5. 6-12-00

MRID No. 445050-08

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

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

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

3. **CITATION:**

Authors:	S.J. Kent, N. Shillabeer, J.E. Caunter, and S.J. Wallace
Title:	ZA1296: Acute Toxicity to Mysid Shrimp (*Mysidopsis bahia*)
Study Completion Date:	February 17, 1996
Laboratory:	Brixham Environmental Laboratory, Brixham Devon, UK
Sponsor:	ZENECA Ag Products, Wilmington, DE
Laboratory Report ID:	BL5593/B
MRID No.:	445050-08
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:** 6/12/00

6. **STUDY PARAMETERS:**

Definitive Test Duration:	96 hours
Study Method:	Static
Type of Concentrations:	Mean measured

7. **CONCLUSIONS:** This study is scientifically sound and fulfills the guideline requirements. Based on mean measured concentrations, the 96-hour LC_{50} for mysid shrimp exposed to ZA1296 was 3.3 ppm, which classifies this compound as moderately toxic to *Mysidopsis bahia*. The NOEC was determined to be 0.10 ppm.

Results Synopsis - Based on mean measured concentrations

LC_{50}: 3.3 ppm 95% C.I.: 2.1 - 5.5 ppm

NOEC: 0.1 ppm Probit Slope: 1.46

8. **ADEQUACY OF THE STUDY:**

   A. Classification: Core

   B. Rationale: N/A

   C. Repairability: N/A

9. **GUIDELINE DEVIATIONS:** The total organic carbon of the dilution water was not reported.

10. **SUBMISSION PURPOSE:**

11. **MATERIALS AND METHODS:**

   A. Test Organisms

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

B. Source/Acclimation

Guideline Criteria	Reported Information
Acclimation Period minimum 10 days	Adults maintained under test conditions
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 No feeding during the study and no feeding for 24 hours before the beginning of the test if organisms are over 0.5 g each.	Mysids were fed brine shrimp nauplii daily during the exposure period (0.1 ml culture/mysid/day).
Pretest Mortality <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	Mix (50/50) of seawater and dechlorinated tap water that was filtered, sterilized, and dechlorinated with sodium thiosulphate.
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‰	18‰

Guideline Criteria	Reported Information
Water Temperature Approx. 22 ± 1 °C	23.2 - 26.2°C
pH 8.0-8.3 for marine (stenohaline) shrimp, 7.7-8.0 for estuarine (euryhaline) shrimp, monthly range < 0.8	7.68 - 7.94
Dissolved Oxygen Static: ≥ 60% during 1st 48 hrs and ≥ 40% during 2nd 48 hrs, Flow-through: ≥ 60%	>90% throughout test
Total Organic Carbon	Not reported
Test Aquaria 1. Material: Glass or stainless steel 2. Size: 19.6 L is acceptable for organisms ≥ 0.5 g (e.g. pink shrimp, white shrimp, and brown shrimp), 3.9 L is acceptable for smaller organisms (e.g. mysids and grass shrimp). 3. Fill volume: 15 L is acceptable for organisms ≥ 0.5 g, 2-3 L is acceptable for smaller organisms.	1. Glass 2. 1000 mL 3. 800 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	1 mysid/80 ml

Guideline Criteria	Reported Information
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	No solvent was used

D. Test Design

Guideline Criteria	Reported Information
Range Finding Test If LC_{50} >100 mg/L with 30 shrimp, then no definitive test is required.	None reported
Nominal Concentrations of Definitive Test Control & 5 treatment levels; a geometric series in which each concentration is at least 60% of the next higher one.	Control, 0.10, 0.18, 0.32, 0.56, 1.0, 1.8, 3.2, 5.6, 10, 18, and 32 mg/L.
Number of Test Organisms Minimum 20/level, may be divided among containers	10 per treatment level
Test organisms randomly or impartially assigned to test vessels?	Not reported
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	1. Temperature was measured daily in all chambers and hourly in an additional vessel containing dilution water without test organisms. 2. DO was measured at test initiation, 48 hours, and 96 hours. pH was measured at test initiation and termination.

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	All test solutions were sampled for analysis at test initiation, 48 hours, and termination (96 hours).

12. REPORTED RESULTS:

A. General Results

Guideline Criteria	Reported Information
Quality assurance and GLP compliance statements were included in the report?	Yes
Recovery of Chemical	94-100%
Control Mortality Not more than 10% of control organisms may die or show abnormal behavior.	0%
Raw data included?	Yes
Signs of toxicity (if any) were described?	Yes

Mortality

Concentration (mg/L)		Number of Shrimp	Cumulative Number Dead			
Nominal	Mean Measured		Hour of Study			
			24	48	72	96
Control	<0.038	10	0	0	0	0
0.10	0.10	10	0	0	0	0
0.18	0.18	10	0	0	0	0
0.32	0.30	10	0	0	0	0
0.56	0.53	10	0	0	1	1
1.0	1.0	10	0	1	1	2
1.8	1.8	10	1	1	3	7
3.2	3.1	10	0	0	2	4
5.6	5.4	10	0	0	4	7
10	9.4	10	0	0	5	7
18	17	10	1	1	4	9
32	32	10	0	1	3	8

Other Significant Results: The 32 mg/L test solution was clear pale yellow. All other test solutions were clear and colorless.

The principle sign of toxicity, swimming erratically, was evident in at least one mysid from all but the lowest treatment level (0.10 mg/L). Surviving mysids from the highest treatment level (32 mg/L) appeared quiescent.

B. Statistical Results

Method: Moving average angle

96-hr LC_{50}: 3.2 mg/L 95% C.I.: 1.8 - 5.6 mg/L

Probit Slope: N/A NOEC: 0.10 mg/L

13. VERIFICATION OF STATISTICAL RESULTS:

Parameter	Result
Binomial Test LC_{50} (95% C.I.)	2.8 (Not determined) ppm
Moving Average Angle LC_{50} (95% C.I.)	3.0 (1.7 - 5.8) ppm
Probit LC_{50} (95% C.I.)	3.3 (2.1 - 5.5) ppm
Probit Slope	1.46
NOEC	0.10 ppm

14. REVIEWER'S COMMENTS: This study is scientifically sound and meets the guideline requirements for an acute toxicity test using *Mysidopsis bahia*. Based on mean measured concentrations, the 96-hour LC_{50} was 3.3 ppm, which classifies ZA1296 as moderately toxic to mysid shrimp. The NOEC was 0.10 ppm. This study is classified as **Core.**

MAX FEKEN ZA1296 MYSID 08-05-98

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
32	10	8	80	5.46875
17	10	9	90	1.074219
9.399999		10	7	70
17.1875				
5.4	10	7	70	17.1875
3.1	10	4	40	37.69531
1.8	10	7	70	17.1875
1	10	2	20	5.46875
.53	10	1	10	1.074219
.3	10	0	0	9.765625E-02
.18	10	0	0	9.765625E-02
.1	10	0	0	9.765625E-02

THE BINOMIAL TEST SHOWS THAT 0 AND +INFINITY 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 2.789307

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
8	.3215825	3.011025	1.69357	5.764912

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
5	.1012324	1	.3735808

SLOPE = 1.460093

95 PERCENT CONFIDENCE LIMITS = .9955347 AND 1.924652

LC50 = 3.315832

95 PERCENT CONFIDENCE LIMITS = 2.079117 AND 5.540859

LC10 = .4474918

95 PERCENT CONFIDENCE LIMITS = .1643682 AND .8129842

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