

File

DP Barcode : D200366
PC Code No : 083301
EEB Out : SEP 27 1994

To: Kathryn Davis
Product Manager 52
Special Review and Reregistration Division (7508W)

From: Anthony F. Maciorowski, Chief
Ecological Effects Branch/EFED (7507C)

Attached, please find the EEB review of...

Reg./File # : 083301
Chemical Name : Triazine
Type Product :
Product Name : Grotan
Company Name : Triazine Joint Venture
Purpose : review aquatic studies

Action Code : 627 Date Due : 9/30/94
Reviewer : Dana Lateulere

EEB Guideline/MRID Summary Table: The review in this package contains an evaluation of the following:

GDLN NO	MRID NO	CAT	GDLN NO	MRID NO	CAT	GDLN NO	MRID NO	CAT
71-1(A)			72-2(A)			72-7(A)		
71-1(B)			72-2(B)			72-7(B)		
71-2(A)			72-3(A)	431431-02	Y	122-1(A)		
71-2(B)			72-3(B)			122-1(B)		
71-3			72-3(C)	431431-03	N	122-2		
71-4(A)			72-3(D)			123-1(A)		
71-4(B)			72-3(E)			123-1(B)		
71-5(A)			72-3(F)			123-2		
71-5(B)			72-4(A)			124-1		
72-1(A)			72-4(B)			124-2		
72-1(B)			72-5			141-1		
72-1(C)	431431-01	Y	72-6			141-2		
72-1(D)						141-5		

Y=Acceptable (Study satisfied Guideline)/Concur

P=Partial (Study partially fulfilled Guideline but additional information is needed)

S=Supplemental (Study provided useful information but Guideline was not satisfied)

N=Unacceptable (Study was rejected)/Nonconcur



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

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

Subject: Aquatic Studies submitted for Triazine, DP# D200366.

To: Kathryn Davis
PM 52
Special Review and Reregistration Division, 7508W

From: *for* Anthony F. Maciorowski, Chief *Douglas J. DeWane*
Ecological Effects Branch
Environmental Fate and Effects Division, H7507C *9/27/94*

EEB has completed the review of three aquatic studies submitted by the Triazine Joint Venture for reregistration requirements for Triazine. The following is a summary of those reviews:

1) Davis, J. W. and N. J. Kernaghan, 1994. "Acute Toxicity to Rainbow Trout, Oncorhynchus mykiss, Under Flow-through Test Conditions". Toxikon Environmental Sciences, 106 Coastal Way, Jupiter FL 33477. Submitted by the Triazine Joint Venture, c/o Buckman Laboratories International Inc. 1256 North McLean Boulevard, Memphis, TN 38108-0305. US EPA MRID No. 431431-01.

This study is scientifically sound and fulfills the Triazine guideline requirement for toxicity testing with a coldwater fish, 72-1(a). The LC50 was determined to be greater than 119 mg ai/L, the highest concentration tested - based on a lack of mortality. The NOEC is 119 ppm based on a lack of sublethal effects at all test levels. Triazine is classified as practically non-toxic to Rainbow trout.

2) Ward G.S. 1994. "Acute Toxicity to the Sheepshead Minnow, Cypridodon variegatus, Under Flow-through Test Conditions". Toxikon Environmental Sciences, 106 Coastal Way, Jupiter FL 33477. Submitted by the Triazine Joint Venture, c/o Buckman Laboratories International Inc. 1256 North McLean Boulevard, Memphis, TN 38108-0305. US EPA MRID No. 431431-02.

This study is scientifically sound and fulfills the Triazine guideline requirement for toxicity testing with an estuarine fish, 72-3(a). The LC50 was determined to be greater than 118 mg ai/L, the highest concentration tested - based on a lack of mortality. The NOEC is 118 ppm based on a lack of sublethal effects at all



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test levels. Triazine is classified as practically non-toxic to Sheepshead minnow.

3) Davis, J.W. 1994. "Acute Toxicity to the Mysid, (Mysidopsis bahia) Under Flow-Through Test Conditions". Toxikon Environmental Sciences, 106 Coastal Way, Jupiter Florida 33477. Laboratory Report No. J9306004f. Submitted by the Triazine Joint Venture, c/o Buckman Laboratories International Inc. 1256 North McLean Boulevard, Memphis, TN 38108-0305. US EPA MRID No. 431431-03.

