

US EPA ARCHIVE DOCUMENT

DATA EVALUATION RECORD

- 1. **CHEMICAL:** RH-7592 Technical.
Shaughnessey Number: Not available. 129011
- 2. **TEST MATERIAL:** RH-7592 Technical; Lot No. BPP-3-1786R;
96.7% active ingredient; a white solid.
- 3. **STUDY TYPE:** Freshwater Fish Flow-through Acute Toxicity
Test. Species Tested: Rainbow trout (Salmo gairdneri).
- 4. **CITATION:** Swigert, J.P. 1988. Acute Flow-through Toxicity
of RH-7592 Technical to Rainbow trout (Salmo gairdneri).
Prepared by Analytical Bio-Chemistry Laboratories, Inc.,
Columbia, Missouri. Report No. 88RC-0025. Submitted by
Rohm and Haas Company, Spring House, PA. Accession No.
410312-35.

5. **REVIEWED BY:**

Kimberly Rhodes
Associate Scientist
KBN Engineering and
Applied Sciences, Inc.

Signature: *Kimberly Rhodes*
Date: *June 13, 1989*

6. **APPROVED BY:**

Prapimpan Kosalwat, Ph.D.
Staff Toxicologist
KBN Engineering and
Applied Sciences, Inc.

Signature: *P. Kosalwat*
Date: *June 14, 1989*

Henry T. Craven
Supervisor, EEB/HED
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Signature: *Henry T. Craven*
Date: *10/23/89*
Henry
10-24-89

7. **CONCLUSIONS:** This study appears scientifically sound and
fulfills the Guideline requirements for an acute 96-hour
flow-through toxicity test using a coldwater fish species.
The 96-hour LC50 of RH-7592 Technical to rainbow trout
(Salmo gairdneri) was 1.5 mg a.i./L based on mean measured
concentrations. Therefore, RH-7592 Technical is classified
as moderately toxic to rainbow trout. The NOEC was
determined to be 0.70 mg a.i./L after 96 hours.

8. **RECOMMENDATIONS:** N/A

9. BACKGROUND:

10. DISCUSSION OF INDIVIDUAL TESTS: N/A

11. MATERIALS AND METHODS:

A. Test Animals: Rainbow trout (*Salmo gairdneri*) were obtained from a commercial supplier in California. The fish were maintained at the testing facility in well water and were fed newly hatched brine shrimp or a commercially available fish food daily. Rainbow trout were removed from the culture and placed in the temperature acclimation unit 48 hours prior to test initiation. During this time, the fish were held without food. The rainbow trout used as the control group during this study had a mean weight of 0.83 (\pm 0.33) grams and a mean length of 39 (\pm 4.7) millimeters at test termination.

B. Test System: A proportional diluter system described by Mount and Brungs, utilizing a Hamilton Micro Lab 420 syringe dispenser, was used for the intermittent introduction of RH-7592 Technical test solutions and diluent water into each test chamber. The proportional diluter system used for the project was set to provide test levels approximately 50 percent dilutions of each other.

The diluter delivered 0.5 liter of test solution or control water to the test vessels at an average rate of 8.0 times per hour over the course of the study. This flow rate was sufficient to replace the 15-liter volume of each replicate within the test chambers 6.4 times per day. The test chambers were immersed in a temperature controlled water bath held at $12 \pm 1^\circ\text{C}$. The laboratory environment was maintained on a 16-hour daylight photoperiod.

Dilution water for the rainbow trout test was a blend of reverse osmosis water and ABC well water characterized as having a pH of 7.1 - 7.9, total hardness of 40 - 48 mg/L as CaCO_3 , total alkalinity of 44 - 56 mg/L CaCO_3 and specific conductance of 100 - 160 umhos/cm.

C. Dosage: 96-hour flow-through acute test.

- D. **Design:** Based on the results of a preliminary test, a control, solvent control, and five nominal RH-7592 concentrations of 0.25, 0.50, 1.0, 2.0, and 4.0 mg a.i./L were tested. Each test concentration and control was replicated twice with ten fish per test vessel. The test was initiated when fish were impartially distributed to each test vessel after the flow-through system had been running for 20 hours. The concentration of acetone in the solvent control (0.1 mL/L) was equivalent to that received by the highest test concentration.

