOMIAL TEST SHOWS THAT 15 AND 22 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 18.77686

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
3	.0591049	20.17653	18.07593	22.84162

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H
8	.1790995	1

GOODNESS OF FIT PROBABILITY  
.9999873

SLOPE = 16.13642  
95 PERCENT CONFIDENCE LIMITS = 9.307464 AND 22.96538

LC50 = 18.9741  
95 PERCENT CONFIDENCE LIMITS = 17.35328 AND 20.60772

LC10 = 15.82914  
95 PERCENT CONFIDENCE LIMITS = 13.2808 AND 17.31557

\*\*\*\*\*

9