This study is not scientifically sound and does not fulfill the guideline requirements for a toxicity test with mysids. There was fungal growth contamination and low dissolved oxygen levels in the three highest test levels.

Questions regarding this review - contact Dana Lateulere of my staff at 308-2856.

DATA EVALUATION RECORD

1. **CHEMICAL:** TRIAZINE
Shaughnessy No. 083301
2. **TEST MATERIAL:** Triazine, 83.8%.
3. **STUDY TYPE:** Acute Toxicity Test for Freshwater Fish, Rainbow Trout (Oncorhynchus mykiss).
4. **CITATION:** Davis, J. W. and N. J. Kernaghan, 1994. "Acute Toxicity to Rainbow Trout, Oncorhynchus mykiss, Under Flow-through Test Conditions". Toxikon Environmental Sciences, 106 Coastal Way, Jupiter FL 33477. Submitted by the Triazine Joint Venture, c/o Buckman Laboratories International Inc. 1256 North McLean Boulevard, Memphis, TN 38108-0305. US EPA MRID No. 431431-01.
5. **REVIEWED BY:**
Dana Lateulere, Biologist
Ecological Effects Branch
Environmental Fate and
Effects Division
Signature: *Dana Lateulere*
Date: *4/12/94*
6. **APPROVED BY:**
Ann Stavola, Section Head, 5
Ecological Effects Branch
Environmental Fate and
Effects Division
Signature: *Ann Stavola*
Date: *5/27/94*
7. **CONCLUSIONS:** This study is scientifically sound and fulfills the Triazine guideline requirement for toxicity testing with a coldwater fish, 72-1(a). The LC50 was determined to be greater than 119 mg ai/L, the highest concentration tested - based on a lack of mortality. The NOEC is 119 ppm based on a lack of sublethal effects at all test levels. Triazine is classified as practically non-toxic to Rainbow trout.
11. **MATERIALS AND METHODS:**
 - A. **Test Animals:** The rainbow trout used in this study were obtained from Mt. Lassen Trout Farms in Red Bluff, CA. Fish were fed salmon starter and commercial flake foods daily throughout the holding period. During the 48 hours immediately prior to initiation of the 96 hour exposure, mortality was 0 and fish were not fed.

Rainbow trout ranged from 40 to 55 millimeters standard length and from 0.81 to 2.21 grams wet weight as measured from the control at test termination.

- B. **Test System:** The flow-through test was conducted in 23 L tanks which maintained a constant water volume of approximately 15.3 L and a water height of 13 cm. The diluter (proportional vacuum-siphon) cycled at an average of 5.0 cycles per hour. Organism loading was calculated to be 0.14 g/L/day with a maximum loading at any point in time of 1.6 g/L.

Dilution water was town water which was vigorously aerated to remove chlorine, then passed through activated carbon beds before being pumped into the laboratory. The water was re-aerated prior to use. The dilution water was a moderately hard freshwater with a mean hardness of 52 milligrams per liter as calcium carbonate, mean alkalinity of 16 mg/L as calcium carbonate and a mean specific conductivity of 428 micromhos per centimeter.

- C. **Dosage:** A range finding test was conducted to determine the concentration range for the definitive test. The nominal concentrations were: 15.6, 25.9, 43.2, 72.0 and 120 mg ai/L. No solvent was utilized to solubilized the test material as Triazine is completely miscible in water.

- D. **Design:** 20 Rainbow trout were randomly distributed in the treatment and control chambers of the flow-through test system. Survival of the trout was monitored daily and any dead removed. Any abnormalities in the behavior or physical appearance of rainbow trout were also noted. Test solutions were gently aerated during the test.

Test water quality was monitored daily during the test. Water temperature was measured in the dilution water control container hourly during the test. Specific conductivity, total alkalinity, and total hardness of the dilution water were measured at test initiation and termination in the control container. Dissolved oxygen concentrations and pH were measured daily in all test solutions with surviving rainbow trout.