All concentrations were observed once every 24 hours for mortality and abnormal effects. The water quality parameters (temperature, dissolved oxygen and pH) were measured in each concentration and control at 0, 48, and 96 hours of testing. Analytical samples were collected from each test level and the diluter stock at 0 and 96 hours of the exposure.

- E. **Statistics:** The concentration of toxicant lethal to 50% of the population (LC50's) and 95% confidence intervals was determined at 24-, 48-, 72-, and 96-hour exposure periods by the computer program developed by Stephan et al. (1978).

12. **REPORTED RESULTS:** Mortality and behavioral observations during the acute flow-through toxicity test of RH-7592 to rainbow trout are shown in Table 5 (attached). The mean measured concentrations of RH-7592 Technical were 0.20, 0.32, 0.70, 1.4 and 2.7 mg a.i./L. The mean measured concentrations ranged from 64% to 80% of the nominal concentrations. A white precipitate was noted in the diluter mixing cell and in the highest test concentration suggesting that not all of the RH-7592 Technical was going into solution.

Water chemistry parameters measured at 0, 48, and 96 hours were within the specified limits for conducting aquatic toxicity tests. Daily temperature measurements remained at 13°C, however, continuous temperature recording indicated that temperature ranged from 11.5 to 14°C. Dissolved oxygen ranged from 8.9 to 9.8 mg/L (representing 88 and 97% saturation at 13°C), and pH ranged from 6.9 to 7.8.

13. **STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES:** The 24-, 48-, 72-, and 96-hour LC50 values for RH-7592 Technical were 1.9, 1.5, 1.5 and 1.5 mg a.i./L, respectively, based upon mean measured concentrations. The

slope of the 96-hour dose-response line was 9.2. Behavioral/sublethal effects (e.g., on bottom orientation, loss of equilibrium, and quiescence) were noted among the fish in the 2.7 and 1.4 mg a.i./L test concentrations. Given these behavioral/sublethal effects, a no-observed effect concentration (NOEC) of RH-7592 Technical to rainbow trout was determined to be 0.70 mg a.i./L. This conclusion is supported by the lack of mortality or behavior/sublethal effects at and below the test concentrations of 0.70 mg a.i./L.

Quality Assurance and Good Laboratory Practice Regulation Statements were included in the report, indicating that the study was conducted in accordance with the FIFRA Good Laboratory Practice Standards set forth in 40 CFR Part 160.

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

A. **Test Procedure:** The test procedures were generally in accordance with protocols recommended by the Guidelines, but deviated from the SEP as follows:

o The SEP states that "test vessels should be described as to construction material and size, as well as depth and volume of solution." The test vessels were not described in this report.

o The ASTM (1980 and 1988) standard protocols state that "the concentration of toxicant in the test chambers should be measured as often as practical during the test. At a minimum, the concentration of toxicant must be measured in (a) each chamber concurrently at least once during the test, preferably near the beginning of the test; (b) except for the control treatment, each test chamber (especially for those toxicant concentrations closest to the LC₅₀ or EC₅₀) at least one additional time during the test, on a schedule designed to give reasonable confidence in the concentration of toxicant in the test chambers, . . . and (c) at least one appropriate chamber whenever a malfunction is detected in any part of the metering system. In this study the concentrations of toxicants were measured only in the "A" replicates (control A, 1A, 2A, etc.) at the beginning of the test and

only in the "B" replicates (control B, 1B, 2B, etc.) at the end of the test. At no time were the concentrations in all chambers measured concurrently.

o The SEP states that each designated treatment group should be exposed to a concentration of toxicant that is at least 60% of the next highest concentration. Each designated treatment group for this test was only 50% of the next highest concentration.

o The SEP states that the recommended temperature for testing coldwater fish species is $12 \pm 1^{\circ}\text{C}$. During this toxicity test, continuous temperature recording indicated that the temperature ranged from 11.5 to 14°C .

The toxicity report did not provide the following information required by the SEP:

o Percent of mortality 48 hours prior to test initiation.

o The SEP recommends a 16-hour light and an 8-hour dark photoperiod with a 15- to 30-minute transition period between light and dark. The report did not state whether a 15- to 30-minute transition period between light and dark was maintained.

