

US EPA ARCHIVE DOCUMENT

DATA EVALUATION RECORD
ACUTE LC₅₀ TEST WITH AN ESTUARINE/MARINE FISH
§ 72-3(A)

1. **CHEMICAL:** Oryzalin **PC Code No.:** 104201

2. **TEST MATERIAL:** Oryzalin **Purity:** 96.9%

3. **CITATION:**

Authors: T.J. Ward, P.L. Kowalski, and R.L. Boeri

Title: Oryzalin: Acute Toxicity to the
Sheepshead Minnow, *Cyprinodon variegatus*

Study Completion Date: December 11, 1995

Laboratory: T.R. Wilbury Laboratories, Inc.,
Mablehead, MA

Sponsor: DowElanco, Midland, MI

Laboratory Report ID: 654-DO

MRID No.: 438877-01

DP Barcode: D223419

4. **REVIEWED BY:** Rosemary Graham Mora, M.S., Environmental
Scientist, KBN Engineering and Applied Sciences, Inc.

Signature:

[Handwritten Signature] for RGM

Date:

5/22/96

APPROVED BY: Pim Kosalwat, Ph.D., Senior Scientist, KBN
Engineering and Applied Sciences, Inc.

Signature:

P. Kosalwat

Date:

5/22/96

5. **APPROVED BY:**

Signature:

Robert K. [Signature]

Date:

May 22 1997

6. **STUDY PARAMETERS:**

Age or Size of Test Organism:	0.33 g
Definitive Test Duration:	96 hours
Study Method:	Flow-Through
Type of Concentrations:	Mean Measured

m) 6/16/97

7. **CONCLUSIONS:** This study is scientifically sound and meets the guideline requirements for an acute toxicity test using sheepshead minnows. The study was conducted with exposure concentrations up to the maximum obtainable water solubility of this material for the conditions of this study (3.04 ppm). No mortality or sublethal effects were observed, therefore, the LC₅₀ is determined to be >3.04 ppm which, at worst, classifies Oryzalin as moderately toxic to the sheepshead minnow. The NOEC was 3.04 ppm, the highest concentration tested.

Results Synopsis

LC₅₀: >3.04 ppm
 NOEC: 3.04 ppm

95% C.I.: N/A
 Probit Slope: N/A

8. ADEQUACY OF THE STUDY

- A. Classification:** Core.
- B. Rationale:** Although a more precise LC₅₀ was not determined, this study was conducted with concentrations up to the maximum water solubility obtainable under the conditions of this test (3.04 ppm).
- C. Repairability:** N/A.

9. Guideline Deviations:

1. The salinity (15-17%) of test solutions during this study was lower than recommended (salinity of 30%).

10. SUBMISSION PURPOSE:**11. MATERIALS AND METHODS:****A. Test Organisms**

Guideline Criteria	Reported Information
<u>Species</u> Preferred species are the sheepshead minnow (<i>Cyprinodon variegatus</i>) or the Silverside (<i>Menidia sp.</i>).	<i>Cyprinodon variegatus</i>
<u>Mean Weight</u> 0.5 - 5 g	0.33 g
<u>Mean Standard Length</u> Longest not > 2x shortest	27 mm
<u>Supplier</u>	Aquatic BioSystems, Fort Collins, CO
All fish from same source?	Yes.
All fish from the same year class?	Not reported.

B. Source/Acclimation

Guideline Criteria	Reported Information
<u>Acclimation Period</u> minimum 14 days	14 days
Wild caught organisms were quarantined for 7 days?	N/A.
Were there signs of disease or injury?	No.
If treated for disease, was there no sign of the disease remaining during the 48 hours prior to testing?	N/A.
<u>Feeding</u> No feeding during the study	The fish were not fed during the 48 hours prior to test initiation or during the test period.
<u>Pretest Mortality</u> <3% mortality 48 hours prior to testing	<3%

C. Test System

Guideline Criteria	Reported Information
<u>Source of dilution water</u> Soft reconstituted water or water from a natural source, not dechlorinated tap water	Carbon-filtered, natural seawater collected at T.R. Wilbury in Mablehead, MA. The water was analyzed and found to be free of pesticides and PCBs.
Does water support test animals without observable signs of stress?	Yes.
<u>Salinity</u> 30-34‰ salinity, weekly range < 6 ‰	15-17‰
<u>Water Temperature</u> 22 ± 1 °C	21.8-22.6 °C