Water samples were collected from the controls and all five test solutions at test initiation, day 2, and termination to verify actual test concentrations. *Measured concentrations were 13.8, 26.6, 44.5, 73.4, 119 mg/L. 2/9/2*

E. Statistics: Based on the results, the 24, 49 and 96 hour LC50 values could not be determined.

12. REPORTED RESULTS: Mortality of rainbow trout exposed for 96 hours to Triazine was 0 percent at all concentrations tested. No mortality occurred in the dilution water control. The 96 hour LC50 was greater than 119 mg ai/L. The NOEC was 119 mg ai/L based on a lack of mortality and sublethal effects at this test concentration and all lower test concentrations.

13. STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES: No conclusions were stated by the author, except that one deviation from protocol - test temperature ranged 0.8°C higher than recommended - did not affect the outcome of the test. The reason for this deviation was given as heat generated from the afternoon sun coming thru the windows of the lab.

A statement of GLP compliance and Quality Assurance was included with the report.

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

A. Test Procedure: The test procedures were in accordance with Subdivision E, and SEP guidelines except for the following deviations:

- Temperature should be 12°C for cold-water fish, the temperature range was 11.1 - 13.8°C.

- Chlorinated water should not be used because dechlorination is seldom complete and residual chlorine may be toxic to aquatic organisms.

B. Statistical Analysis: Data was not conducive to statistical analysis based on a lack of mortality.

C. Discussion/Results: This study fulfills the guideline requirement for toxicity testing with a coldwater fish. There was no mortality in any of the test concentrations; therefore, the LC50 is determined to be >119 mg ai/L, the highest concentration tested. Triazine is classified as practically non-toxic to Rainbow trout.

D. Adequacy of the Study:

- (1) Classification: Core.
- (2) Rationale:

MRID No. 431431-01

(3) Repairability:

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DATA EVALUATION RECORD

1. **CHEMICAL:** Grotan
Shaughnessy No. 083301
2. **TEST MATERIAL:** Triazine, 83.8%.
3. **STUDY TYPE:** Acute Toxicity Test for Estuarine and Marine Organisms, Mysids (Mysidopsis bahia).
4. **CITATION:** Davis, J.W. 1994. "Acute Toxicity to the Mysid, (Mysidopsis bahia) Under Flow-Through Test Conditions". Toxikon Environmental Sciences, 106 Coastal Way, Jupiter Florida 33477. Laboratory Report No. J9306004f. Submitted by the Triazine Joint Venture, c/o Buckman Laboratories International Inc. 1256 North McLean Boulevard, Memphis, TN 38108-0305. US EPA MRID No. 431431-03.
5. **REVIEWED BY:**
Dana Lateulere, Biologist
Ecological Effects Branch
Environmental Fate and
Effects Division
Signature: *Dana Lateulere*
Date: *4/12/94*
6. **APPROVED BY:**
Ann Stavola, Section Head, 5
Ecological Effects Branch
Environmental Fate and
Effects Division
Signature: *Ann Stavola*
Date: *9/26/94*
7. **CONCLUSIONS:** This study is not scientifically sound and does not fulfill the guideline requirements for a toxicity test with mysids. There was fungal growth contamination and low dissolved oxygen levels in the three highest test levels.
8. **RECOMMENDATIONS:** Repeat study.
9. **BACKGROUND:** This study was submitted as part of reregistration requirements.
10. **DISCUSSION OF INDIVIDUAL TESTS:** N/A.
11. **MATERIALS AND METHODS:**
 - A. **Test Animals:** Post-larval mysids were obtained from mysid cultures maintained at Toxikon Environmental Sciences, Jupiter, FL. Upon collection, post-larval mysids were fed live brine shrimp nauplii hatched daily from cysts obtained from Glen Burnie MD. No diseases

INVALID
NOT REPAIRABLE
Not entered into database

were observed and no disease treatments were administered to either the adult culture population or the post-larvae.

- B. **Test System:** The dilution water was natural filtered saltwater adjusted to a salinity of approximately 20 ppt, it was vigorously aerated prior to use. The definitive exposure was conducted under flow-through conditions in a modified proportional vacuum-siphon diluter system. A dilution water control was maintained concurrently with the five test concentrations.

