

DATA EVALUATION RECORD

1. CHEMICAL: Sulfosate
2. TEST MATERIAL: SC-0224 4LC-E; 39.9% a.i.  
Lot No. WFK-0501; ~~Sample purity not specified~~
3. STUDY TYPE: Static Acute Toxicity Test. Species Tested:  
bluegill sunfish, (Lepomis macrochirus)
4. CITATION: Bowman, J.H. (1987) Acute Toxicity of SC-0224  
4LC-E to Bluegill Sunfish (Lepomis macrochirus), ABC Study  
No. 35637. Prepared by Analytical Bio-Chemistry  
Laboratories, Inc., Columbia, Missouri; submitted by Stauffer  
Chemical Co., Richmond, Calif.; Accession No. 408938-06.
5. REVIEWED BY:  
  
Kimberly D. Rhodes  
Aquatic Toxicologist  
Hunter/ESE  
  
Signature: *Kimberly D. Rhodes*  
Date: 01/09/89
6. APPROVED BY:  
  
Prapimpan Kosalwat, Ph.D.  
Staff Toxicologist  
KBN Engineering and  
Applied Sciences, Inc.  
  
Signature: *P. Kosalwat*  
Date: *January 11, 1989*  
  
Henry T. Craven  
Supervisor, EEB/HED  
USEPA  
  
Signature: *Henry T. Craven*  
Date: *1/30/89*
7. CONCLUSIONS: This study appears scientifically sound, ~~but~~ and  
*would* ~~does not~~ fulfill the Guideline requirements for a 96-hour  
static acute study for a warmwater fish species <sup>with this formulation.</sup> The 96-hour  
LC50 based upon nominal concentrations of SC-0224 4LC-E to  
bluegill sunfish (Lepomis macrochirus) was 297 mg/L, which  
classifies it as practically non-toxic to ~~rainbow trout~~. The  
NOEC was determined to be 100 mg/L after 96 hours. *bluegill  
sunfish.*
8. RECOMMENDATIONS: N/A

9. BACKGROUND:

10. DISCUSSION OF INDIVIDUAL TESTS: N/A

11. MATERIALS AND METHODS:

A. Test Animals: Bluegill sunfish (Lepomis macrochirus) were obtained from a commercial supplier in Missouri and were held for a minimum of 14 days in culture tanks on a 16-hour daylight photoperiod prior to testing. The bluegill sunfish used for this experiment had a mean weight of 0.36 ( $\pm 0.064$ ) grams and a mean standard length of 26 ( $\pm 1.3$ ) millimeters. The chamber loading biomass was 0.24 grams/liter for the definitive study. Fish received a standard commercial fish food occasionally supplemented with brine shrimp nauplii (Artemia sp.) daily until 48-96 hours prior to testing.

B. Test System: The test was conducted in five-gallon glass vessels containing 15 L of soft reconstituted water. The reconstituted water was composed of 48 mg  $\text{NaHCO}_3$ , 30 mg  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ , 30 mg  $\text{MgSO}_4$ , and 2 mg KCL per liter of deionized water. The temperature was maintained by a water bath at  $22 \pm 1^\circ\text{C}$ . Five concentrations and a control were used to determine the toxicity of SC-0224 4LC-E to bluegill sunfish.

The water parameters of the dilution water were a total hardness of 42 mg/L as  $\text{CaCO}_3$ , a total alkalinity of 30 mg/L as  $\text{CaCO}_3$  and a pH of 7.6. The 0-hour measured control water parameters of this dilution water were dissolved oxygen 9.4 mg/L and pH 7.8.

C. Dosage: 96-hour static acute test.

D. Design: A 96-hour range-finding and definitive test were conducted. The range-finding test concentrations were set at 1.0, 10, and 100 mg/L. Based on the results of preliminary testing, five concentrations of the test compound, ranging in a logarithmic series from 100 to 1000 were tested. Ten fish were added per chamber within 30 minutes following preparation of nominal concentrations. Treatments were not duplicated. A control and nominal SC-0224 4LC-E concentrations of 100, 180, 320, 560 and 1000 mg/L were maintained. All concentrations were observed once every 24 hours for mortality and abnormal effects.

E. Statistics: The computer program developed by Stephan et al. was used to calculate the LC50 values.

12. **REPORTED RESULTS:** "Nominal test concentrations, mortality rates, and water quality data are presented in Table 3 (attached)." The 24-, 48- and 96-hour LC50 values for nominal concentrations of SC-0224 4LC-E were 360, 360 and 300 mg/L, respectively. The no-effect concentration based on mortality and abnormal effects was 100 mg/L after 96 hours. The abnormal effects of mortality, surfacing, loss of equilibrium, fish on the bottom of test chamber and quiescence were observed in the 180, 360, 560, and 1000 mg/L test concentrations during the 96-hour exposure period. The dissolved oxygen concentrations ranged from 2.3 to 9.5 mg/L (26 to 106% saturation at 22 and 21°C, respectively) during the test. The oxygen depletion was likely due to the test compound, as the control solution remained within an acceptable range for testing.

