

US EPA ARCHIVE DOCUMENT

MRID No. 448065-05

DATA EVALUATION RECORD
ACUTE LC₅₀ TEST WITH AN ESTUARINE/MARINE SHRIMP
§ 72-3

1. **CHEMICAL:** Captan PC Code No.: 081301
2. **TEST MATERIAL:** Captan technical Purity: 99.8%
3. **CITATION:** Authors: K.R. Drottar and H.O. Krueger
Title: Captan: A 96-Hour Static Acute Toxicity Test with the
Saltwater Mysid (*Mysidopsis bahia*)
Study Completion Date: April 14, 1999
Laboratory: Wildlife International Ltd., Easton, MD
Sponsor: Captan Stewardship Task Force, Tomen Agro, Inc., San
Francisco, CA and Makhteshim-Agan of North America,
Inc., New York, NY
Laboratory Report ID: 493A-105
MRID No.: 448065-05
DP Barcode: D255807
4. **REVIEWED BY:** Mark Mossler, M.S., Environmental Scientist, Golder Associates Inc.
Signature: **Date:**
- APPROVED BY:** Pim Kosalwat, Ph.D., Senior Scientist, Golder Associates Inc.
Signature: **Date:**
5. **APPROVED BY:** Brian Montague, Fisheries Biologist
Signature: **Date:** Oct. 29, 1999
6. **STUDY PARAMETERS:**
- | | |
|--------------------------------------|------------------|
| Age or Size of Test Organism: | <24 hours old |
| Definitive Test Duration: | 96 hours |
| Study Method: | Static |
| Type of Concentrations: | Initial measured |
7. **CONCLUSIONS:** This study is scientifically sound and fulfills the guideline requirements.
The 96-hour LC₅₀ for mysids exposed to captan was 8.4 ppm ai, which classifies this
compound as moderately toxic to *Mysidopsis bahia*. The NOEC was 2.8 ppm ai.
8. **ADEQUACY OF THE STUDY:**
A. **Classification:** Core.



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- B. Rationale: N/A.
- C. Repairability: N/A.

9. **GUIDELINE DEVIATIONS:** No deviations that would effect final results were noted.
1. Mysids were fed daily
 2. Test vessels were smaller than recommended
 3. Measured concentrations not made at 96 hours to verify stability.
10. **SUBMISSION PURPOSE:** Submitted to support reregistration of captan for crops located adjacent to estuarine habitats.

11. **MATERIALS AND METHODS:**

A. Test Organisms

Guideline Criteria	Reported Information
Species Preferred species are <i>Mysidopsis bahia</i> , <i>Penaeus setiferus</i> , <i>P. duorarum</i> , <i>P. aztecus</i> or <i>Palaemonetes sp.</i>	<i>Mysidopsis bahia</i> used
Age Juvenile, mysids should be ≤ 24 hours old	<24 hours old
Supplier	In-house cultures
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	Adult mysids were cultured under the same temperature, salinity, and pH as that used during the study.
Wild caught organisms were quarantined for 7 days?	N/A
Were there signs of disease or injury?	No
If treated for disease, was there no sign of the disease remaining during the 48 hours prior to testing?	N/A, No disease symptoms observed
Feeding No feeding during the study and no feeding	Mysids were fed live brine shrimp nauplii daily during

Guideline Criteria	Reported Information
for 24 hours before the beginning of the test if organisms are over 0.5 g each.	the study.
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	Natural filtered seawater collected from Indian River Inlet, DE - adjusted to 20 ppt with well water and aerated
Does water support test animals without observable signs of stress?	Yes
Salinity 30-34 ‰ for marine (steno-haline) shrimp and 10-17 ‰ for estuarine (euryhaline) shrimp, weekly range < 6 ‰	20‰
Water Temperature Approx. 22 ± 1 °C	24.8-25.2°C
pH 8.0-8.3 for marine (stenohaline) shrimp, 7.7-8.0 for estuarine (euryhaline) shrimp, monthly range < 0.8	8.1-8.3
Dissolved Oxygen Static: $\geq 60\%$ during 1 st 48 hrs and $\geq 40\%$ during 2 nd 48 hrs, Flow-through: $\geq 60\%$	$\geq 79\%$ of saturation
Total Organic Carbon	1.0 mg/L
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.	Glass 2-L 1 L
Type of Dilution System Must provide reproducible supply of toxicant	N/A
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

Guideline Criteria	Reported Information
Biomass Loading Rate Static: ≤ 0.8 g/L at $\leq 17^\circ\text{C}$, ≤ 0.5 g/L at $> 17^\circ\text{C}$; flow-through: ≤ 1 g/L/day	Not reported
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	Solvent: DMF Maximum conc.: 0.5 mL/L.

