2-6-91

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DATA EVALUATION RECORD

1. CHEMICAL: OCTHILINONE

2. TEST MATERIAL: Octhilinone technical 98.5% active ingredient Lot #3192, yellow liquid

3. STUDY TYPE: 96-hour Freshwater Fish Flow-Through Acute Toxicity Test.

4. CITATION: Sousa, J.V. 1990. Octhilinone-Acute Toxicity to Bluegill (Lepomis macrochirus) Under Flow-Through Conditions. Study conducted by Springborn Laboratories, Inc., Wareham, MA. Report NO. 90-6-3349. Submitted by Rohm and Haas Company, Spring House, PA. Accession No. 416080-04.

5. REVIEWED BY:

Greg Susanke, Biologist
Ecological Effects Branch
Environmental Fate and Effects Division (H7507 C)

Greg Susanke 11/27/90

6. APPROVED BY:

Doug Urban, Deputy Branch Chief
Ecological Effects Branch
Environmental Fate and Effects Division (H7507 C)

2/6/91

7. CONCLUSION:

This study appears scientifically sound and fulfills the Guideline requirements for an acute 96-hour toxicity test for a warmwater fish species. The LC50 of octhilinone to bluegill sunfish is 0.18 ppm, therefore it is considered highly toxic. The NOEL is 0.069 ppm.

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8. MATERIALS AND METHODS:

A. Test Organisms:

Species- Bluegill (Lepomis macrochirus)

Supplier- Baybrook Bass Hatchery, Ashford, CN.

Mean weight- 0.55 g (range, 0.32 - 0.86 g)

Mean length- 35 mm (range, 29 - 40 mm)

Acclimation period- 14 days, food withheld 48 hours prior to testing.

B. Test System:

Source of dilution water- well water

Water temperature- 22 ± 1° C

pH- 6.7-7.1

Dissolved oxygen- 87-98% saturation

Total hardness- 27-35 mg/L as $CaCo_3$

Total Alkalinity- 22-24 mg/L as $CaCo_3$

Specific conductance- 135-140 umhos/cm

Total organic carbon- .66 mg/L

Test aquaria- 14 glass aquaria (39 x 20 x 25 cm) in temperature controlled water bath, test water volume 11 L

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

Flow rate- 6.5 aquarium volumes per day

Biomass loading rate- .076 g/L per day

Photoperiod- 16 hours light, 8 hours dark, fluorescent light intensity 70-130 foot candles

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C. Test Design:

Range finding test- Preliminary testing used nominal concentrations of 0.50, 0.30, 0.18, 0.11, 0.065 mg a.i./L. 100% mortality occurred at two highest concentrations, 0% mortality occurred at three lowest concentrations

Definitive test

Nominal concentrations- 0.50, 0.30, 0.18, 0.11, 0.065 mg a.i./L

Controls- Water control and solvent control with triethylene glycol at 0.092 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 control groups)

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

Water parameter measurements- pH, DO, and temperature taken at test initiation and subsequent 24 hr intervals in all treatment levels and controls. Total alkalinity, total hardness and specific conductance taken at test initiation in all treatment levels and controls

9. REPORTED RESULTS:

Mean measured concentrations- .42, 0.27, 0.16, 0.11, 0.069 mg a.i./L are 84-107% of nominal concentration (100% avg.), measured at 0 hour and 96 hours

Recovery of chemical- Average octhilinone recovery was 103% ± 5% from formulation

Mortality and observations- Mortality at the two highest concentrations (0.42 and 0.27 mg a.i./L) was 100%. At 0.16 and 0.11 mg a.i./L there was 25% and 5% mortality, respectively. One surviving fish in the 0.16 treatment level exhibited a partial loss of equilibrium after 96 hours of exposure. No mortality or sublethal effects were observed at the lowest treatment level (0.069 mg a.i./L)

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

"Based on these data, it was established the the effects observed during this study were clearly concentration-dependant. The 96-hour LC50 for bluegill exposed to octhilinone was calculated by probit analysis to be 0.18 mg a.i./L with a 95% confidence interval of 0.16 - 0.20 mg a.i./L. The No Observed Effect Concentration (NOEC) for bluegill exposed to ochtilinone was determined to be 0.069 mg a.i./L. Based on US EPA (1985) criteria, octhilinone would be classified as highly toxic to bluegill (Lepomis macrochirus)."

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 pH of the dilution water was 6.7 - 7.1 which is lower than the suggested range of 6.9 - 7.5.

- The light intensity of this study was 70 - 130 footcandles which is higher than the suggested range of 20 - 100 footcandles.

- Test aquaria of 39 x 20 x 25 cm are only a third of the recommended size of 30 x 60 x 30 cm, however the biomass loading rate is acceptable.

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 results appear to be scientifically valid. The 96-hour LC50 value, based upon mean measured octhilinone concentrations was estimated to be 0.18 ppm. The 95% confidence interval is .16 - 2.0 ppm, and the NOEL is 0.069 ppm. Octhilinone is classified as highly toxic to warmwater fish.

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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 ochtilinone Bluegill Acute LC50

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
.42	20	20	100	9.536742E-05
.27	20	20	100	9.536742E-05
.16	20	5	25	2.069473
.11	20	1	5	2.002716E-03
.069	20	0	0	9.536742E-05

THE BINOMIAL TEST SHOWS THAT .16 AND .27 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 .1841838

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
4	4.002301E-02	.1748429	.1541703	

1992228

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H
7	.1769671	1

ODNESS OF FIT PROBABILITY

170571

SLOPE = 10.47887
95 PERCENT CONFIDENCE LIMITS = 6.070675 AND 14.88706

LC50 = .1754113
95 PERCENT CONFIDENCE LIMITS = .1575403 AND .1997135

LC10 = .1326971
95 PERCENT CONFIDENCE LIMITS = .1072702 AND .1488706

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