

US EPA ARCHIVE DOCUMENT

6/13/88

Accession Number 404892-05

**DATA EVALUATION RECORD**

1. **CHEMICAL:** Iprodione Technical
2. **TEST MATERIAL:** Iprodione Technical, an off-white colored powder; Tested as 100% active ingredient
3. **STUDY TYPE:** Acute Estuarine Fish, 96-Hour Flow-through Test. Species Tested: Cyprinodon variegatus.
4. **CITATION:** Surprenant, D.C. 1988. Acute Toxicity of Iprodione Technical to Sheepshead Minnow (Cyprinodon variegatus) Under Flow-Through Conditions. SLS Report #87-11-2583. Prepared by Springborn Life Sciences, Inc., Wareham, Massachusetts. Submitted by Rhone-Poulenc Ag Company, Inc. Research Triangle Park, North Carolina. Accession Number 404892-05.

5. **REVIEWED BY:**

Kimberly D. Rhodes  
Aquatic Toxicologist  
Hunter Environmental Services, Inc.

Signature: *Kimberly D. Rhodes*

Date: 6/13/88

6. **APPROVED BY:**

Prapimpan Kosalwat, Ph.D.  
Staff Toxicologist.  
KBN Engineering and  
Applied Sciences, Inc.

Signature: *Prapimpan Kosalwat*

Date: 6-15-88

Henry T. Craven  
Supervisor, EEB/HED  
USEPA

Signature:

Date:

7. **CONCLUSIONS:** This study is scientifically sound and meets the guideline requirements for estuarine fish test. The 96-hour LC50 value for Cyprinodon variegatus exposed for 96 hours to Iprodione Technical under flow-through test conditions was 7.7 mg/L. Iprodione Technical is classified as moderately toxic to Cyprinodon variegatus. The NOEC was less than 2.2 mg/L.

8. **RECOMMENDATIONS:** N/A

9. BACKGROUND:

10. DISCUSSION OF INDIVIDUAL TESTS: N/A

11. MATERIALS AND METHODS:

A. Test Animals: Cyprinodon variegatus were obtained from a commercial fish supplier in Massachusetts and maintained for a minimum of 14 days in 33 to 35‰ seawater at 20 to 21°C. At test termination, the fish ranged from 0.05 to 0.44 grams wet weight with an average wet weight of 0.20 grams. No mortality was observed during the 48-hour holding period immediately prior to testing. Adult [24 mm average total length] fish were selected for testing. Fish were fed a dry commercial pelleted food ad libitum, during holding.

B. Test System: The exposure system used in this study was an intermittent flow proportional diluter, similar to that described by Mount and Brungs (1967) with a 0.65 dilution factor. The flow rate provided approximately 6 volume additions per day. The temperature was maintained by a water bath at 21 ± 1°C.

The dilution water was filtered natural seawater. The salinity of the seawater was 31 ‰ and the pH was 7.9.

C. Dosage: 96-hour acute flow-through test.

D. Design: Ten sheepshead minnows were tested per test aquarium (20 per treatment level). A control, solvent control (469 microliters/Liter acetone), and nominal Iprodione Technical concentrations (100% active ingredient) of 20, 13, 8.4, 5.5, and 3.6 mg/L were maintained. The mean measured test concentrations were 10, 7.0, 5.1, 3.5, and 2.2 mg/L.

E. Statistics: The computer program developed by Stephan et al. was used to calculate the LC50 values.

12. REPORTED RESULTS: "The mean measured concentrations (0- and 96-hour analyses), the corresponding cumulative mortalities and physical and biological observations made during the test are presented in Table 2" (attached). Mortality ranged from 0 percent in 2.2 and 3.5 mg/L to 100 percent in 10 mg/L; mortality was 0 percent in both the seawater and solvent controls. The 96-hour LC50 for sheepshead minnow exposed to Iprodione Technical was calculated by the moving average angle analysis to be 7.7 mg/L with a 95% confidence interval of 7.1 to 8.4 mg/L. Because all fish exposed to 2.2 mg/L appeared lethargic, the No-observed-effect Concentration was reported to be <2.2 mg/L.

A precipitate was observed in nominal test concentrations of 20 and mg/L. The author reported a solubility of approximately 13 mg/L for Iprodione-Technical in water.

13. **STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES:** The 96-hour LC50 for sheepshead minnow (Cyprinodon variegatus) exposed to mean measured concentrations of Iprodione technical under flow-through test conditions was 7.7 mg/L with 95 percent confidence limits of 7.1 and 8.4 mg/L.

