

AR 226 - 3281

TRADE SECRET

Study Title

H-25767: Static, Acute, 48-Hour Screening Test to
Daphnia magna

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STUDY COMPLETED ON: May 28, 2003

PERFORMING LABORATORY: E.I. du Pont de Nemours and Company
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Elkton Road, P.O. Box 50
Newark, Delaware 19714-0050

WORK REQUEST NUMBER: [REDACTED]

STUDY CODE NUMBER: [REDACTED]

Company Sanitized. Does not contain TSCA CB

CERTIFICATION

We, the undersigned, declare that this report provides an accurate evaluation of data obtained from this study.

Work Completed by: Barbra D. Ferrell 28 May 2003
Barbra D. Ferrell, B.S.
Associate Scientist
Date

Issued by Study Director: Robert A. Hoke 28 May 2003
Robert A. Hoke, Ph.D.
Senior Research Ecotoxicologist and Manager
Date

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STUDY INFORMATION

Substance Tested: [REDACTED]

Synonyms/Codes: • H-25767
[REDACTED]

Haskell Number: 25767

Composition: [REDACTED]

Known Impurities: [REDACTED]

Physical Characteristics: White liquid

Stability: The test substance appeared to be stable under the conditions of the study; no evidence of instability was observed.

Sponsor: E.I. du Pont de Nemours and Company
Wilmington, Delaware 19898
U.S.A.

Study Initiated/Completed: May 13, 2003 / (see report cover page)

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SUMMARY

The acute toxicity of H-25767 to the water flea, *Daphnia magna* (less than 24 hours old) was determined in an unaerated, 48-hour, static test.

The study was conducted with 4 concentrations of H-25767 and a dilution water control at a mean temperature of 20.7°C (range of 20.5-20.8°C). One test chamber was used per test concentration with 10 test organisms in each chamber. Based on visual observations, the water control and 1 mg/L test concentration solutions were clear and colorless at test start. The 10 mg/L test concentration solution was clear with a surface film at test start. The 100 mg/L test concentration solution was clear with a surface film and test material on the solution surface and bottom of test chamber at test start. The 1000 mg/L test concentration solution was cloudy with a surface film and test material on the solution surface and bottom of test chamber at test start. All water quality parameters were within acceptable limits during the exposure.

Exposure of daphnids to the water control and nominal H-25767 concentrations of 1, 10, 100, and 1000 mg/L resulted in 0, 0, 0, 70 and 100% immobility, respectively, at the end of 48 hours. No immobility or sublethal effects were seen in the water control test organisms. The highest nominal concentration causing no immobility at test end was 10 mg/L. The lowest nominal concentration causing 100% immobility at test end was 1000 mg/L. Nominal H-25767 concentrations were used for calculation of LC₅₀ values.

The results are summarized as follows:

Nominal concentrations of H-25767, mg/L	dilution water control, 1, 10, 100, and 1000
48-hour LC ₅₀ (95% confidence interval) for H-25767, based on nominal concentrations, mg/L ^a	69 (28 to 210)

H-25767 exhibited medium concern for aquatic hazard^b in an unaerated, 48-hour, static acute test using the water flea, *Daphnia magna* (less than 24 hours old).

- a Peltier, W.H. and Weber, C.I., Eds. (1985). *Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms*. EPA/600/4-85-013. United States Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio.
- b Smrcek, J., Clements, R., Morcock, R., and Rabert, W. (1993). Assessing ecological hazard under TSCA: methods and evaluation of data. *Environmental Toxicology and Risk Assessment, ASTM STP 1179*. (W.G. Landis, J.S. Hughes, and M.A. Lewis, Eds.), pp 22-39. American Society for Testing and Materials, Philadelphia.

MATERIALS AND METHODS

A. Test Solution Preparation

Test substance solutions were prepared by direct addition of H-25767 to dilution water. Test solutions of 1, 10, 100, and 1000 mg/L were prepared by adding the appropriate amount of test material to HLWW in 1-L beakers and stirring for approximately 60 minutes. The water control and 1 mg/L test concentration solutions were clear and colorless at test start. The 10 mg/L test concentration solution was clear with a surface film at test start. The 100 mg/L test concentration solution was clear with a surface film and test material on the solution surface and bottom of test chamber at test start. The 1000 mg/L test concentration solution was cloudy with a surface film and test material on the solution surface and bottom of test chamber at test start.

B. Dilution Water

Dilution water originated from the Haskell Laboratory well which is 378-feet deep and is cased and sealed to bedrock. The hardness of the HLWW is adjusted to approximately 100-140 mg/L as CaCO_3 by the flow-proportioned addition of CaCl_2 . The HLWW is then aerated, passed through a green sand filter to remove iron, and filtered through 50-, 10-, and 5- μm filters to remove particulates. The water is heated or chilled as appropriate and distributed through aged polyvinyl chloride piping. The dilution water is analyzed twice yearly for major anions and cations, metals, total organochlorine and organophosphate pesticides, and polychlorinated biphenyls. The dilution water meets OECD⁽¹⁾ and ASTM⁽²⁾ specifications.