B. Statistical Analysis: The reviewer used EPA's Toxanal computer program to calculate the LC50 values. These calculations are attached. The binomial test provides a 96-hour LC50 value of 1.5 mg a.i./L with a 95 percent confidence interval of 0.70 to 2.7 mg a.i./L which is the same as that reported by the author. However, this analysis is based on a cumulative mortality at the 2.0mg/L nominal concentration level of 9 fish when according to the raw data provided there was a cumulative mortality of 10 fish at this level. When a cumulative mortality of 10 fish is considered in the analysis the calculated 96-hour LC₅₀ value becomes 1.4 mg a.i./L with a 95 percent confidence interval of 0.7 to 2.7 mg a.i./L. At this point it is unclear what the true cumulative mortality actually was.

C. Discussion/Results: Although the study appears to be scientifically valid, the 96-hour LC50 value is based upon 1) a cumulative mortality of 9 fish at the 2.0mg

a.i./L nominal concentration and 2) the mean of measured RH-7592 Technical concentrations. Due to the fact that the actual mortality data is unclear at this time and that using the mean of the measured concentration is improper (since measurements were not made in accordance with established standards), the LC₅₀ value thus calculated is invalid. The reviewer used EPA's Toxanal computer program to calculate the LC₅₀ values using 1) the mean concentration values as used in the report, 2) the measured concentration values of the "A" replicates only, and 3) the measured concentration values of "B" replicates only. The 96-hour LC₅₀ value, based on the mean measured RH-7592 Technical concentrations, was estimated to be 1.5 mg a.i./L with a 95 percent confidence interval of 0.7. to 2.7 mg a.i./L which is the same as that reported by the author. The 96-hour LC₅₀ value, based on the actual measured RH-7592 Technical concentrations of the "A" replicates, was estimated to be 1.5 mg a.i./L with a 95 percent confidence interval of 0.65 to 2.6 mg a.i./L. The 96-hour LC₅₀ value, based on the actual measured RH-7592 Technical concentrations of the "B" replicates, assuming a cumulative mortality of 6 fish, was estimated to be 1.4 mg a.i./L with a 95 percent confidence interval of 0.74 to 2.8 mg a.i./L. In light of the similarity of the calculated LC₅₀ values, the study author's value, LC₅₀ of 1.5 mg a.i./L, will be accepted. Therefore, RH-7592 Technical is classified as moderately toxic to rainbow trout (Salmo gairdneri). The no-observed effect concentration (NOEC) was determined to be 0.7. mg a.i./L mean measured concentration.

D. Adequacy of the Study:

- (1) **Classification:** Core.
- (2) **Rationale:** Although the test procedures deviated from the guidelines, the reviewer does not believe they significantly affected the toxicity results.
- (3) **Repairability:** N/A.

15. **COMPLETION OF ONE-LINER FOR STUDY:** Yes, 06-06-89.

