

US EPA ARCHIVE DOCUMENT

6-28-88  
File  
100-1000-1000

DATA EVALUATION RECORD

1. Chemical: Ammonium-DL-Homoalanin-4-yl (methyl) phosphinate
2. Test Material: HOE-039866-OHZ96-002 Technical 96.3% ai
3. Study/Action Type: Nontarget Area Phytotoxicity - Aquatic Plant Growth (Selenastrum capricornutum)
4. Study ID: The Toxicity of HOE 039866 OH ZC96 Technical to Selenastrum capricornutum prepared by Malcolm Pirnie, Inc., March 27, 1987. (Unpublished study submitted by Hoechst Celanese Corporation under Accession No. 403456-53.)
5. Reviewed By: Charles Lewis  
EEB/HED  
Signature: *Charles Lewis*  
Date: *June 7, 1988*
6. Approved By: Doug Urban  
EEB/HED  
Signature: *Douglas J. Urban*  
Date: *6/28/88*
7. Conclusions:  

The study is scientifically sound and fulfills the Guidelines requirement for a Tier II freshwater green algae study.

HOE-039866 with a 5-day EC<sub>50</sub> of 7.80 mg/L is not expected to exert a detrimental effect on the algae Selenastrum capricornutum when applied at a current maximum application rate of 3.5 lb ai/A.
8. Recommendations: N/A
9. Background: N/A
10. Discussion of Individual Tests or Studies:

11. Materials and Methods (Protocols):

An algal assay bottle test on Selenastrum capricornutum, obtained from stock cultures, was conducted by Malcolm Pirnie, Inc., White Plains, NY. The test was conducted for 7 days in a Sherer Incubator. Flasks were continuously shaken at 100 oscillations/minute on an Orbit Junior shaker table. Lighting was continuous at  $4306 \pm 650$  lumens/m<sup>2</sup> from overhead cool-white fluorescent lights. Temperature was  $24 \pm 2$  °C.

Test vessels were 125 mL Erlenmeyer flasks fitted with foam stoppers. Each concentration was replicated three times and contained 25 mL of stock solution plus test chemical.

Concentrations of 2.5, 5.0, 10.0, 20.0, 40.0, and 80 mg/L were tested. The initial cell count for each concentration was 3000 cells/mL.

Cell counts were made using the Coulter counter on days 3, 4, 5, and 7. Three counts per replicate were made on each of the test days.

EC<sub>50</sub> and EC<sub>25</sub> values were determined by plotting the log of concentration against percent inhibition. Inverse estimation least squares linear regression was used to determine line of best fit, concentrations corresponding to 25 and 50 percent inhibition and the associated 95 percent confidence limits.

12. Reported Results:

Effects of HOE 039866 on mean standing crop (MSC) relative to controls on day 7 ranged from 2.6 to 71.1 percent inhibition. The 7-day EC<sub>25</sub> is 14.5 mg/L (95% CL 7.4 - 28.6 mg/L) and 7-day EC<sub>50</sub> 37.3 mg/L (95% CL 19.2 - 79.4 mg/L). The NOEL was 2.5 mg/L.

13. Study Author's Conclusions/Quality Assurance Measures:

Percent Inhibition, Relative to Control, Based Upon Mean Standing Crop, Cells/mL, on Day 7.

Nominal Concentration, mg/L	Mean Standing Crop on Day 7, Cells/mL	Percent Inhibition
0	6,940,000	-
2.5	6,760,000	2.6
5	6,233,333*	10.2
10	6,026,667*	13.2
20	5,213,333*	24.9
40	3,313,333*	52.3
80	2,006,667*	71.1

\*Significantly different from the control ( $\alpha = 0.05$ ).

The study entitled The Toxicity of HOE-039866-OH2C96 Technical to Selenastrum capricornutum conducted and reported by Malcolm Pirnie, Inc., White Plains, NY for Hoechst-Roussel Agri-Vet Company, Somerville, NJ is in compliance with EPA Good Laboratory Practice Standards under the Federal Insecticide, Fungicide, and Rodenticide Act and the Toxic Substances Control Act (FEDERAL REGISTER Vol. 48, No. 230, November 29, 1983) except as follows: No exceptions

Study Director: Jane S. Hughs

Date: June 3, 1987

14. Reviewer's Discussion and Interpretation of Study Results:

- a. Test Procedures - The study followed the protocol outlined in the 1982 Guidelines - Subdivision J, Aquatic Plant Testing.
- b. Statistical Analysis - Data were analyzed with the Stephens Program for Days 3, 4, 5, and 7. The following values were obtained using the moving average method: Day 3 EC<sub>50</sub> 3.3 mg/L (95% CL 2.98 and 3.66 mg/L); Day 4 EC<sub>50</sub> 4.6 mg/L (95% CL 4.1 and 5.2 mg/L); Day 5 EC<sub>50</sub> 7.8 mg/L (95% CL 6.5 and 9.1 mg/L); and Day 7 EC<sub>50</sub> 40.1 mg/L (95% CL 33.4 and 48.2 mg/L).
- c. Discussion/Results - The study is a Tier II test using the freshwater green algae Selenastrum capricornutum. Maximum application rate is reported to be 3.5 lb ai/A.

This rate would result in a water concentration of 2.5 mg/L if the herbicide was applied directly to a 1-acre pond 0.5 feet deep to simulate a worst case situation.

Based on available data, HOE 039866, with an EC<sub>50</sub> of 7.8 mg/L on Day 5 would not be expected to exert a detrimental effect on the algae Selenastrum capricornutum. On Day 3 the EC<sub>50</sub> was determined to be 3.3 mg/L and would also be below the level of concern.

