8-11-95

DATA EVALUATION RECORD
ACUTE LC_{50} TEST WITH AN ESTUARINE/MARINE SHRIMP
GUIDELINE 72-3c

1. **CHEMICAL:** Sulfentrazone (129081)

2. **TEST MATERIAL:** Sulfentrazone technical; 94.2%

3. **CITATION:**

Author:	Boeri, R.L., J.P. Magazu, and T.J. Ward
Title:	F6285 technical: acute toxicity to the mysid, *Mysidopsis bahia*
Date:	1994
Laboratory:	T.R. Wilbury Laboratories, Inc., Marblehead, MA
Lab. Report #:	494-FM
Sponsor:	FMC Corporation, Princeton, NJ
MRID No.:	435886-03

4. **REVIEWED BY:**

William Erickson
Biologist
EEB/EFED

Signature: W. Erickson
Date: 8/09/95

5. **APPROVED BY:**

Harry Craven
Section Head 4
EEB/EFED

Signature: Harry Craven
Date: 8/11/95

6. **STUDY PARAMETERS/RESULTS SYNOPSIS:**

Age of Test Organism:	<24 h old
Test Duration:	96 hours
Study Method:	flow through
Concentrations:	mean measured
LC_{50}:	1.0 mg/l
95% C.I.:	0.8-1.2 mg/l
NOEC:	0.657 mg/l

7. **CONCLUSIONS:** The study is scientifically sound and satisfies the guideline requirement for an acute toxicity test with an estuarine/marine shrimp.

8. **ADEQUACY OF THE STUDY:** Core.

9. **MAJOR GUIDELINE DEVIATIONS:** None.

10. MATERIALS AND METHODS:

Test Organisms:

Guideline Criteria	Reported Information
Species Preferred species are *Mysidopsis bahia*, *Penaeus setiferus*, *P. duorarun*, *P. aztecus* and *Palaemonetes sp.*	*Mysidopsis bahia*
Age Juvenile, mysids should be ≤24 hours old	<24 h old
Supplier	in-house culture
All shrimp are from same source?	yes
All shrimp are from the same year class?	yes

Source/Acclimation:

Guideline Criteria	Reported Information
Acclimation Period minimum 10 days	10 days
Wild caught organisms were quarantined for 7 days?	n/a
Were there signs of disease or injury?	none
If treated for disease, was there no sign of the disease remaining during the 48 hours prior to testing?	n/a
Feeding	*Artemia salina* daily
Pretest Mortality <3% mortality 48 hours prior to testing	not reported

Test System:

Guideline Criteria	Reported Information
Source of dilution water Soft reconstituted water or water from a natural source, **not** dechlorinated tap water	carbon-filtered, natural sea water
Does water support test animals without observable signs of stress?	yes
Salinity 30-34 ‰ for marine (stenohaline) shrimp and 10-17 ‰ for estuarine (euryhaline) shrimp, weekly range < 6 ‰	11-17 ‰
Water Temperature 22 ± 1°C	22 ± 1°C
pH 8.0-8.3 for marine (stenohaline) shrimp, 7.7-8.0 for estuarine (euryhaline) shrimp, monthly range < 0.8	7.9-8.2
Dissolved Oxygen Static: ≥ 60% during 1st 48 hrs and ≥ 40% during 2nd 48 hrs, Flow-through: ≥ 60%	≥80% of saturation
Total Organic Carbon	not reported
Test Aquaria 1. Material: Glass or stainless steel 2. Size: 3. Fill volume:	 glass 20 l 15 l
Type of Dilution System Must provide reproducible supply of toxicant	intermittent flow proportional diluter
Flow Rate Consistent flow rate of 5-10 vol/24 hours, meter systems calibrated before study and checked twice daily during test period	6.2 vol/24 h

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Guideline Criteria	Reported Information
Biomass Loading Rate Static: ≤ 0.8 g/L at ≤ 17°C, ≤ 0.5 g/L at > 17°C; flow-through: ≤ 1 g/L/day	0.0003 g/l/day
Photoperiod 16 hours light, 8 hours dark	16 h light, 8 h dark
Solvents Not to exceed 0.5 ml/L for static tests or 0.1 ml/L for flow-through tests	DMF (0.5 ml/l)

Test Design:

Guideline Criteria	Reported Information
Range Finding Test If LC_{50} >100 mg/L with 30 shrimp, then no definitive test is required.	yes
Number of Test Organisms Minimum 20/level, may be divided among containers	20/level
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 yes