13. **STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES:**  
The 96-hour LC50 value for SC-0224 4LC-E based upon nominal concentrations was estimated to be 300 mg/L with a 95 percent confidence interval of 180 to 560. The NOEC (No- Observed- Effect Concentration) was 100 mg/L after 96-hours.

The study was conducted following the intent of the Good Laboratory Practice Regulations and the final report was reviewed by Analytical Bio-Chemistry Laboratories' Quality Assurance Unit. A Quality Assurance Statement was included and signed by the Quality Assurance Officer.

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 test material was not clearly identified as to exact purity.
  - o Six hour temperature measurements were not recorded as required by the SEP for tests conducted in a water bath.
  - o Individual fish ( $0.36 \pm 0.064$  gram) used for the test were smaller than the recommended 0.5 - 5 gram range.
  - 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 the test was only 56% of the next highest concentration.

- o The SEP states that the dissolved oxygen level during the first 48 hours should be between 60% and 100% of saturation and between 40% and 100% saturation after 48 hours. The dissolved oxygen concentration was as low as 2.3 mg/L or 26% saturation in test concentration 320 mg/L at 96-hours.

B. Statistical Analysis: The reviewer used the Toxanal computer program to calculate the LC50 values. These calculations are attached. The binomial test provides a 96-hour LC50 value of 297 mg/L with a 95 percent confidence interval of 180 to 560 mg/L, which is similar to that reported by the author.

C. Discussion/Results: The study results appear to be scientifically valid, however, the lack of test substance purity does not permit final evaluation of the substance's toxicity to bluegill. The 96-hour LC50 value based upon nominal concentrations was estimated to be 300 mg/L. Therefore, SC-0224 4LC-E is classified as practically non-toxic to bluegill sunfish (Lepomis macrochirus).

D. Adequacy of the Study:

- (1) Classification: ~~SUPPLEMENTAL~~ Core, for this formulation
- (2) Rationale: Purity of the ~~test~~ substance not provided.
- (3) Repairability: Yes, submit purity of the test substance.

15. COMPLETION OF ONE-LINER FOR STUDY: Yes, 01-09-89.

- 39.9% a.i., according to proposed label  
 - Confidential Statement of Formula  
 also on file with Agency

No. \_\_\_\_\_ Chemical Name sulfosate Chemical Class practically non-toxic  
SC-0224 4LC-E

Study/Species/Lab/ Succession \_\_\_\_\_ Chemical 1 a.i \_\_\_\_\_ Results \_\_\_\_\_ Reviewer/ \_\_\_\_\_ Validation \_\_\_\_\_  
Date \_\_\_\_\_ Status \_\_\_\_\_

14-Day Single Dose Oral LD<sub>50</sub> \_\_\_\_\_ LD<sub>50</sub> = \_\_\_\_\_ mg/kg ( 95% C.L. ) \_\_\_\_\_ Cont. Mort.(%) = \_\_\_\_\_  
Species \_\_\_\_\_ Slope = \_\_\_\_\_ # Animals/Level = \_\_\_\_\_ Age(Days) = \_\_\_\_\_  
Sex = \_\_\_\_\_  
Lab \_\_\_\_\_ 14-Day Dose Level mg/kg/(% Mortality) \_\_\_\_\_  
Acc. \_\_\_\_\_ Comments: \_\_\_\_\_

14-Day Single Dose Oral LD<sub>50</sub> \_\_\_\_\_ LD<sub>50</sub> = \_\_\_\_\_ mg/kg ( 95% C.L. ) \_\_\_\_\_ Cont. Mort.(%) = \_\_\_\_\_  
Species \_\_\_\_\_ Slope = \_\_\_\_\_ # Animals/Level = \_\_\_\_\_ Age(Days) = \_\_\_\_\_  
Sex = \_\_\_\_\_  
Lab \_\_\_\_\_ 14-Day Dose Level mg/kg/(% Mortality) \_\_\_\_\_  
Acc. \_\_\_\_\_ Comments: \_\_\_\_\_

