

US EPA ARCHIVE DOCUMENT

DATA EVALUATION REPORTECOLOGICAL EFFECTS BRANCH

1. Chemical: Tilt
2. Formulation: CGA-64250 technical
3. Study ID: Data Accession No: 072209 reference 19 **MRID# 100132938**
Hollister, Terry. 1981. The effect of CGA-64250 to the freshwater diatom Navicula seminulum. An unpublished study prepared by EG&G Bionomics for Ciba-Geigy Corp.
4. Study Type: 11-day EC50 with Navicula seminulum freshwater diatom
5. Review By: Daniel Rieder
Wildlife Biologist
Ecological Effects Branch
Daniel Rieder
Date: 10/17/84 X
Review Time: 3 Hrs

6. Reported Results:

11-day EC₅₀ = 93 ppb based on dry cell weight as compared to the solvent
 95% Confidence Limits = 46-187 ppb control
 No Observed Effect Level = 51 ppb

7. Reviewers Conclusions:

This study is scientifically sound. It fulfills the guideline requirements for an aquatic plant toxicity EC₅₀ with freshwater diatoms. The results show that Tilt will cause 50% reduction in diatom growth at 93 ppb. Tilt is very highly toxic to freshwater diatoms.



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8. Methods/materialsTest Material: Tilt

Percent active ingredient: 90.7%

Test Organism: freshwater diatomSpecies: Navicula seminulum

Age/Stage: 11 days old

Source: National Acad. of Science, Pa.

Test Containers: glass

Size: 125 ml with 50 ml medium

Conc. per container: 1X10⁴

Replicates: 3

Test Conditions: static

Illumination: 4300 lux

Temperature: 24 °C

Measured concentrations: yes at initiation

Controls: untreated and solvent

Test Medium: Regular Algal Assay Proc. Medium

Solvent: acetone

Reference: BMRL Testing Protocol for Static Phytotoxicity Tests with Freshwater Algae, February, 1981.

9. Results:

Reported

 11-day EC₅₀=93 ppb
 95% Confidence Limits=46-187 ppb

Reviewer

 44.8 ppb (binomial method)
 26-51 ppb " "
 EC50 using moving average method
 is 72 ppb 95% C.L. 63-82 ppb

No Observed Effect Level=51 ppb

CONCENTRATION ppb Nominal/Measured*	PERCENTAGE CHANGE AS COMPARED TO THE SOLVENT CONTROL					
	Increase (+) or decrease (-) in production of Chlorophyll a					Dry cell weight day 11
	day 3	day 4	day 7	day 9	day 11	
control	+16	+22	+6	-1	+3	+3
solvent control**	---	---	---	---	---	---
31 / 26	-5	+4	-11	-15	-1	-3
62 / 51	-21	-16	-68	-51	-52	-64 ^a
125 / 109	-32	-23	-70	-73	-76	-69 ^a
250 / 252	-29	-31	-81	-85	-87	-85 ^a
500 / 649	-41	-45	-94	-92	-95	-92 ^a

* at initiation of study

** solvent control used as basis for comparison

^aSignificantly less (P < 0.05) than the solvent control

10. Statistical Analysis: Dry cell weight was subjected to ANOVA and Williams' method (Williams, 1971) to locate significant differences among treatment means. Each test concentration was converted to a logarithm and the corresponding percentage decrease of maximum standing crop to a probit (Finney, 1971).

11. Reviewer Evaluation

a. Methods/Procedure: The protocol is generally consistent with the guidelines in Subdivision J, October, 1982. The study did not mention the photoperiod.

b. Statistics: Independent statistical analysis was performed and is attached.

c. Discussion/Results: The results show that Tilt is highly toxic to freshwater diatoms.

12. Conclusions

Category: core

122101 tilt FRESHWATER DIATOM EC50

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
649	100	92	92	0
252	100	85	85	0
109	100	69	69	0
51	100	64	64	0
26	100	3	3	0

THE BINOMIAL TEST SHOWS THAT 26 AND 51 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 44.8707

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
4	.0144029	72.0149	62.6158	81.8963

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
4	1.22253	16.6436	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 = 1.84807
95 PERCENT CONFIDENCE LIMITS = -.195309 AND 3.89145

LC50 = 67.8631
95 PERCENT CONFIDENCE LIMITS = 0 AND +INFINITY

LC10 = 13.9454
95 PERCENT CONFIDENCE LIMITS = 0 AND 48.2247

REFERENCE

- EG&G Bionomics Marine Research Laboratory. 1981. Static Phytotoxicity Test with Freshwater Algae. 6pp.
- Finney, D. J. 1971. Probit Analysis. Cambridge University Press, London. 333pp.
- Williams, D. A. 1971. A test for difference between treatment means when several dose levels are compared with a zero dose control. *Biometrics* 27, 103-117