6-14-91

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
PESTICIDES AND TOXIC
SUBSTANCES

MEMORANDUM

SUBJECT: Trifluralin Data Evaluation Record: Reregistration Follow-up (D163487; 818802; S394328)

FROM: James W. Akerman, Chief
Ecological Effects Branch
Environmental Fate and Effects Division (H7507C)

6/14/91

TO: Lois Rossi, PM 74
Reregistration Branch
Special Review and Reregistration Division (H7508W)

One study was submitted by the Trifluralin Data Development Corporation in response to the Trifluralin Registration Standard. This study, with results, and its status is as follows:

Trifluralin (a,a,a-trifluro-2,6-dinitro-N,N-dipropyl-p-toluidine) (96.4% a.i.)

Grass shrimp LC_{50}= 638.5 ppb Core

EEB has examined the Registration Standard and has determined that the data submitted (MRID 406748-01) fulfills the data requirement for acute toxicity testing of a marine-estuarine invertebrate (72-3).

If you have any questions on the above, please feel free to contact Norm Cook (557-0322) or Kathryn Valente (557-4368) of my staff.

Data Evaluation Record

1. Chemical: Trifluralin (a,a,a,-trifluoro-2,6-dinitro-N,N-dipropyl-p-toluidine)
Shaughnessy No.:036101

2. Test Material: Trifluralin technical (EL-152, compound 36352) 96.4% purity, lot #554AP2

3. Study type: 96-Hour Acute Flow-Through Toxicity Test for Estuarine and Marine Invertebrates

Test Species: Grass shrimp (Palaemonetes pugio)

4. Study ID: Final report #C01687. Acute toxicity of Trifluralin to the grass shrimp (Palaemonetes pugio) in a flow-through test system. MRID 406748-01. By The Toxicology Division, Lilly Research Laboratories, Division of Eli Lilly and Co., Greenfield, IN for the Trifluralin Data Development Consortium.

5. Reviewed by: Kathryn Valente
Biologist
EEB/EFED

Signature: Kathryn F. Valente
Date: 6/13/91

6. Approved by: Norman Cook
Head, Section II
EEB/EFED

Signature: Norman Cook
Date: 6.13.91

7. Conclusions: The study is scientifically sound. With an 96-hour estimated LC_{50} of 638.5 ug/L, Trifluralin is considered to be highly toxic to estuarine and marine invertebrates. The NOEL is $\leq$138.0 ug/L.

8. Recommendations: N/A

9. Background information: This study was submitted under the requirements of the registration standard for Trifluralin.

10. Discussion of Individual Tests: N/A

11. Materials and Methods:
a. Test animals: Juvenile grass shrimp were obtained from Cultured Aquatics, Northport, NY. They were held for 13 days prior to testing and fed frozen brine shrimp daily until testing began. the control group had a mean weight of 0.033 +/- 0.009 g and a mean length of 16.2 +/- 2.3 mm, and is believed to be representative of all groups of organisms. The photoperiod was 16 hours light and 8 hours dark. The biomass loading rate was 0.12g/L.

b. Test system: A glass and stainless steel diluter was used to deliver the test solution to the test chambers. The diluter delivered 1.9 mL stock Trifluralin solution to the chambers during every 100 minute diluter cycle. Acetone in a final concentration of 0.5 mL/L was used as a solvent. Physical characteristics of the water include: Temperature: 21.6 +/- 2 C. Dissolved Oxygen: 6.7 +/- 1.1 mg/L (62% saturation). pH: 8.0-8.3. Salinity: 16 o/oo. Un-ionized ammonia: <0.01 mg/L. DO, pH and temperature were measured at 0,24,48 and 96 hours of the study. Temperature was also monitored constantly. Salinity and ammonia concentration were measured at 0 and 96 hours. Analytical samples were taken at 0 and 96 hours.

c. Study design: A pilot study was conducted, from which it was determined that no mortality or behavioral effects would occur at < 0.125 mg/L. Twenty shrimp were exposed to each of the following nominal levels of Trifluralin: control, solvent control, 0.075, 0.150, 0.300, 0.600 and 1.200 mg/L. Observations for mortality and sublethal effects were made every 24 hours.

d. Statistics: The log-probit analysis method of Finney (1971) was used to determine the LC_{50} with 95% confidence limits and the slope of the regression line.

12. Reported Results: The average measured concentrations of T Trifluralin were 0.00, 0.00, 0.051, 0.099, 0.138, 0.330 and 0.786 mg/L, which ranged from 46-68% of the nominal levels. Four shrimp (20%) died at the 0.330 mg/L concentration and 12 (60%) died at 0.786 mg/L. The only behavioral/sublethal effect observed during the study was hypoactivity, seen at 0.330 and 0.786 mg/L.

13. Study Author's Conclusions/Quality Assurance Report: The 96-hour LC_{50} value was 0.638 mg/L. The NOEL was $\leq$ 0.138 mg/L.

Quality Assurance and good Laboratory Practice statements were included in the report.

14. Reviewer's Discussion and Interpretation of the Results:
a. Test Procedure: The test design and procedure were in accordance with protocols recommended by the Guidelines. However, a few minor deviations were noted:
1) The nominal test levels were established as 0.075, 0.150, 0.300, 0.600 and 1.200 mg/L. The Guidelines recommend that each concentration level be at least 60% of the next highest level, but in this case, the levels are all 50% of the next highest level. The mean measured concentrations (0.031, 0.099, 0.138, 0.330 and 0.786 mg/L) meet the Guidelines recommendation (except for 0.138 and 0.330 mg/L which are <60% of the next highest levels).

2) The ideal pH range established in the guidelines is 7.7-8.0 for estuarine organisms. The pH range in this study was 8.0-8.3, which is slightly high.
3) There was no 30 minute transition period between light and dark in the photoperiod, as recommended in the Guidelines.

b. Statistical Analysis: Data was verified using EPA's Toxanal computer program. The binomial tests was used for analysis, and this test gave an approximate LC_{50} of 0.6385 mg/L with a 95% confidence interval of 0.4871-0.9741. The slope of the regression line was 3.48. These values are in agreement with the reported values.

c. Discussion/Results: The study is scientifically sound and in accordance with the Guidelines except for the minor deviations noted above. With an LC_{50} of 0.638 mg/L, Trifluralin is considered to be highly toxic to marine/estuarine invertebrates.

d. Adequacy of the study:
(1) Classification: Core for formulated product
(2) Rationale: N/A
(3) Repairability: N/A

15. Completion of one-liner: No

kay valente trifluralin marine invert acute

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
786	20	12	60.00001	25.17223
330	20	4	20	.5908966
138	20	0	0	9.536742E-05
99	20	0	0	9.536742E-05
51	20	0	0	9.536742E-05

THE BINOMIAL TEST SHOWS THAT 330 AND +INFINITY 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 638.5125

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
1	.5837126	638.5121	452.9174	1697.119

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
6	.2160114	1	.9068695

SLOPE = 3.484607

95 PERCENT CONFIDENCE LIMITS = 1.865066 AND 5.104149

LC50 = 638.0185

95 PERCENT CONFIDENCE LIMITS = 487.0607 AND 974.0813

LC10 = 275.6596

95 PERCENT CONFIDENCE LIMITS = 150.388 AND 370.8573

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