DATA EVALUATION RECORD
§ 72-1(A) -- ACUTE LC_{50} TEST WITH A WARMWATER FISH

1. **CHEMICAL:** Glyphosate Acid PC Code No.:417300

2. **TEST MATERIAL:** Glyphosate Acid Purity: 95.6%

3. **CITATION**

Authors:	Kent, S.J.,Caunter, J.E., Morris, D.S., and Johnson, P.A.
Title:	Acute Toxicity To Bluegill Sunfish
Study Completion Date:	November 24, 1995
Laboratory:	Brixham Environmental Laboratory
Sponsor:	Zeneca Ag Products
Laboratory Report ID:	BL5553/B
MRID No.:	443206-30
DP Barcode:	249306

4. **REVIEWED BY:** Curtis E. Laird, Fishery Biologist, EHB, EFED

Signature: Curtis E. Laird **Date:** 2-11-99

5. **APPROVED BY:** Tom A. Bailey, Chief, EHB, EFED

Signature: Tom A. Bailey **Date:** 2-17-99

6. **STUDY PARAMETERS**

Scientific Name of Test Organism:	*Lepomis macrochirus*
Age or Size of Test Organism:	0.20 to 0.9g; L = 30 mm
Definitive Test Duration:	96-hours
Study Method:	Static
Type of Concentrations:	Nominal

7. **CONCLUSIONS:** This study indicates glyphosate acid is slightly toxic to bluegill sunfish with an LC50 of 45 ppm. This study does fulfill the guideline requirenents in support of registration for a warmwater fish study even thouh four fish were under 0.5g in weight and water hardness was 16.0 mg/L of CaCO3 instead of 40 to 48.

Results Synopsis

LC_{50}: 45 ppm ai 95% C.I.: 32-56 ppm ai
NOEL: 32 ppm ai Probit Slope: N/A

8. **ADEQUACY OF THE STUDY**

A. Classification: Core

B. Rationale: N/A

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C. Repairability: N/A

9. GUIDELINE DEVIATIONS

1. Four fish weighed less than 0.5 g

2. Water hardness was 16.0 mg/L of CaCO3 instead of 40 - 48.

10. SUBMISSION PURPOSE: This study was submitted in support of registration.

11. MATERIALS AND METHODS

A. Test Organisms

Guideline Criteria	Reported Information
Species Preferred species is the bluegill sunfish (*Lepomis macrochirus*)	Yes
Mean Weight 0.5-5 g	0.20 - 0.96g; mean = 0.54g
Mean Standard Length Longest not > 2x shortest	Mean: 30 mm Range: 26 - 35 mm
Supplier	
All fish from same source?	Not reported
All fish from the same year class?	Not reported

B. Source/Acclimation

Guideline Criteria	Reported Information
Acclimation Period Minimum 14 days	19 days
Wild caught organisms were quarantined for 7 days?	No
Were there signs of disease or injury?	No

Guideline Criteria	Reported Information
If treated for disease, was there no sign of the disease remaining during the 48 hours prior to testing?	No
Feeding No feeding during the study	48 hour prior to testing
Pretest Mortality No more than 3% mortality 48 hours prior to testing	<1% mortality prior to testing.

C. **Test System**

Guideline Criteria	Reported Information
Source of dilution water Soft reconstituted water or water from a natural source, **not** dechlorinated tap water	Dechlorinated tap water
Does water support test animals without observable signs of stress?	Yes
Water Temperature 17°C or 22°C	22°C
pH Prefer 7.2 to 7.6	3.94 - 6.79
Dissolved Oxygen Static: ≥ 60% during 1st 48 hrs and ≥ 40% during 2nd 48 hrs, flow-through: ≥ 60%	6.2 - 6.79
Total Hardness Prefer 40 to 48 mg/L as $CaCO_3$	16.0 mg/L as $CaCO_3$
Test Aquaria 1. Material: Glass or stainless steel 2. Size: Volume of 19 L (5 gal) or 30 x 60 x 30 cm 3. Fill volume: 15-30 L of solution	glass vessels; 400mm x 280 mm x 280 mm with 20 L of test solution

