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 Rainbow Trout (Oncorhynchus mykiss) Under Flow-Through Conditions. Study conducted by Springborn Laboratories, Inc., Wareham, MA. Report NO. 90-7-3367. Submitted by Rohm and Haas Company, Spring House, PA. Accession No. 416080-05.

5. REVIEWED BY:

Greg Susanke, Biologist Greg Susanke 11/27/90
Ecological Effects Branch
Environmental Fate and Effects Division (H7507 C)

6. APPROVED BY:

for Doug Urban, Deputy Branch Chief 2/6/91
Ecological Effects Branch
Environmental Fate and Effects Division (H7507 C)

7. CONCLUSION:

This study appears scientifically sound and fulfills the Guideline requirements (72-1) for an acute 96-hour toxicity test for a coldwater fish species. The LC50 of octhilinone to rainbow trout is 0.047 ppm, therefore it is considered very highly toxic. The NOEL is 0.023 ppm.

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8. MATERIALS AND METHODS:

A. Test Organisms:

Species- Rainbow trout (Oncorhynchus mykiss)

Supplier- Mount Lassen Trout Farm, CA.

Mean weight- 0.68 g (range, 0.42 - 0.96 g)

Mean length- 41 mm (range, 35 - 45 mm)

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

B. Test System:

Source of dilution water- well water

Water temperature- 11-16 ° C

pH- 6.7-7.1

Dissolved oxygen- 80-91% saturation (8.5-9.7 mg/L)

Total hardness- 31-35 mg/L as $CaCo_3$

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

Specific conductance- 120-140 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 15 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- .069 g/L per day

Photoperiod- 16 hours light, 8 hours dark, fluorescent light intensity 60-100 foot candles

C. Test Design:

Range finding test- Preliminary testing used nominal concentrations of .130, .078, .047, .028, .017 mg a.i./L. 100% mortality occurred at two highest concentrations, 0% mortality occurred at three lowest concentrations however, all surviving fish in the .047 treatment level were lethargic.

Definitive test

Nominal concentrations- 0.130, 0.078, 0.047, 0.028, 0.017 mg a.i./L

Controls- Water control and solvent control with triethylene glycol at 0.094 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. Test solutions were not aerated.

9. REPORTED RESULTS:

Mean measured concentrations- 0.120, 0.067, 0.042, 0.023, 0.017 mg a.i./L, are 82-101% of nominal concentration (90% avg.), measured at 0 hour and 96 hours

Recovery of chemical- Average octhilinone recovery was 106% ± 5% from freshwater

Mortality and observations- Mortality at the two highest concentrations (0.12 and 0.067 mg a.i./L) were 100% and 95%, respectively. The one surviving fish at .067 had darkened pigmentation and was lethargic. At .042 mg a.i./L there was 30% mortality. Several of these fish were lethargic. No mortality or sublethal effects were observed at the two lowest treatment levels (0.023 and .017 mg a.i./L)

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

"Based on these data, it was established the effects observed during this study were clearly concentration-dependant. The 96-hour LC50 for rainbow trout exposed to octhilinone was calculated by probit analysis to be 47 ug a.i./L with a 95% confidence interval of 42-53 ug a.i./L. The No Observed Effect Concentration (NOEC) for rainbow trout exposed to ochtilinone was determined to be 23 ug a.i./L. Based on US EPA (1985) criteria, octhilinone would be classified as very highly toxic to rainbow trout (Oncorhynchus mykiss)."

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 dissolved oxygen concentration ranged from 86-91% saturation, which is below the recommended saturation concentration of 90%.

- Water temperature ranged between 11-16 °C, the temperature should be 12 $\pm$ 1 °C

- 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.

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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 0.047 ppm. The 95% confidence interval is 0.042 - 0.053 ppm, and the NOEL is 0.023 ppm. Octhilinone is classified as very highly toxic to coldwater 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 rainbow trout LC50

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
.12	20	20	100	9.536742E-05
.067	20	19	95	2.002716E-03
.042	20	6	30	5.765915
.023	20	0	0	9.536742E-05
.017	20	0	0	9.536742E-05

THE BINOMIAL TEST SHOWS THAT .023 AND .067 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 4.773317E-02

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS
4	6.892476E-02		4.749802E-02
061679E-02		.0568299	

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H
DNESS OF FIT PROBABILITY		
7	.2322788	1
997617		

SLOPE = 10.76807

95 PERCENT CONFIDENCE LIMITS = 5.578365 AND 15.95777

LC50 = 4.704372E-02

95 PERCENT CONFIDENCE LIMITS = 4.158744E-02 AND 5.283915E-02

LC10 = 3.585588E-02

95 PERCENT CONFIDENCE LIMITS = .026563 AND 4.077467E-02

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