Shanghai No. <u>Not available</u>	Chemical Name <u>RH-7592</u>	Chemical Class <u>Technical</u>	Page <u> </u> of <u> </u>	Reviewer/Date	Valid Str.
Study/Species/Lab/ Accession	Chemical # a.l.	Results			
14-Day Single Dose Oral LD50		LD50 = . mg/kg (<u>95% C.L.</u>)	Contr. Mort. (X) =		
Species		Slope = # Animals/Level =	Age (Days) =		
Lab		14-Day Dose Level mg/kg/(% Mortality)			
Acc.		Comments:			
14-Day Single Dose Oral LD50		LD50 = mg/kg. (<u>95% C.L.</u>)	Contr. Mort. (X) =		
Species		Slope = # Animals/Level =	Age (Days) =		
Lab		14-Day Dose Level mg/kg/(% Mortality)			
Acc.		Comments:			
8-Day Dietary LC50		LC50 = ppm (<u>95% C.L.</u>)	Contr. Mort. (X) =		
Species		Slope = # Animals/Level =	Age (Days) =		
Lab		8-Day Dose Level ppm/(% Mortality)			
Acc.		Comments:			
8-Day Dietary LC50		LC50 = ppm (<u>95% C.L.</u>)	Contr. Mort. (X) =		
Species		Slope = # Animals/Level =	Age (Days) =		
Lab		8-Day Dose Level ppm/(% Mortality)			
Acc.		Comments:			
48-Hour LC50		LC50 = pp (<u>95% C.L.</u>)	Contr. Mort. (X) =		
Species		Slope = # Animals/Level =	Sol. Contr. Mort. (X) =		
Lab		48-Hour Dose Level pp/(% Mortality)		Temperature =	
Acc.		Comments:			
96-Hour LC50		LC50 = 1.5 ppm (<u>95% C.L.</u>)	Binomial method.		
Species <u>Salmo gairdneri</u>		Slope = N/A	Con. Mort. (X) = 0		
Lab <u>Analytical Bio-Chemistry</u>		# Animals/Level = 20	Sol. Con. Mort. (X) = 0		
Acc. <u>410312-35</u>		96-Hour Dose Level ppm/(% Mortality)		Temp. = 11.5-14°C	<u>W.R. 6/6/89 Cor</u>
		0.20 0 0.32 0 0.70 0 1.4 45 2.7 100			
		Comments: Based on mean measured concentrations.			
96-Hour LC50		LC50 = pp (<u>95% C.L.</u>)	Con. Mort. (X) =		
Species		Slope = # Animals/Level =	Sol. Con. Mort. (X) =		
Lab		96-Hour Dose Level pp/(% Mortality)		Temp. =	
Acc.		Comments:			

RIN 3477-95

EEB FENBUCONAZOLE REVIEW

Page 8 is not included in this copy.

Pages _____ through _____ are not included.

The material not included contains the following type of information:

- Identity of product inert ingredients.
- Identity of product impurities.
- Description of the product manufacturing process.
- Description of quality control procedures.
- Identity of the source of product ingredients.
- Sales or other commercial/financial information.
- A draft product label: _____
- The product confidential statement of formula.
- Information about a pending registration action.
- FIFRA registration data.
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- The document is not responsive to the request.

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.

KIMBERLY RHODES RH7592 SALMO GAIRDNERI 06-06-89

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
2.7	20	20	100	9.536742E-05
1.4	20	9	45	41.19014
.7	20	0	0	9.536742E-05
.32	20	0	0	9.536742E-05
.2	20	0	0	9.536742E-05

THE BINOMIAL TEST SHOWS THAT .7 AND 2.7 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 1.462045

WHEN THERE ARE LESS THAN TWO CONCENTRATIONS AT WHICH THE PERCENT DEAD IS BETWEEN 0 AND 100, NEITHER THE MOVING AVERAGE NOR THE PROBIT METHOD CAN GIVE ANY STATISTICALLY SOUND RESULTS.

LC50 BASED ON "B" REPLICATE DATA ONLY - ASSUMING 6 DEAD FISH

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
2.8	10	10	100	9.765625E-02
1.5	10	6	60.00001	37.69531
.74	10	0	0	9.765625E-02
.34	10	0	0	9.765625E-02
.21	10	0	0	9.765625E-02

THE BINOMIAL TEST SHOWS THAT .74 AND 2.8 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 1.371451

WHEN THERE ARE LESS THAN TWO CONCENTRATIONS AT WHICH THE PERCENT DEAD IS BETWEEN 0 AND 100, NEITHER THE MOVING AVERAGE NOR THE PROBIT METHOD CAN GIVE ANY STATISTICALLY SOUND RESULTS.

LC50 BASED ON "A" REPLICATIVE DATA ONLY

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
2.6	10	10	100	9.765625E-02
1.4	10	4	40	37.69531
.65	10	0	0	9.765625E-02
.3	10	0	0	9.765625E-02
.2	10	0	0	9.765625E-02

THE BINOMIAL TEST SHOWS THAT .65 AND 2.6 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 1.514323

WHEN THERE ARE LESS THAN TWO CONCENTRATIONS AT WHICH THE PERCENT DEAD IS BETWEEN 0 AND 100, NEITHER THE MOVING AVERAGE NOR THE PROBIT METHOD CAN GIVE ANY STATISTICALLY SOUND RESULTS.