Guideline Criteria	Reported Information
Type of Dilution System Must provide reproducible supply of toxicant	N/A
Flow Rate Consistent flow rate of 5-10 vol/24 hours, meter systems calibrated before study and checked twice daily during test period	N/A
Biomass Loading Rate Static: ≤ 0.8 g/L at ≤ 17°C, ≤ 0.5 g/L at > 17°C; flow-through: ≤ 1 g/L/day	0.27g/L (or g/L/day)
Photoperiod 16 hours light, 8 hours dark	16 hour light and 8 hour darkness with 20 minutes transition period
Solvents Not to exceed 0.5 ml/L for static tests or 0.1 ml/L for flow-through tests	Solvent: N/A Maximum conc.: N/A

D. **Test Design**

Guideline Criteria	Reported Information
Range Finding Test If LC_{50} >100 mg/L with 30 fish, then no definitive test is required.	Not mentioned
Nominal Concentrations of Definitive Test Control & 5 treatment levels; dosage should be 60% of the next highest concentration; concentrations should be in a geometric series	10, 18, 32, 56, 100, 180 mg ai/L.
Number of Test Organisms Minimum 10/level, may be divided among containers	

Guideline Criteria	Reported Information
Test organisms randomly or impartially assigned to test vessels?	Yes
Biological observations made every 24 hours?	Yes
Water Parameter Measurements 1. Temperature Measured constantly or, if water baths are used, every 6 hrs, may not vary > 1°C 2. DO and pH Measured at beginning of test and ever 48 h in the high, medium, and low doses and in the control	Yes
Chemical Analysis Needed if solutions were aerated, if chemical was volatile, insoluble, or known to absorb, if precipitate formed, if containers were not steel or glass, or if flow-through system was used	No aeration

12. REPORTED RESULTS

A. General Results

Guideline Criteria	Reported Information
Quality assurance and GLP compliance statements were included in the report?	(Yes/No)
Recovery of Chemical	98-100%
Control Mortality Not more than 10% control organisms may die or show abnormal behavior.	0%
Raw data included?	Yes

Guideline Criteria	Reported Information
Signs of toxicity (if any) were described?	No

Mortality

Concentration (ppm)		Number of Fish	Cumulative Number Dead			
			Hour of Study			
Nominal	Mean Measured		24	48	72	96
Control	N/A	10	0	0	0	0
10	10	10	0	0	0	0
18	18	10	0	0	0	0
32	32	10	0	0	0	0
56	55	10	4	4	1	0
100	100	10	10	0/10	0/10	0/10
180	180	10	10	0/10	0/10	0/10

Other Significant Results:

B. Statistical Results

Method: Binomial average

96-hr LC_{50}: 45 ppm ai 95% C.I.: 32-56 ppm ai

Probit Slope: N/A NOEC: N/A ppm ai

13. VERIFICATION OF STATISTICAL RESULTS

Parameter	Result
Binomial Test LC_{50} (C.I.)	45 (32-56) ppm ai
Moving Average Angle LC_{50} (95% C.I.)	N/A (____-____) ppm ai
Probit LC_{50} (95% C.I.)	N/A (____-____) ppm ai
Probit Slope	N/A

NOEC	32 ppm ai

14. **REVIEWER'S COMMENTS:** This study indicates glyphosate acid is slightly toxic to bluegill sunfish with an LC50 of 45 ppm. This study does fulfill the guideline requirements in support of registration for a warmwater fish study.

C. Laird Glyphosate 96-Hour LC50 for Bluegill Sunfish

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
180	10	10	100	9.765625E-02
100	10	10	100	9.765625E-02
56	10	9	90	1.074219
32	10	0	0	9.765625E-02
18	10	0	0	9.765625E-02
10	10	0	0	9.765625E-02

THE BINOMIAL TEST SHOWS THAT 32 AND 56 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 44.90551

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.

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