The data were audited by the laboratory's Quality Assurance Unit to assure compliance with protocols, standard operating procedures and pertinent EPA Good Laboratory Practice (GLP) Regulations. A GLP compliance statement was included and signed by the Quality Assurance Unit.

14. **REVIEWER'S DISCUSSION AND INTERPRETATION OF STUDY RESULTS:**

- A. **Test Procedure:** The test procedures were generally in accordance with protocols recommended by the Guidelines, but deviated from the SEP as follows:

The SEP states that the temperature should be measured every 6 hours if controlled by a water bath. The temperature was measured every 24 hours for this test.

The test fish (0.05-0.44 grams) were smaller than the recommended 0.5 to 5.0 gram size range.

The SEP states that the salinity of the dilution water should be 10 to 17 parts per thousand for testing estuarine (euryhaline) fish species. The dilution water used during this study had a salinity of 31 parts per thousand.

- B. **Statistical Analysis:** The reviewer used the computer program developed by Stephan et al. to calculate the LC50 values. These calculations are attached. The use of the moving average method provides the same LC50 and 95 percent confidence limits (7.7 mg/L with limits of 7.1 and 8.4 mg/L). The report did not specify the slope of the toxicity curve as required by the SEP, but the value calculated by Stephan's program was 14.1.
- C. **Discussion/Results:** The 96-hour LC50 value of 7.7 mg/L for Cyprinodon variegatus classifies Iprodione Technical as moderately toxic. The procedural modifications do not appear to have affected the validity of the test. Since the concentrations were measured and the LC50 values can be calculated from those measured concentrations, the results of the study are an accurate indication of the toxicity of the test material.

D. Adequacy of the Study:

(1) **Classification:** Core

(2) **Rationale:** N/A

(3) **Repairability:** N/A

15. COMPLETION OF ONE-LINER FOR STUDY: Yes, 6-13-88

Iprodione

No. \_\_\_\_\_

Chemical Name Technical

Chemical Class \_\_\_\_\_

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Study/Species/Lab/  
Succession \_\_\_\_\_

Chemical  
9 a.i.

Results

Reviewer/  
Date \_\_\_\_\_

Validation  
Status \_\_\_\_\_

14-Day Single Dose Oral LD<sub>50</sub>

LD<sub>50</sub> = mg/kg ( 95% C.L. )      Concn. Mort.(%) = \_\_\_\_\_

Species \_\_\_\_\_

Slope =      # Animals/Level =      Age(Days) = \_\_\_\_\_  
Sex = \_\_\_\_\_

Lab \_\_\_\_\_

14-Day Dose Level mg/kg/(% Mortality)  
(    ), (    ), (    ), (    ), (    )

Acc. \_\_\_\_\_

Comments: \_\_\_\_\_

14-Day Single Dose Oral LD<sub>50</sub>

LD<sub>50</sub> = mg/kg ( 95% C.L. )      Concn. Mort.(%) = \_\_\_\_\_

Species \_\_\_\_\_

Slope =      # Animals/Level =      Age(Days) = \_\_\_\_\_  
Sex = \_\_\_\_\_

Lab \_\_\_\_\_

14-Day Dose Level mg/kg/(% Mortality)  
(    ), (    ), (    ), (    ), (    )

Acc. \_\_\_\_\_

Comments: \_\_\_\_\_

8-Day Dietary LC<sub>50</sub>

LC<sub>50</sub> = ppm ( 95% C.L. )      Concn. Mort.(%) = \_\_\_\_\_

Species \_\_\_\_\_

Slope =      # Animals/Level =      Age(Days) = \_\_\_\_\_  
Sex = \_\_\_\_\_

Lab \_\_\_\_\_

8-Day Dose Level ppm/(Mortality)  
(    ), (    ), (    ), (    ), (    )

Acc. \_\_\_\_\_

Comments: \_\_\_\_\_

8-Day Dietary LC<sub>50</sub>

LC<sub>50</sub> = ppm ( 95% C.L. )      Concn. Mort.(%) = \_\_\_\_\_

Species \_\_\_\_\_

Slope =      # Animals/Level =      Age(Days) = \_\_\_\_\_  
Sex = \_\_\_\_\_

Lab \_\_\_\_\_

8-Day Dose Level ppm/(Mortality)  
(    ), (    ), (    ), (    ), (    )

Acc. \_\_\_\_\_

Comments: \_\_\_\_\_

8-Day Dietary LC<sub>50</sub>

LC<sub>50</sub> = PP ( 95% C.L. )      Concn. Mort.(%) = \_\_\_\_\_  
Sol. Concn. Mort.(%) = \_\_\_\_\_