Guideline Criteria	Reported Information
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	yes

11. **REPORTED RESULTS**

General Results:

Guideline Criteria	Reported Information
Quality assurance and GLP compliance statements were included in the report?	yes
Recovery of Chemical % of nominal	76-100+%
Control Mortality Not more than 10% of control organisms may die or show abnormal behavior.	none
Raw data included?	yes
Signs of toxicity (if any) were described?	yes

Mortality:

Concentration (ppm)		Number of Shrimp	Cumulative Number Dead			
			Hour of Study			
Nominal	Mean Measured		24	48	72	96
Control	-	20	0	0	0	0
Solvent Control	-	20	0	0	0	0
0.45	0.344	20	1	1	1	1
0.72	0.657	20	1	1	1	1
1.2	1.23	20	3	9	11	13

Concentration (ppm)		Number of Shrimp	Cumulative Number Dead			
			Hour of Study			
Nominal	Mean Measured		24	48	72	96
1.8	1.87	20	7	13	15	19
3.0	3.06	20	17	20	20	20

Other Findings: Sublethal effects (lethargic mysids) were observed at the three highest test concentrations.

Statistical Results:

Methods: Binomial/nonlinear interpolation (LC_{50}); Visual inspection of data (NOEC)
96-h LC_{50}: 1.07 mg/l
95% C.I.: 0.657-1.87 mg/l
NOEC: 0.657 mg/l

12. **VERIFICATION OF STATISTICAL RESULTS:** (results attached)

Methods: Moving average (LC_{50}); Williams test (NOEC)
96-h LC_{50}: 1.0 mg/l
95% C.I.: 0.8-1.2 mg/l
NOEC: 0.657 mg/l

13. **REVIEWER'S COMMENTS:** The study is scientifically sound and fulfills the guideline requirement for an acute toxicity test with a marine/estuarine shrimp.

W. ERICKSON SULFENTRAZONE MYSID ACUTE TOXICITY

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
3.06	20	20	100	9.536742E-05
1.87	20	19	95	2.002716E-03
1.23	20	13	65	13.1588
.657	20	1	5	2.002716E-03
.344	20	1	5	2.002716E-03

THE BINOMIAL TEST SHOWS THAT .657 AND 1.87 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 1.072439

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
3	7.421799E-02	1.028289	.8659871	1.249632

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
5	.8523404	2.880085	3.447676E-02

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = 5.307733
95 PERCENT CONFIDENCE LIMITS = .4075127 AND 10.20795

LC50 = 1.024863
95 PERCENT CONFIDENCE LIMITS = .1998422 AND 2.315181

LC10 = .5907345
95 PERCENT CONFIDENCE LIMITS = 2.831855E-04 AND .938255

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MYSIDOPSIS MORTALITY

SUMMARY STATISTICS TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	SOLVENT CONTROL	2	0.000	1.000	0.500
2	0.344 PPM	2	0.000	1.000	0.500
3	0.657 PPM	2	0.000	1.000	0.500
4	1.23 PPM	2	6.000	7.000	6.500
5	1.87 PPM	2	9.000	10.000	9.500
6	3.06 PPM	2	10.000	10.000	10.000

SUMMARY STATISTICS TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM
1	SOLVENT CONTROL	0.500	0.707	0.500
2	0.344 PPM	0.500	0.707	0.500
3	0.657 PPM	0.500	0.707	0.500
4	1.23 PPM	0.500	0.707	0.500
5	1.87 PPM	0.500	0.707	0.500
6	3.06 PPM	0.000	0.000	0.000

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	SOLVENT CONTROL	2	0.500	0.500	0.500
2	0.344 PPM	2	0.500	0.500	0.500
3	0.657 PPM	2	0.500	0.500	0.500
4	1.23 PPM	2	6.500	6.500	6.500
5	1.87 PPM	2	9.500	9.500	9.500
6	3.06 PPM	2	10.000	10.000	10.000

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
SOLVENT CONTROL	0.500				
0.344 PPM	0.500	0.000		1.94	k= 1, v= 6
0.657 PPM	0.500	0.000		2.06	k= 2, v= 6
1.23 PPM	6.500	9.295	*	2.10	k= 3, v= 6
1.87 PPM	9.500	13.943	*	2.12	k= 4, v= 6
3.06 PPM	10.000	14.717	*	2.13	k= 5, v= 6

s = 0.645

Note: df used for table values are approximate when v > 20.

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