

8-11-95

DATA EVALUATION RECORD
MARINE DIATOM EC₅₀ TEST
GUIDELINE 123-2 (TIER II)

1. CHEMICAL: Sulfentrazone (129081)
2. TEST MATERIAL: Sulfentrazone technical; 94.2%
3. CITATION:

Authors: Ward, T.J., P.L. Kowalski, and R.L. Boeri
Title: Acute toxicity of sulfentrazone technical
to the marine alga, *Skeletonema costatum*
Date: 1995
Laboratory: T.R. Wilbury Laboratories, Inc.,
Marblehead, MA
Lab. Report No.: 619-FM
Sponsor: FMC Corporation, Princeton, NJ
MRID No.: 436510-07

4. REVIEWED BY:

William Erickson
Biologist
EEB/EFED/EPA

Signature: W. Erickson

Date: 8/09/95

5. APPROVED BY:

Harry Craven
Section Head 4
EEB/EFED/EPA

Signature: Harry Craven

Date: 8/11/95

6. STUDY PARAMETERS/RESULTS SYNOPSIS:

Test Duration: 120 hours
Type of Concentrations: Mean measured
EC₅₀: 1.8 mg/l
95% C.I.: 1.7-2.0 mg/l
NOEC: 1.35 mg/l

7. CONCLUSIONS: The study is scientifically sound and fulfills the guideline requirement for a Tier 2 aquatic plant growth study with a marine diatom.
8. ADEQUACY OF THE STUDY: Core.
9. MAJOR GUIDELINE DEVIATIONS: None.
10. SUBMISSION PURPOSE: New chemical.

11. MATERIALS AND METHODS:

Test Organisms:

Guideline Criteria	Reported Information
Species: <i>Skeletonema costatum</i> <i>Anabaena flos-aquae</i> <i>Selenastrum capricornutum</i> <i>Navicula pelliculosa</i>	<i>Skeletonema costatum</i>
Number of Cells: 3,000 - 10,000	10,000
Nutrients:	sterile enriched media

Test System:

Guideline Criteria	Reported Information
Solvent used:	DMF
Site of test: Growth Chamber	growth chamber
Temperature: 20° C for <i>Skeletonema</i> sp.; others are 24-25°C	20 ± 2°C
Light Intensity: 2.0 Lux for <i>Anabaena</i> sp.; others are 4-5.0	4400 lux
Photoperiod:	16. h light/8 h dark
pH: 7.5-8.0	8.0

Test Design:

Guideline Criteria	Reported Information
Dose range: 2X or 3X	2X
Doses: at least 5	5
Controls: negative and/or solvent	negative and solvent
Three or more replicates per dose:	3
Duration of test: 120 hours	120 h
Daily Observations?	cell counts at 72, 96, and 120 h
Method of Observations:	hemacytometer/microscope

Guideline Criteria	Reported Information
Maximum Labeled Rate:	n/a

12. REPORTED RESULTS:

Guideline Criteria	Reported Information
Initial and 120 hours Cell Measurements?	yes
Control cell count at 120 hr from initial increase $\geq 2X$?	yes
Measured Initial Chemical Concentrations? Optional	yes
Raw data included? (Y/N)	yes
Quality Assurance Measures?	yes

Dose Response:

Dose (mg ai/L)	Cell density ($\times 10^4$ cells/ml)	% inhibition	120-hr pH
control	265.3	-	9.1
solvent control	254.7	-	9.2
0.161	262.0	0	9.2
0.354	227.3	11	9.3
0.616	276.0	0	9.2
1.35	223.3	12	9.2
2.72	28.9	89	8.5

Statistical Results:

Methods: Nonlinear regression (EC_{50})
Bonferroni's t-test (NOEC)

EC_{50} : 1.90 mg/l
95% C.I.: 1.65-2.17 mg/l
NOEC: 1.35 mg/l

13. VERIFICATION OF STATISTICAL RESULTS: (results attached)

Methods: Moving average (EC_{50})
Williams Test (NOEC)

EC_{50} : 1.8 mg/l
95% C.I.: 1.7-2.0 mg/l
NOEC: 1.35 mg/l

14. REVIEWER'S COMMENTS: The study is scientifically sound and fulfills the guideline requirement for a Tier 2 aquatic plant growth study with a marine diatom.

W. ERICKSON SULFENTRAZONE SKELETONEMA TOXICITY

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
2.72	100	89	89	0
1.35	100	12	12	0
.616	100	0	0	0
.354	100	11	11	0
.161	100	0	0	0

THE BINOMIAL TEST SHOWS THAT 1.35 AND 2.72 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 1.904432

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
2	1.379993E-02		1.897821	1.747779

2.081706

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H
6	3.121275	36.89954

GOODNESS OF FIT PROBABILITY

0

A PROBABILITY OF 0 MEANS THAT IT IS LESS THAN 0.001.

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

SLOPE = 3.108421
95 PERCENT CONFIDENCE LIMITS = -2.383267 AND 8.600109

LC50 = 1.783102
95 PERCENT CONFIDENCE LIMITS = 0 AND +INFINITY

LC10 = .6959989
95 PERCENT CONFIDENCE LIMITS = 0 AND +INFINITY

SKELETONEMA CELL GROWTH DATA

SUMMARY STATISTICS

TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	SOLVENT CONTROL	32360000.000	2780000.000	2546666.667	
2	0.161	32380000.000	2960000.000	2620000.000	
3	0.354	31920000.000	2660000.000	2273333.333	
4	0.616	32340000.000	3360000.000	2760000.000	
5	1.35	32120000.000	2360000.000	2233333.333	
6	2.72	3 232000.000	328000.000	288666.667	

SUMMARY STATISTICS

TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM
1	SOLVENT CONTROL	45733333333.313	213853.532	123468.395
2	0.161	191600000000.000	302654.919	174737.899
3	0.354	137733333333.250	371124.418	214268.782
4	0.616	284400000000.000	533291.665	307896.086
5	1.35	145333333333.344	120554.275	69602.043
6	2.72	25293333333.332	50292.478	29036.376

WILLIAMS TEST (Isotonic regression model)

TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	SOLVENT CONTROL	3	2546666.667	2546666.667	2583333.333
2	0.161	3	2620000.000	2620000.000	2583333.333
3	0.354	3	2273333.333	2273333.333	2516666.667
4	0.616	3	2760000.000	2760000.000	2516666.667
5	1.35	3	2233333.333	2233333.333	2233333.333
6	2.72	3	288666.667	288666.667	288666.667

WILLIAMS TEST (Isotonic regression model)

TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
SOLVENT CONTROL	2583333.333				
0.161	2583333.333	0.145		1.78	k= 1, v=12
0.354	2516666.667	0.119		1.87	k= 2, v=12
0.616	2516666.667	0.119		1.90	k= 3, v=12
1.35	2233333.333	1.238		1.92	k= 4, v=12
2.72	288666.667	8.921	*	1.93	k= 5, v=12

s = 309981.003

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

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