A test solution volume of approximately 1400 mL was delivered to each test chamber during every cycle. The diluter cycled at an average rate of 4.6 cycles per hour providing approximately 10.1 volume additions every 24 hours.

Mysids were impartially added by twos, to all chambers located within the tanks until total of 10 mysids were distributed to each chamber, 20 mysids per test tank or treatment.

- C. **Dosage:** Nominal test concentrations were: 7.78, 13.0, 21.6, 36.0, and 60 .0 mg ai/L.
- D. **Design:** Test water quality was monitored each day during the test. Water temperature in the dilution water control was continuously monitored. Salinity of the dilution water was measured daily. Dissolved oxygen concentrations and pH were measured daily in all test solutions with surviving mysids.

Survival of mysids was monitored daily and any dead removed. Any abnormalities in the behavior or physical appearance of the mysids were also noted. Mysids were fed live brine shrimp daily to reduce cannibalism. test solutions were not aerated during the test. Test solutions remained clear throughout the test. *Mean measured conc. were 7.43, 10.9, 16.8, 32.1 and 54.7 mg/l. 2/9/76*

- E. **Statistics:** The LC50 values were estimated by a computer program using the following statistical methods: moving average angle, probit, logit, and non-linear interpolation. Confidence limits for LC50 values determined by non-linear interpolation were calculated by binomial probability.

12. **REPORTED RESULTS:** Mortality of mysids exposed for 96 hours to Triazine ranged from 0 percent at 7.43 mg ai/L to 100 percent at test concentrations greater than 16.8 mg ai/L.

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The 96 hour mean measured LC50 was determined to be 12.0 mg ai/L with 95 percent confidence limits of 7.43 and 16.8. The no-observable-effect concentration was 7.43 mg/L based on lack of mortality and absence of sublethal effects at that concentration.

13. **STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES:**

Quality Assurance Inspection was conducted for compliance verification by the Quality Assurance Unit. It was also stated that this study was conducted in compliance with the Good Laboratory Practice Standards, 40 CFR Part 160.

14. **REVIEWER'S DISCUSSION AND INTERPRETATION OF STUDY RESULTS:**

A. **Test Procedure:** The test procedures were in accordance with Subdivision E, and SEP guidelines except for the following deviations:

- Dissolved oxygen concentrations fell below acceptable levels in the four highest test levels, the author attributes this to a fungal growth in the chambers.

B. **Statistical Analysis:** Statistics were not performed because the results of the test are viewed to be unreliable due to fungal contamination.

C. **Discussion/Results:** Based on the growth of fungus in the highest test levels, which the author attributes the occurrence of low dissolved oxygen levels, the study is classified as invalid. The low dissolved oxygen rates and the fungal growth coincide with those test levels having significant mortality. The biological response is not dose related - at the second test level there was a total of 6 dead mysids, the third level had 100% mortality. This data is not reliable to determine the toxic effects of triazine to mysids.

D. **Adequacy of the Study:**

(1) **Classification:** Invalid

(2) **Rationale:** Fungal contamination in the three highest test levels.

(3) **Repairability:** No.

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DATA EVALUATION RECORD

- 1. **CHEMICAL:** TRIAZINE
Shaughnessy No. 083301
- 2. **TEST MATERIAL:** Triazine, 83.8%.
- 3. **STUDY TYPE:** Acute Toxicity Test for Estuarine/Marine Fish, Sheepshead Minnow (Cypridodon variegatus).
- 4. **CITATION:** Ward G.S. 1994. "Acute Toxicity to the Sheepshead Minnow, Cypridodon variegatus, Under Flow-through Test Conditions". Toxikon Environmental Sciences, 106 Coastal Way, Jupiter FL 33477. Submitted by the Triazine Joint Venture, c/o Buckman Laboratories International Inc. 1256 North McLean Boulevard, Memphis, TN 38108-0305. US EPA MRID No. 431431-02.

