

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: 48-hour Freshwater Aquatic Invertebrate Flow-
Through Acute Toxicity Test

4. CITATION: McNamara, P.C. 1990. Octhiline - Acute
Toxicity to Daphnids (Daphnia magna) During a 48-Hour Flow-
Through Exposure. Study conducted by Springborn
Laboratories, Inc., Wareham, MA. Report No.90-6-3350.
Submitted by Rohm and Haas Company, Spring House, PA.
Accession No. 416080-06.

5. REVIEWED BY:

Greg Susanke, Biologist
Ecological Effects Branch
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Greg Susanke 11/27/90

6. APPROVED BY:

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L. T. A 2/6/91

7. CONCLUSION:

This study appears scientifically sound and fulfills the
Guideline requirement (72-2) for an acute 48-hour toxicity
test for freshwater aquatic invertebrates. The EC50 of
octhiline to Daphnia magna is 0.32 ppm, therefore it is
considered highly toxic. The NOEL is 0.21 ppm.

8. MATERIALS AND METHODS:

A. Test Organisms:

Species- Daphnia magna

Supplier- The daphnids used were obtained from laboratory cultures maintained at Springborn Laboratories.

Age- \leq 24 hours old

Acclimation period- No acclimation or quarantine period needed. Daphnid cultures were fed up to test initiation, but not fed during the 48-hour definitive exposure.

B. Test System:

Source of dilution water- fortified well water

Water temperature- $19\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$

pH- 8.2 - 8.3

Dissolved oxygen- 8.6 - 9.2 mg a.i./L

Total hardness- 160-170 mg a.i./L as CaCO_3

Total Alkalinity- 120 mg a.i./L as CaCO_3

Specific conductance- 500 umhos/cm

Total organic carbon- 0.39 mg/L

Test aquaria- 14 glass aquaria with 1.8 L of water at a depth of 12 cm

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

Flow rate- 6 aquarium volume replacements per day

Biomass loading rate- not provided

Photoperiod- 16 hours light, 8 hours dark, 15 minute transition period,
fluorescent light intensity 80 - 100 footcandles

C. Test Design:

Range finding test- Preliminary testing used nominal concentrations of 1.0, 0.60, 0.36, 0.22, and 0.13 mg a.i./L. 100% immobilization was observed in two highest treatment levels, and 5% immobilization was observed in the remaining three.

Definitive test

Nominal concentrations- 1.0, 0.60, 0.36, 0.22, 0.13 mg a.i./L

Controls- water control and solvent control with triethylene glycol at 0.061 ml/L (highest concentration added to test chambers)

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

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

Water parameter measurements- DO, water temperature, and ph were measured at test initiation and subsequent 24 hour intervals in all treatment levels and controls. Total hardness, alkalinity, and specific conductance were measured at test initiation in all treatment levels and controls

9. REPORTED RESULTS:

Mean measured concentrations- 1.0, 0.59, 0.34, 0.21, 0.12 mg a.i./L were 90-104% of nominal concentration (97% avg.), measured at 0 hour and 48 hours

Recovery of chemical- Average octhiline recovery was 103% \pm 5% from freshwater

Mortality and observations- 100, 95, 60% immobilization occurred at three highest mean measured concentrations of 1.0, 0.59, and 0.34 mg a.i./L, respectively. Sublethal effects (e.g. lethargy) was observed among several surviving daphnids in the 0.59 and 0.34 treatment levels. Less than 10% immobilization occurred in the two lowest treatment levels of 0.21 and 0.12 mg a.i./L

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

"Based on the concentration-effect relationship observed, the No Observed Effect Concentration established for this study was 0.21 mg a.i./L as Octhilinone. The 48-hour EC50 for daphnids exposed to mean measured concentrations of Octhilinone was estimated by non-linear interpolation to be 0.32 mg a.i./L with a 95% confidence interval calculated by binomial probability of 0.21 - 0.35 mg ai.i/L. Based on criterion established by U.S. EPA (1985), Octhilinone is classified as highly toxic to Daphnia magna".

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

A. Test Procedure: 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.

- Test water was 1.8 L which is below the recommended amount of 2 -3 L.

-The biomass loading rate was not provided, it should not be greater than 1 g/L per day. But, with only 10 daphnids per aquaria, the loading factor is not expected to be exceeded

B. Statistical Analysis:

The LC50 was calculated by the Ecological Effects Branch toxanol computer program which used the Moving Average Method.

C. Discussion/Results: The study results appear to be scientifically valid. The 48-hour EC50 value, based upon mean measured octhilinone concentrations was estimated to be .32 ppm. The 95% confidence interval is .26 - .38 ppm, and the NOEL is 0.21 ppm. Octhilinone is classified as highly toxic to freshwater aquatic invertebrates.

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 Daphnia magna LC50

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
1	20	20	100	9.536742E-05
.59	20	19	95	2.002716E-03
.34	20	12	60.00001	25.17223
.21	20	1	5	2.002716E-03
.12	20	2	10	2.012253E-02

THE BINOMIAL TEST SHOWS THAT .21 AND .59 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 .3153606

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
4	7.083268E-02		.3150998	.2568236

.381707

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H
4	.8107655	2.844758

3.616876E-02

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = 4.869816
 95 PERCENT CONFIDENCE LIMITS = .484911 AND 9.254721

LC50 = .3057311
 95 PERCENT CONFIDENCE LIMITS = .1070813 AND .8340683

LC10 = .1677063
 95 PERCENT CONFIDENCE LIMITS = 5.868168E-04 AND .2667768
