13 6-13-00

MRID No. 443735-11

DATA EVALUATION RECORD
§ 72-2 - ACUTE EC_{50} TEST WITH A FRESHWATER INVERTEBRATE

1. **CHEMICAL:** Mesotrione PC Code No.: 122990

2. **TEST MATERIAL:** ZA1296 Purity: 96.8%

3. **CITATION:**

Authors:	W.E. Gentle and M.J. Hamer
Title:	ZA1296: Acute Toxicity of the Technical Material to First Instar *Daphnia magna*
Study Completion Date:	August 21, 1995
Laboratory:	Jealott's Hill Research Station, Bracknell, Berks, UK
Sponsor:	ZENECA Ag Products, Wilmington, DE
Laboratory Report ID:	RJ1872B
MRID No.:	443735-11
DP Barcode:	D245475

4. **REVIEWED BY:** Max Feken, M.S., Environmental Toxicologist, Golder Associates Inc.

Signature: [signature] **Date:** 8/25/98

APPROVED BY: Pim Kosalwat, Ph.D., Senior Scientist, Golder Associates Inc.

Signature: P. Kosalwat **Date:** 8/25/98

5. **APPROVED BY:**

Signature: [signature] **Date:** 6/13/00

6. **STUDY PARAMETERS:**

Age of Test Organism:	<24 hours
Definitive Test Duration:	48 hours
Study Method:	Static
Type of Concentrations:	Mean measured

7. **CONCLUSIONS:** This study is scientifically sound and fulfills the guideline requirements for an acute freshwater invertebrate test. The 48-hour EC_{50} value of 840 ppm classifies ZA1296 as practically non-toxic to *Daphnia magna*.

Results Synopsis:

EC_{50}: 840 ppm 95% C.I.: 622 - 1042 ppm

NOEC: 622 ppm Probit Slope: N/A

8. **ADEQUACY OF THE STUDY:**

   A. Classification: Core

   B. Rationale: N/A

   C. Repairability: N/A

9. **GUIDELINE DEVIATIONS:** The pH of the two highest treatment levels (6.6 and 5.3 for 600 and 1000 mg/L treatment levels, respectively) was lower than recommended (7.2 - 7.6).

10. **SUBMISSION PURPOSE:**

11. **MATERIALS AND METHODS:**

   A. Test Organisms

Guideline Criteria	Reported Information
Species Preferred species is *Daphnia magna*	*Daphnia magna*
All organisms are approximately the same size and weight?	Not reported
Life Stage Daphnids: 1st instar (<24 h). Amphipods, stoneflies, and mayflies: 2nd instar. Midges: 2nd & 3rd instar.	1st instar (<24 h)
Supplier	In-house cultures
All organisms from the same source?	Yes

   B. Source/Acclimation

Guideline Criteria	Reported Information
Acclimation Period Minimum 7 days	N/A
Wild caught organisms were quarantined for 7 days?	N/A

Guideline Criteria	Reported Information
Were there signs of disease or injury?	Not reported
If treated for disease, was there no sign of the disease remaining during the 48 hours prior to testing?	N/A
Feeding No feeding during the study.	Not reported
Pretest Mortality No more than 3% mortality 48 hours prior to testing.	Not reported

C. **Test System**

Guideline Criteria	Reported Information
Source of dilution water Soft reconstituted water or water from a natural source, **not** dechlorinated tap water.	Hard blended water produced by mixing dechlorinated tap water and deionized water.
Does water support test animals without observable signs of stress?	Yes
Water Temperature Daphnia: 20°C Amphipods and mayflies: 17°C Midges and mayflies: 22°C Stoneflies: 12°C	20.2 - 20.6°C
pH Prefer 7.2 to 7.6.	5.6 - 8.5
Dissolved Oxygen Static: ≥ 60% during 1st 48 h and ≥ 40% during 2nd 48 h, flow-through: ≥ 60%.	≥91% of saturation during the test
Total Hardness Prefer 40 to 200 mg/L as $CaCO_3$.	178 mg/L as $CaCO_3$