C. Test Organism Culture

Daphnia magna were reared at Haskell Laboratory in 1000-mL Pyrex® beakers (10 per beaker at culture initiation) which contained 1000 mL of aerated, filtered HLWW held at 20.8°C. Daphnids were fed on a daily basis with a yeast, cereal leaves and trout chow (YCT) mixture (standardized to 1700 to 2100 mg/L total solids) and the green alga, *Selenastrum capricornutum*, at a rate of 62,500 cells/mL of culture medium. The combination of YCT and alga is equivalent to 0.1-0.2 mg total organic carbon per daphnid per day. Neonates used in this test were less than 24 hours old and were collected from the 7th, 10th, and 12th broods of 21, 28, and 28-day old parent daphnids, respectively. Sickness, injury, and abnormalities were not seen and ephippia were not being produced by the parent daphnids. No adult immobility was seen in the cultures used for testing during the 48-hour pretest period. *Daphnia magna* were identified by labels on the culture beakers and test chambers.

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D. Test Methods

Four nominal concentrations and a dilution water control were used in this study. The nominal concentrations were 1, 10, 100, and 1000 mg/L H-25767.

Pyrex® beakers (250-mL) containing 200 mL of test solution (6.8-cm test solution depth) were used as test chambers. One replicate test chamber was used per test concentration with 10 daphnids in each chamber. The test chambers were covered with a glass plate during the test.

Daphnia magna neonates, less than 24 hours old, were used in this study. Daphnids were not fed during the test. Addition of daphnids to test solutions was initiated after mixing of the test solutions was completed. Immobility and behavioral observations were made daily. The criterion for the effect (immobility) was a lack of reaction to application of a gentle stimulus.

A recirculating water bath was used to maintain mean temperature in the test chambers during the 48-hour test at approximately 20.7°C with a range of 20.5 to 20.8°C. A photoperiod of 16 hours light (approximately 564 to 740 Lux) and 8 hours darkness was employed which included 30 minutes of transitional light (34 to 45 Lux) preceding and following the 16-hour light interval.

Dissolved oxygen concentration, pH, and temperature were measured in all replicates of the control and test substance concentrations (Table 1). These measurements were taken at test start, and at test end or at total immobility in a replicate chamber. Test solutions were not aerated during the test and were disposed of in an appropriate manner at test end.

RESULTS AND DISCUSSION

The study was conducted with 4 concentrations of H-25767 and a dilution water control at a mean temperature of 20.7°C (range of 20.5-20.8°C). One test chamber was used per test concentration with 10 test organisms in each chamber. Based on visual observations, the water control and 1 mg/L test concentration solutions were clear and colorless at test start. The 10 mg/L test concentration solution was clear with a surface film at test start. The 100 mg/L test concentration solution was clear with a surface film and test material on the solution surface and bottom of test chamber at test start. The 1000 mg/L test concentration solution was cloudy with a surface film and test material on the solution surface and bottom of test chamber at test start. All water quality parameters were within acceptable limits during the exposure.

Exposure of daphnids to the water control and nominal H-25767 concentrations of 1, 10, 100, and 1000 mg/L resulted in 0, 0, 0, 70 and 100% immobility, respectively, at the end of 48 hours (Table 2). No immobility or sublethal effects were seen in the water control test organisms. The highest nominal concentration causing no immobility at test end was 10 mg/L. The lowest nominal concentration causing 100% immobility at test end was 1000 mg/L. Nominal H-25767 concentrations were used for calculation of LC₅₀ values.

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H-25767 exhibited medium concern for aquatic hazard^c in an unaerated, 48-hour, static acute test using the water flea, *Daphnia magna* (less than 24 hours old).

REFERENCES

1. Organisation for Economic Co-Operation and Development (OECD). Guideline for the Testing of Chemicals: 203, 17 July 1992.
2. American Society for Testing and Materials (ASTM). (1988). Standard Guide for Conducting Acute Toxicity Tests with Fishes, Macroinvertebrates, and Amphibians. E 729-88a. Annual Book of ASTM Standards, Vol. 11.04.

^c Smrcek, J., Clements, R., Morcock, R., and Rabert, W. (1993). Assessing ecological hazard under TSCA: methods and evaluation of data. *Environmental Toxicology and Risk Assessment, ASTM STP 1179*. (W.G. Landis, J.S. Hughes, and M.A. Lewis, Eds.), pp 22-39. American Society for Testing and Materials, Philadelphia.

TABLE 1

DISSOLVED OXYGEN AND pH OF TEST AND CONTROL SOLUTION SAMPLES

Nominal H-25767 Concentration (mg/L)	Test Initiation (0 hours)		Test Completion (48 hours)	
	Dissolved Oxygen (mg/L)	pH	Dissolved Oxygen (mg/L)	pH
Water Control	8.4	7.8	8.5	7.8
1.0	8.4	7.9	8.6	7.8
10	8.4	7.9	8.7	7.9
100	8.4	7.9	8.7	7.9
1000	8.4 ^a	7.7 ^a	8.6 ^a	7.4 ^a

a Measurements taken at 24 hours due to total immobility in a test concentration.

TABLE 2

IMMOBILITY OF *Daphnia magna* IN AN UNAERATED, STATIC, ACUTE, 48-HOUR TEST
WITH H-25767

Nominal H-25767 Concentration (mg/L)	Number of Dead Test Organisms / Number of Test Organisms at Study Start	
	24 Hours	48 Hours
Water Control	0/10	0/10
1.0	0/10	0/10
10	0/10	0/10
100	0/10	7/10
1000	10/10	10/10

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