

US EPA ARCHIVE DOCUMENT

DATA EVALUATION RECORD

1. CHEMICAL: OCTHILINONE
2. TEST MATERIAL: Octhiline technical 98.5% active ingredient
Lot #3192, yellow liquid
3. STUDY TYPE: 96-hour Estuarine Fish Flow-Through Acute
Toxicity Test.
4. CITATION: Sousa, J.V. 1990. Octhiline-Acute Toxicity to
Sheepshead Minnow (Cyprinodon variegatus) Under Flow-Through
Conditions. Study conducted by Springborn Laboratories,
Inc., Wareham, MA. Report NO. 90-7-3375. Submitted by Rohm
and Haas Company, Spring House, PA. Accession No. 416080-07.
5. REVIEWED BY:
Greg Susanke, Biologist *Greg Susanke 11/27/90*
Ecological Effects Branch
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6. APPROVED BY: *ln T 2/6/91*
f Doug Urban, Deputy Chief
Ecological Effects Branch
Environmental Fate and Effects Division (H7507 C)
7. CONCLUSION: This study appears scientifically sound and
fulfills the Guideline requirements (72-3) for an acute 96-
hour toxicity test for an estuarine/marine fish. The LC50 of
octhiline to sheepshead minnow is .16 ppm, therefore it is
considered highly toxic. The NOEL is 0.054 ppm.

8. MATERIALS AND METHODS:

A. Test Organisms:

Species- Sheepshead minnow (Cyprinodon variegatus)

Supplier- SP Inc., Salem MA.

Mean weight- 0.97 g (0.26 - 1.50)

Mean length- 37 mm (25 - 43)

Acclimation period- 14 days prior to testing,
no mortalities

B. Test System:

Source of dilution water- Dilution water was prepared by filtering natural seawater collected from the Cape Cod Canal, Bourne, MA. The quality of test dilution water was biologically monitored in the laboratory through the maintenance of continuous cultures of mysid shrimp.

Water temperature- 22 °C ± 1°C

pH- 7.8 - 8.1

Dissolved oxygen- 82 - 96% saturation

Salinity- 32 ‰

Total organic carbon- 1.4 - 6.0 mg/L

Test aquaria- 14 glass aquaria (39 x 20 x 25 cm) in temperature controlled water bath, test water volume 15 L

Type of dilution system- Constant flow serial diluter calibrated to provide 60% dilutions between each treatment level

Flow rate- 6.5 aquarium volume replacements per day, test solutions were not aerated

Biomass loading rate- .099 g/L of test solution per day

Photoperiod- 16 hours light and 8 hours dark, fluorescent light intensity 70 - 110 footcandles

C. Test Design:

Range finding test- Preliminary testing used nominal concentrations of 0.40, 0.24, 0.14, 0.086, and 0.052 mg a.i./L. 100% and 80% mortality occurred at the two highest treatment levels. The surviving fish at 0.24 mg a.i./L were lethargic. No mortality or adverse effects occurred in the three lowest treatment levels.

Definitive test

Nominal concentrations- 0.40, 0.24, 0.14, 0.086, and 0.052 mg a.i./L

Controls- water control and solvent control with triethylene glycol at 0.94 ml/L (highest concentration added to test chambers)

Number of test organisms- 10 per aquaria plus replicate, total of 140 fish (5 treatment levels, 2 controls)

Biological observations- Made at test initiation and at subsequent 24 hour intervals

Water parameter measurements- DO, temperature, salinity, and pH were measured daily at test initiation and subsequent 24 hour intervals in all treatment levels and controls.

9. REPORTED RESULTS:

Mean measured concentrations- 0.37, 0.21, 0.11, 0.054, and 0.040 mg a.i./L, are 63-94% of nominal concentrations (81% avg.), measured at 0 hour and 96 hours

Recovery of chemical- Average octhilinone recovery was 98% of the nominal fortified seawater levels

Mortality and observations- Mortality at the two highest treatment levels of 0.37 and 0.21 mg a.i./L were 100 and 80%, respectively. All surviving fish at the 0.21 level were lethargic. At the 0.11 mg a.i./L treatment level there was 10% mortality. No mortality or adverse effects occurred in the two lowest treatment levels (0.54 and 0.40 mg a.i./L).

10. STUDY AUTHORS'S CONCLUSIONS / QUALITY ASSURANCE MEASURES:

"Based on these data, it was established that the effects observed during this study were clearly concentration

dependent. The 96-hour LC50 for sheepshead minnow exposed to Octhilinone was calculated by probit analysis to be 0.16 mg a.i./L with a 95% confidence interval 0.14-0.19 mg a.i./L. The No Observed Effect Concentration for sheepshead minnow exposed to Octhilinone was determined to be 0.054 mg a.i./L. Based on US EPA (1985) criteria, Octhilinone would be classified as highly toxic to sheepshead minnow (Cyprinodon variegatus).

Quality Assurance and Good Laboratory Practice Regulation Statements were included in the report, indicating that the study was conducted in accordance with the FIFRA Good Laboratory Practice Standards set forth in 40 CFR Part 160.

11. REVIEWER'S DISCUSSION AND INTERPRETATION OF STUDY RESULTS:

A. Test Procedure: The test procedures were generally in accordance with protocols recommended by the Guidelines. The protocol deviations listed below are not expected to affect the results of the study.

- The study did not mention if feeding was stopped prior to testing.

- Light intensity during the study was slightly higher (70-110 footcandles) than the recommended range of 20-100 footcandles.

B. Statistical Analysis:

The LC50 was calculated by the Ecological Effects Branch toxanol computer program which used the probit method.

C. Discussion/Results: The study appears to be scientifically valid. The 96-hour LC50 value, based upon mean measured octhilinone concentrations was estimated to be .16 ppm. The 95% confidence interval is .14-.19 ppm, and the NOEL is 0.054 ppm. Octhilinone is classified as highly toxic to estuarine/marine fish.

D. Adequacy of the Study:

1. Classification: Core
2. Rationale: N/A
3. Repairability: N/A

12. COMPLETION OF ONE-LINER FOR STUDY: yes

Greg Susanke octhilinone sheephead minnow LC50

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
.37	20	20	100	9.536742E-05
.21	20	16	80	.5908966
.11	20	2	10	2.012253E-02
.054	20	0	0	9.536742E-05
.04	20	0	0	9.536742E-05

THE BINOMIAL TEST SHOWS THAT .11 AND .21 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 .1608778

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
4	4.146392E-02		.1521493	.1292145
.1839703				

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H
5	.1663258	1
.9950956		

SLOPE = 7.763339
 95 PERCENT CONFIDENCE LIMITS = 4.597211 AND 10.92947

LC50 = .1620191
 95 PERCENT CONFIDENCE LIMITS = .1382173 AND .1886324

LC10 = .1111673
 95 PERCENT CONFIDENCE LIMITS = .0802453 AND .1316149