Guideline Criteria	Reported Information
Test Aquaria 1. Material: Glass or stainless steel. 2. Size: 250 mL (daphnids and midges) or 3.9 L (1 gal). 3. Fill volume: 200 mL (daphnids and midges) or 2-3 L.	 Glass 250 mL 200 mL
Type of Dilution System Must provide reproducible supply of toxicant.	Static test
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.	Not reported
Photoperiod 16 hours light, 8 hours dark.	16 hours light, 8 hours dark
Solvents Not to exceed 0.5 mL/L for static tests or 0.1 mL/L for flow-through tests.	Solvent: None Maximum conc.: N/A

D. Test Design

Guideline Criteria	Reported Information
Range Finding Test If EC_{50} >100 mg/L, then no definitive test is required.	None
Nominal Concentrations of Definitive Test Control & 5 treatment levels; a geometric series with each concentration being at least 60% of the next higher one.	Control, 130, 216, 360, 600, and 1000 mg/L, not corrected for purity

Guideline Criteria	Reported Information
Number of Test Organisms Minimum 20/level, may be divided among containers.	30 per level, 10 per replicate
Test organisms randomly or impartially assigned to test vessels?	Yes
Water Parameter Measurements 1. Temperature Measured continuously or, if water baths are used, every 6 h, 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.	Temperature measured continuously in the water bath. DO and pH measured at test initiation in replicate D (without daphnids) and at 48 hours in one replicate (with daphnids) of each treatment level.
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	Samples were collected from replicate D (without daphnids) at test initiation and from one replicate (with daphnids) at test termination (48 hours).

12. REPORTED RESULTS:

A. General Results

Guideline Criteria	Reported Information
Quality assurance and GLP compliance statements were included in the report?	Yes
Control Mortality Static: ≤10% Flow-through: ≤5%	0%
Percent Recovery of Chemical	104-107% of nominal
Raw data included?	Yes

Effects

Concentration (mg/L)		Number of Organisms	Cumulative Number Dead/Immobile	
Nominal	Mean Measured		Hour of Study	
			24	48
Control	<0.02	30	0	0
130	136	30	0	0
216	231	30	0	0
360	383	30	0	0
600	622	30	0	0
1000	1042	30	--*	28

*Test solution too cloudy to assess mobility

Other Significant Results: The test solution at the highest treatment level (1000 mg/L) was too cloudy to determine daphnid mobility. Daphnid mobility at this treatment level was determined by removing the daphnids to a glass crystallizing dish at test termination.

B. Statistical Results

Method: Probit and binomial probability

48-hr EC_{50}: 900 mg/L 95% C.I.: 622 - 1042 mg/L

Probit Slope: Not reported NOEC: 622 mg/L

13. VERIFICATION OF STATISTICAL RESULTS:

Parameter	Result
Binomial Test EC_{50} (95% C.I.)	840 (622 - 1042) ppm
Moving Average Angle EC_{50} (95% C.I.)	N/A
Probit EC_{50} (95% C.I.)	N/A
Probit Slope	N/A
NOEC	622 ppm

14. **REVIEWER'S COMMENTS:** This study is scientifically sound, fulfills the guideline requirements for an acute toxicity study using freshwater invertebrates, and can be classified as **Core.** The 48-hour EC_{50} value of 840 ppm classifies ZA1296 as practically non-toxic to *Daphnia magna*. The NOEC determined to be 622 ppm.

MAX FEKEN ZA1296 DAPHNIA 08-11-98

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
1042	30	28	93.33334	4.339964E-05
622	30	0	0	9.313227E-08
383	30	0	0	9.313227E-08
231	30	0	0	9.313227E-08
136	30	0	0	9.313227E-08

THE BINOMIAL TEST SHOWS THAT 622 AND 1042 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 839.9396

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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