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.	Concentrations selected based on consultation with the sponsor and a range finding test
Nominal Concentrations of Definitive Test Control & 5 treatment levels; in a geometric series in which each concentration is at least 60% of the next higher one.	Control, solvent control, 1.3, 2.2, 3.6, 6.0, and 10 ppm active ingredient (ai)
Number of Test Organisms Minimum 20/level, may be divided among containers	10 mysids per test chamber; 2 replicate test chambers per treatment and control
Test organisms randomly or impartially assigned to test vessels?	Yes
Biological observations made every 24 hours?	Observations were made daily
Water Parameter Measurements 1. Temperature Measured constantly or, if water baths are used, every 6 hrs, may not vary $> 1^\circ\text{C}$ 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 was measured continuously throughout the test in a test vessel. Temperature was also measured at 0 and 96 hours in each test vessel. DO and pH were measured daily in alternating replicates of each test group.
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 each vessel at 0 hours and analyzed by GC.

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 Percent of nominal, procedural recovery, limit of quantitation (LOQ)	61-99% of nominal, procedural recovery of 86.4%, LOQ = 0.25 ppm,
Control Mortality Not more than 10% of control organisms may die or show abnormal behavior.	No mortality in either control group
Raw data included?	Yes
Signs of toxicity (if any) were described?	Yes

Mortality

Concentration (mg ai/L)		Number of Shrimp	Cumulative Number Dead			
Nominal	Initial Measured*		Hour of Study			
			24	48	72	96
Control	<0.25	20	0	0	0	0
Solvent Control	<0.25	20	0	0	0	0
1.3	0.8	20	0	0	0	0
2.2	1.4	20	0	0	0	0
3.6	2.8	20	0	0	0	0
6.0	5.1	20	0	0	0	1

Concentration (mg ai/L)		Number of Shrimp	Cumulative Number Dead			
Nominal	Initial Measured*		Hour of Study			
			24	48	72	96
10	9.9	20	1	3	10	14

*Initial measured concentrations were not corrected for a procedural recovery of 86.4%.

Other Significant Results: Signs of test material toxicity noted at the highest-concentration treatment level included surfacing and lethargy.

B. Statistical Results

Method: probit method

96-hr LC₅₀: 8.4 ppm ai

Probit Slope: 7.6

95% C.I.: 7.2-10 ppm ai

NOEC: 2.8 ppm ai

13. VERIFICATION OF STATISTICAL RESULTS:

Method: probit analysis

96-hr LC₅₀: 8.4 ppm ai

Probit Slope: 7.6

95% C.I.: 7.2-10 ppm ai

NOEC: 2.8 ppm ai

14. **REVIEWER'S COMMENTS:** This study is scientifically sound and fulfills the guideline requirements for an acute toxicity test using an estuarine shrimp. However the LC₅₀ is based on initial measured concentrations not mean 96 hour measured concentrations. The 96-hour LC₅₀ of 8.4 ppm ai classifies captan as moderately toxic to the mysid shrimp. The NOEC was determined to be 2.8 ppm ai. This study is classified as **Core**.

96-h mysid mortality

Conc.	Observed Number Exposed	Adjusted Number Resp.	Predicted Proportion Responding	Adjusted Proportion Responding	Predicted Proportion Responding
0.8000	20	0	0.0000	0.0000	0.0000
1.4000	20	0	0.0000	0.0000	0.0000
2.8000	20	0	0.0000	0.0000	0.0001
5.1000	20	1	0.0500	0.0500	0.0495
9.9000	20	14	0.7000	0.7000	0.7003

Chi - Square Heterogeneity = 0.003

Mu = 0.926064
 Sigma = 0.132438

Parameter	Estimate	Std. Err.	95% Confidence Limits
Intercept	-1.992421	1.757571	(-5.437261, 1.452418)
Slope	7.550688	1.903365	(3.820091, 11.281284)

Theoretical Spontaneous Response Rate = 0.0000

Point	Conc.	Lower 95% Confidence Limits	Upper 95% Confidence Limits
EC 1.00	4.1493	2.0653	5.3674
EC 5.00	5.1076	3.0755	6.2458
EC10.00	5.7060	3.7858	6.8024
EC15.00	6.1490	4.3412	7.2299
EC50.00	8.4346	7.1599	10.1159
EC85.00	11.5697	9.7427	17.1554
EC90.00	12.4680	10.3321	19.7159
EC95.00	13.9287	11.2298	24.3185
EC99.00	17.1457	13.0430	36.2833