8-Day Dietary LC<sub>50</sub> \_\_\_\_\_ LC<sub>50</sub> = \_\_\_\_\_ ppm ( 95% C.L. ) \_\_\_\_\_ Cont. Mort.(%) = \_\_\_\_\_  
Species \_\_\_\_\_ Slope = \_\_\_\_\_ # Animals/Level = \_\_\_\_\_ Age(Days) = \_\_\_\_\_  
Sex = \_\_\_\_\_  
Lab \_\_\_\_\_ 8-Day Dose Level ppm/(% Mortality) \_\_\_\_\_  
Acc. \_\_\_\_\_ Comments: \_\_\_\_\_

8-Day Dietary LC<sub>50</sub> \_\_\_\_\_ LC<sub>50</sub> = \_\_\_\_\_ ppm ( 95% C.L. ) \_\_\_\_\_ Cont. Mort.(%) = \_\_\_\_\_  
Species \_\_\_\_\_ Slope = \_\_\_\_\_ # Animals/Level = \_\_\_\_\_ Age(Days) = \_\_\_\_\_  
Sex = \_\_\_\_\_  
Lab \_\_\_\_\_ 8-Day Dose Level ppm/(% Mortality) \_\_\_\_\_  
Acc. \_\_\_\_\_ Comments: \_\_\_\_\_

8-Day Dietary LC<sub>50</sub> \_\_\_\_\_ LC<sub>50</sub> = \_\_\_\_\_ ppm ( 95% C.L. ) \_\_\_\_\_ Cont. Mort.(%) = \_\_\_\_\_  
Species \_\_\_\_\_ Slope = \_\_\_\_\_ # Animals/Level = \_\_\_\_\_ Sol. Cont. Mort.(%) = \_\_\_\_\_  
Temperature = \_\_\_\_\_  
Lab \_\_\_\_\_ 96-Hour Dose Level ppm/(% Mortality) \_\_\_\_\_  
Acc. \_\_\_\_\_ Comments: \_\_\_\_\_

96-Hour LC<sub>50</sub> \_\_\_\_\_ LC<sub>50</sub> = 297 ppm ( 95% C.L. ) \_\_\_\_\_ Cont. Mort.(%) = 0  
Species Lepomis macrochirus slope not given # Animals/Level = 10 Sol. Cont. Mort.(%) = N/A  
Lab Analytical Bio- not specified 96-Hour Dose Level ppm/(% Mortality) \_\_\_\_\_  
Chemistry Laboratories 100 ( 0 ), 180 ( 0 ), 320 ( 60 ), 560 ( 100 ), 1000 ( 100 )  
Acc. 408938-06 \_\_\_\_\_ Comments: Based on nominal concentrations \_\_\_\_\_

96-Hour LC<sub>50</sub> \_\_\_\_\_ LC<sub>50</sub> = \_\_\_\_\_ ppm ( 95% C.L. ) \_\_\_\_\_ Cont. Mort.(%) = \_\_\_\_\_  
Species \_\_\_\_\_ Slope = \_\_\_\_\_ # Animals/Level = \_\_\_\_\_ Sol. Cont. Mort.(%) = \_\_\_\_\_  
Temperature = \_\_\_\_\_  
Lab \_\_\_\_\_ 96-Hour Dose Level ppm/(% Mortality) \_\_\_\_\_  
Acc. \_\_\_\_\_ Comments: \_\_\_\_\_

K.R. Suppl  
1/9/88 Core, for  
4LC-E  
formulation

TABLE 3

Mortality Rates and Water Quality Measurements During the Acute Toxicity Test  
of SC-0224 4LC-E to Bluegill Sunfish (Lepomis macrochirus)

Nominal Concentration (mg/l)	Percent Mortality Hours			Water Quality								
				0-hours			48-hours			96-hours		
				Temp. °C	D.O. <sup>a</sup> mg/l	pH <sup>b</sup>	Temp. °C	D.O. mg/l	pH	Temp. °C	D.O. mg/l	pH
				24	48	96						
Control	0	0	0	21	9.4	7.8	21	6.7	7.4	22	5.9	7.0
100	0	0	0	21	9.4	6.9	21	6.4	7.0	22	3.0	6.6
180	0	0	0			6.5				22	3.2	6.5
320	30	30	60	21	9.4	6.2	21	6.6	6.5	22	2.3	6.3
560	100	100	100			5.9						
1000	100	100	100	21	9.5	5.6						

<sup>a</sup> Dissolved oxygen concentrations - Dissolved Oxygen Probe (YSI Model 54).

<sup>b</sup> pH - pH Probe (Corning Model 476182) used with a Corning Model 125 pH and mV meter.

NOTE: Dissolved oxygen saturations at the test temperatures of 21 and 22°C are 9.0 and 8.8 mg/l, respectively.