If application rates were increased to 4.5 lb ai/A, the 3-day EC<sub>50</sub> would be exceeded and could require additional testing if environmental fate data and the specific use pattern did not resolve EEB concerns.

- d. Adequacy of the Study
  - 1) Classification - Core
  - 2) Rationale - N/A
  - 3) Reparability - N/A
- 15. Completion of One-Liner for Study
  - One-liner form completed.
- 16. CBI Appendix: N/A

lewis ignite 6-9-88

Day -3

\*\*\*\*\*

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
80	100	91	91	0
40	100	88	88	0
20	100	83	83	0
10	100	78	78	0
5	100	78	78	0
2.5	100	30	30	0

THE BINOMIAL TEST SHOWS THAT 2.5 AND 5 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 3.320055

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	EC50	95 PERCENT CONFIDENCE LIMITS
1	7.722315E-02	3.320055	2.982279

3.657391

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
3	.7075059	7.261	0

A PROBABILITY OF 0 MEANS THAT IT IS LESS THAN 0.001.

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

SLOPE = 1.101947

95 PERCENT CONFIDENCE LIMITS = .1750622 AND 2.028832

EC50 = 2.862268

95 PERCENT CONFIDENCE LIMITS = 2.634529E-03 AND 7.43843

LC10 = .2014673

95 PERCENT CONFIDENCE LIMITS = 1.893851E-10 AND 1.362383

\*\*\*\*\*

lewis ignite 6-9-88 **PAY-4**

```
*****
CONC.      NUMBER      NUMBER      PERCENT      BINOMIAL
          EXPOSED      DEAD        DEAD        PROB. (PERCENT)
  80         100         96          96           0
  40         100         93          93           0
  20         100         88          88           0
  10         100         80          80           0
   5         100         61          61           0
  2.5        100         15          15           0
*****
```

BECAUSE THE NUMBER OF ORGANISMS USED WAS SO LARGE, THE 95 PERCENT CONFIDENCE INTERVALS CALCULATED FROM THE BINOMIAL PROBABILITY ARE UNRELIABLE. USE THE INTERVALS CALCULATED BY THE OTHER TESTS.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 4.284378

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	<b>EC50</b>	95 PERCENT CONFIDENCE LIMITS
2	.0388949	<u>4.63171</u>	<u>4.087997</u> 5.215341

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
4	.324716	6.25153	0

A PROBABILITY OF 0 MEANS THAT IT IS LESS THAN 0.001.

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

SLOPE = 1.848795

95 PERCENT CONFIDENCE LIMITS = .7952805 AND 2.90231

**EC50** = 5.008566

95 PERCENT CONFIDENCE LIMITS = 1.783398 AND 8.674642

LC10 = 1.029864

95 PERCENT CONFIDENCE LIMITS = 5.760446E-02 AND 2.480509

\*\*\*\*\*

Day 5

lewis ignite 6-8-88

\*\*\*\*\*

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
80	100	94	94	0
40	100	88	88	0
20	100	77	77	0
10	100	60	60.00001	0
5	100	37	37	0
2.5	100	17	17	0

BECAUSE THE NUMBER OF ORGANISMS USED WAS SO LARGE, THE 95 PERCENT CONFIDENCE INTERVALS CALCULATED FROM THE BINOMIAL PROBABILITY ARE UNRELIABLE. USE THE INTERVALS CALCULATED BY THE OTHER TESTS.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 7.403966

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	EC50	95 PERCENT CONFIDENCE LIMITS
4	3.124708E-02	7.757623	6.484485

9.129951

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
3	.0229237	1	.7964115

SLOPE = 1.699007  
95 PERCENT CONFIDENCE LIMITS = 1.441768 AND 1.956246

EC50 = 7.945109  
95 PERCENT CONFIDENCE LIMITS = 6.678894 AND 9.315793

LC10 = 1.421033  
95 PERCENT CONFIDENCE LIMITS = .9524283 AND 1.927641

\*\*\*\*\*



Day 7

lewis

```
*****
CONC.      NUMBER      NUMBER      PERCENT      BINOMIAL
          EXPOSED      DEAD        DEAD        PROB. (PERCENT)
  80         100         71          71           0
  40         100         52          52           0
  20         100         25          25           0
  10         100         13          13           0
   5         100         10          10           0
  2.5        100         3           3            0
*****
```

BECAUSE THE NUMBER OF ORGANISMS USED WAS SO LARGE, THE 95 PERCENT CONFIDENCE INTERVALS CALCULATED FROM THE BINOMIAL PROBABILITY ARE UNRELIABLE. USE THE INTERVALS CALCULATED BY THE OTHER TESTS.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 38.07765

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD  
SPAN            G            EC50            95 PERCENT CONFIDENCE LIMITS  
2            8.527814E-02            40.14374            33.43192  
48.23529

RESULTS CALCULATED USING THE PROBIT METHOD  
ITERATIONS            G            H            GOODNESS OF FIT PROBABILITY  
3            2.792366E-02            1            .3500412

SLOPE = 1.634495  
95 PERCENT CONFIDENCE LIMITS = 1.361365 AND 1.907625

EC50 = 40.37742  
95 PERCENT CONFIDENCE LIMITS = 33.62366 AND 50.18025

LC10 = 6.747457  
95 PERCENT CONFIDENCE LIMITS = 4.99029 AND 8.519522

\*\*\*\*\*

8