Species \_\_\_\_\_

Slope =      # Animals/Level =      Temperature = \_\_\_\_\_

Lab \_\_\_\_\_

96-Hour Dose Level pp/(Mortality)  
(    ), (    ), (    ), (    ), (    )

Acc \_\_\_\_\_

Comments: \_\_\_\_\_

96-Hour LC<sub>50</sub>

LC<sub>50</sub> = 7:7 ppm ( 95% C.L. )      Concn. Mort.(%) = 0  
Sol. Concn. Mort.(%) = 0

Species Cyprinodon variegatus

Slope = n/a      # Animals/Level = 10

Lab Springborn Life Sciences, Inc.

not reported

Temp. = 22±1°C

KDR  
6/13/88

CORE

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96-Hour Dose Level ppm/(Mortality)  
2.2 ( 0 ), 3.5 ( 0 ), 5.1 ( 5 ), 7.0 ( 15 ), 10 ( 100 )

Comments: Mean measured concentrations reported

96-Hour LC<sub>50</sub>

LC<sub>50</sub> = PP ( 95% C.L. )      Concn. Mort.(%) = \_\_\_\_\_  
Sol. Concn. Mort.(%) = \_\_\_\_\_

Species \_\_\_\_\_

Slope =      # Animals/Level =      Temp. = \_\_\_\_\_

Lab \_\_\_\_\_

96-Hour Dose Level pp/(Mortality)  
(    ), (    ), (    ), (    ), (    )

Acc. \_\_\_\_\_

Comments: \_\_\_\_\_

Table 2. Concentrations tested and corresponding mortalities of sheepshead minnow (Cyprinodon variegatus) exposed to IPRADIONE Technical during a 96-hour flow-through toxicity test.

Mean Measured Concentration (mg/L)	Cumulative Mortality (%)											
	24-hour			48-hour			72-hour			96-hour		
	A	B	Mean	A	B	Mean	A	B	Mean	A	B	Mean
10 <sup>a</sup>	30	10	20 <sup>ce</sup>	60	70	65 <sup>c</sup>	90	80	85 <sup>c</sup>	100	100	100
7.0 <sup>a</sup>	0	0	0 <sup>dfg</sup>	0	10	5 <sup>def</sup>	0	20	10 <sup>ce</sup>	10	20	15 <sup>ce</sup>
5.1	0	0	0 <sup>bdfg</sup>	0	0	0 <sup>bdfg</sup>	0	0	0 <sup>bdefg</sup>	10	0	5 <sup>bdfg</sup>
3.5	0	0	0 <sup>bf</sup>	0	0	0 <sup>bf</sup>	0	0	0 <sup>bf</sup>	0	0	0 <sup>bf</sup>
2.2	0	0	0 <sup>b</sup>	0	0	0 <sup>bf</sup>	0	0	0 <sup>bh</sup>	0	0	0 <sup>bh</sup>
Solvent Control	0	0	0	0	0	0	0	0	0	0	0	0
Control	0	0	0	0	0	0	0	0	0	0	0	0

<sup>a</sup>A precipitate was present in the test solutions at 0 hour and throughout the study period.

<sup>b</sup>A precipitate was present in the test solutions at 24 hours and throughout the remainder of the study period.

<sup>c</sup>All fish exhibited a complete loss of equilibrium.

<sup>d</sup>Several fish exhibited a complete loss of equilibrium.

<sup>e</sup>Several fish were at the surface of the test solution.

<sup>f</sup>Several fish were lethargic.

<sup>g</sup>Several fish exhibited a partial loss of equilibrium.

<sup>h</sup>All fish were lethargic.

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (%)
10	20	20	100	9.536743E-05
7	20	3	15	.1288414
5.1	20	1	5	2.002716E-03
3.5	20	0	0	9.536743E-05
2.2	20	0	0	9.536743E-05

THE BINOMIAL TEST SHOWS THAT 7 AND 10 CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS SINCE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS 99.87106 PERCENT. AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 7.934455

>>>>>>>RESULTS CALCULATED USING THE MOVING AVERAGE METHOD  
SPAN            G                    LC50            95 PERCENT CONFIDENCE LIMITS  
2                6.572942E-02 7.667107        7.114755        8.357078

>>>>>>>RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
8	1.411903	3.027286	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 = 14.12914  
95 PERCENT CONFIDENCE LIMITS = -2.659601 AND 30.91788

LC50 = 7.65798  
95 PERCENT CONFIDENCE LIMITS = 0 AND + INFINITY  
LC1 = 5.241239  
95 PERCENT CONFIDENCE LIMITS = 0 AND 6.767895