5. **REVIEWED BY:**
Dana Lateulere, Biologist
Ecological Effects Branch
Environmental Fate and
Effects Division

Signature: *Dana Lateulere*
Date: *4/12/94*

6. **APPROVED BY:**
Ann Stavola, Section Head, 5
Ecological Effects Branch
Environmental Fate and
Effects Division

Signature: *Ann Stavola*
Date: *9/26/94*

7. **CONCLUSIONS:** This study is scientifically sound and fulfills the Triazine guideline requirement for toxicity testing with an estuarine fish, 72-3(a). The LC50 was determined to be greater than 118 mg ai/L, the highest concentration tested - based on a lack of mortality. The NOEC is 118 ppm based on a lack of sublethal effects at all test levels. Triazine is classified as practically non-toxic to Sheepshead minnow.

11. **MATERIALS AND METHODS:**

A. **Test Animals:** Juvenile (8 weeks old) sheepshead minnows, were obtained from cultures maintained at Toxikon Sciences. Sheepshead minnows were initially raised on a diet of live brine shrimp nauplii and later transferred to a diet of flake food and frozen brine shrimp. During the 48 hours prior to testing the minnows were not fed.

The minnows ranged from 18 to 24 millimeters in length and from 0.14 to 0.61 grams wet weight as determined from the control fish at test termination.

- B. **Test System:** The flow-through test was conducted in 23 L tanks which maintained a constant water volume of approximately 15.3 L and a water height of 13 cm. The diluter (proportional vacuum-siphon) cycled at an average of 5.7 cycles per hour. Organism loading was calculated to be 0.03 g/L/day with a maximum loading at any point in time of 0.37 g/L.

The dilution water was natural saltwater pumped from a shallow well. The saltwater was then filtered, carbon treated, and adjusted to a salinity of approximately 20 ppt with carbon-treated aerated laboratory freshwater. This dilution water was re-aerated prior to use.

- C. **Dosage:** A range finding test was conducted to determine the concentration range for the definitive test. The nominal concentrations were: 15.6, 25.9, 43.2, 72.0 and 120 mg ai/L. No solvent was utilized to solubilized the test material as Triazine is completely miscible in water.

- D. **Design:** 20 fish were randomly distributed in the treatment and control chambers of the flow-through test system. Survival of the fish was monitored daily and any dead removed. Any abnormalities in the behavior or physical appearance of the minnows was also noted. Test solutions were gently aerated during the test.

Test water quality was monitored daily during the test. Water temperature was measured in the dilution water control container hourly during the test. Salinity was measured once daily. Dissolved oxygen concentrations and pH were measured daily in all test solutions with surviving fish.

Water samples were collected from the controls and all five test solutions at test initiation, day 2, and termination to verify actual test concentrations. *Mean measured conc. were 11.8, 23.8, 38.9, 70.9 and 118 mg/L at 96h*

- E. **Statistics:** Based on the results, the 24, 49 and 96 hour LC50 values could not be determined.

12. **REPORTED RESULTS:** Mortality of Sheepshead minnows exposed for 96 hours to Triazine was 0 percent at all concentrations tested. No mortality occurred in the dilution water control. The 96 hour LC50 was greater than 118 mg ai/L.

The NOEC was 118 mg ai/L based on a lack of mortality and sublethal effects at this test concentration and all lower test concentrations.

13. **STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES:**

No conclusions were stated by the author, except that one deviation from protocol - test temperature ranged 0.8°C higher than recommended - did not affect the outcome of the test.

A statement of GLP compliance and Quality Assurance was included with the report.

14. **REVIEWER'S DISCUSSION AND INTERPRETATION OF STUDY RESULTS:**

A. **Test Procedure:** The test procedures were in accordance with Subdivision E, and SEP guidelines except for the following deviations:

- Temperature should be 22°C for estuarine fish, the temperature range was 22.9 - 23.8°C.

B. **Statistical Analysis:** Data was not conducive to statistical analysis based on a lack of mortality.

C. **Discussion/Results:** This study fulfills the guideline requirement for toxicity testing with an estuarine fish. There was no mortality in any of the test concentrations; therefore, the LC50 is determined to be >118 mg ai/L, the highest concentration tested. Triazine is classified as practically non-toxic to Sheepshead minnows.

D. **Adequacy of the Study:**

- (1) **Classification:** Core.
- (2) **Rationale:**
- (3) **Repairability:**

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