Guideline Criteria	Reported Information
<p>pH 8.0-8.3 for marine-stenohaline fishes, 7.7-8.0 for estuarine-euryhaline fishes, monthly range < 0.8</p>	7.7-7.9
<p>Dissolved Oxygen Static: $\geq 60\%$ during 1st 48 hrs and $\geq 40\%$ during 2nd 48 hrs, flow-through: $\geq 60\%$</p>	$\geq 80\%$ of saturation
<p>Test Aquaria 1. Material: Glass or stainless steel 2. Size: Volume of 19 L (5 gal) or 30 x 60 x 30 cm 3. Fill volume: 15-30 L of solution</p>	<p>1. Glass 2. 20 L 3. 15 L</p>
<p>Type of Dilution System Must provide reproducible supply of toxicant</p>	Intermittent-flow proportional diluter
<p>Flow Rate Consistent flow rate of 5-10 vol/24 hours, meter systems calibrated before study and checked twice daily during test period</p>	6.8 volume additions/24 hours
<p>Biomass Loading Rate Static: ≤ 0.8 g/L at $\leq 17^\circ\text{C}$, ≤ 0.5 g/L at $> 17^\circ\text{C}$; flow-through: ≤ 1 g/L/day</p>	0.22 g/L instantaneous loading or 0.03 g/L/day
<p>Photoperiod 16 hours light, 8 hours dark</p>	16 h light, 8 h dark.
<p>Solvents Not to exceed 0.5 ml/L for static tests or 0.1 ml/L for flow-through tests</p>	Solvent: DMF Maximum conc.: 0.1 ml/L.

D. Test Design

Guideline Criteria	Reported Information
<p><u>Range Finding Test</u> If $LC_{50} > 100$ mg/L with 30 fish, then no definitive test is required.</p>	<p>During a range-finding test, no mortality or sublethal effects occurred at concentrations ≤ 1 mg/L and total mortality at 10 mg/L.</p>
<p><u>Nominal Concentrations of Definitive Test</u> Control & 5 treatment levels; each conc. should be 60% of the next highest conc.; concentrations should be in a geometric series</p>	<p>Dilution water control, solvent control and five nominal concentrations (1.5, 2.5, 4.0, 6.0, and 10 mg/L).</p>
<p><u>Number of Test Organisms</u> Minimum 10/level, may be divided among containers</p>	<p>10 fish per test vessel; 2 test vessels per treatment and control.</p>
<p>Test organisms randomly or impartially assigned to test vessels?</p>	<p>Yes.</p>
<p>Biological observations made every 24 hours?</p>	<p>Yes.</p>
<p><u>Water Parameter Measurements</u> 1. <u>Temperature</u> Measured constantly or, if water baths are used, every 6 hrs, may not vary $> 1^{\circ}C$ 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>1. Water temperature was measured daily in each test vessel and continuously in one test vessel. 2. DO and pH were measured daily in each test vessel.</p>
<p><u>Chemical Analysis</u> 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>Centrifuged samples of the test solutions were analyzed at 0, 48, and 96 hours using high performance liquid chromatography.</p>

12. REPORTED RESULTS:**A. General Results**

Guideline Criteria	Reported Information
Quality assurance and GLP compliance statements were included in the report?	Yes.
<u>Recovery of Chemical</u>	30-39%.
<u>Control Mortality</u> Not more than 10% of control organisms may die or show abnormal behavior.	No mortality occurred in the dilution water control or the solvent control.
Raw data included?	Yes.
Signs of toxicity (if any) were described?	No signs of toxicity were observed.

Mortality

Concentration (ppm)		Number of Fish	Cumulative Number Dead			
Nominal	Mean Measured		Hour of Study			
			24	48	72	96
Control	ND	20	0	0	0	0
Solvent Control	ND	20	0	0	0	0
1.5	0.59	20	0	0	0	0
2.5	0.94	20	0	0	0	0
4.0	1.40	20	0	0	0	0
6.0	1.96	20	0	0	0	0
10.0	3.04	20	0	0	0	0

Other Significant Results: Insoluble material was noted in all test solutions during the test. The solutions turned orange, and orange particles were observed in the bottom of each tank. The color and concentration of particles increased with increasing toxicant concentration.

B. Statistical Results

Method: Visual inspection

96-hr LC₅₀: >3.04 ppm

95% C.I.: N/A

Probit Slope: N/A

NOEC: 3.04 ppm

13. VERIFICATION OF STATISTICAL RESULTS:

Parameter	Result
Binomial Test LC ₅₀ (C.I.)	N/A
Moving Average Angle LC ₅₀ (95% C.I.)	N/A
Probit LC ₅₀ (95% C.I.)	N/A
Probit Slope	N/A
NOEC	3.04 ppm

- 14. REVIEWER'S COMMENTS:** This study is scientifically sound, meets the guideline requirements for an acute toxicity test using sheepshead minnow, and is classified as Core. Although a more precise LC₅₀ was not determined, this study was conducted with concentrations up to the maximum water solubility obtainable under the conditions of this test (3.04 ppm). The LC₅₀ is determined to be >3.04 ppm which, at worst, classifies Oryzalin as moderately toxic to the sheepshead minnow. The NOEC was 3.04 ppm, the highest concentration tested.