

MRID No. 438698-07

DATA EVALUATION RECORD
§ 72-2 -- ACUTE LC₅₀ TEST WITH A FRESHWATER INVERTEBRATE

1. **CHEMICAL:** Captan PC Code No.: 081301
2. **TEST MATERIAL:** Technical Captan Purity: 93.5%
3. **CITATION:**

Authors: J.H. Rapley and M.J. Hamer
Title: Captan: Acute Toxicity of the Technical Material to First Instar *Daphnia magna*
Study Completion Date: March 26, 1993
Laboratory: ICI Agrochemicals, Jealotts Hill Research Station, Bracknell, UK
Sponsor: ICI Americas Inc., Wilmington, DE
Laboratory Report ID: RJ1116B
MRID No.: 438698-07
DP Barcode: Not available.
4. **REVIEWED BY:** Rosemary Graham Mora, M.S., Environmental Scientist, KBN Engineering and Applied Sciences, Inc.

Signature: *[Handwritten Signature]* Date: 4/4/96
APPROVED BY: Pim Kosalwat, Ph.D., Senior Scientist, KBN Engineering and Applied Sciences, Inc.

Signature: P. Kosalwat Date: 4/4/96
5. **APPROVED BY:**

Signature: *[Handwritten Signature]* Date: 4/3/97
6. **STUDY PARAMETERS:**

Scientific Name of Test Organism:	<i>Daphnia magna</i>
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 but does not fulfill the guideline requirements. The test material had a low water solubility and was unstable in the water. The test concentrations were measured only at test initiation and termination. All concentrations were below the detection limit (<0.002 mg/L) at test termination. Therefore, the exposure concentrations are unknown. This test should have been conducted using a flow-through system or a static-renewal procedure. An EC₅₀ and NOEC could not be determined.

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Results Synopsis

EC₅₀: Not determined
 NOEL: Not determined

95% C.I.: N/A.
 Probit Slope: N/A.

8. ADEQUACY OF THE STUDY:

- A. **Classification:** ~~Invalid.~~ *supplemental*
- B. **Rationale:** An EC₅₀ could not be determined due to unknown exposure concentrations.
- C. **Repairability:** No.

9. Guideline Deviations:

1. Although the test material was not stable in the water, the test was conducted using a static system.
2. The test design consisted of only four test concentrations; at least five concentrations are recommended.
3. The dilution water was a mixture of dechlorinated tap water; the use of dechlorinated tap water is discouraged.
4. The temperature of the test solution in the test vessels was not measured. The temperature in the replicate vessels should have been measured.

10. SUBMISSION PURPOSE:

11. MATERIALS AND METHODS:

A. Test Organisms

Guideline Criteria	Reported Information
Species Preferred species is <i>Daphnia magna</i>	<i>Daphnia magna</i>
All organisms are approximately the same size and weight?	Not Reported.

Guideline Criteria	Reported Information
Life Stage Daphnids: 1 st instar (<24 h). Amphipods, stoneflies, and mayflies: 2 nd instar. Midges: 2 nd & 3 rd instar.	<24 hours
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
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.	No feeding during the study.
Pretest Mortality No more than 3% mortality 48 hours prior to testing.	N/A

C. Test System:

Guideline Criteria	Reported Information
Source of dilution water Soft reconstituted water or water from a natural source, not dechlorinated tap water.	The dilution water was a mixture of dechlorinated mains water and deionized mains water.
Does water support test animals without observable signs of stress?	Yes

Guideline Criteria	Reported Information
<p><u>Water Temperature</u> Daphnia: 20°C Amphipods and mayflies: 17°C Midges and mayflies: 22°C Stoneflies: 12°C</p>	19.9-20.2°C
<p><u>pH</u> Prefer 7.2 to 7.6.</p>	7.2-8.0
<p><u>Dissolved Oxygen</u> Static: ≥ 60% during 1st 48 h and ≥ 40% during 2nd 48 h, flow-through: ≥ 60%.</p>	≥74% saturation throughout the study
<p><u>Total Hardness</u> Prefer 40 to 48 mg/L as CaCO₃.</p>	160-180 mg/L as CaCO ₃
<p><u>Test Aquaria</u> 1. <u>Material:</u> Glass or stainless steel. 2. <u>Size:</u> 250 ml (daphnids and midges) or 3.9 L (1 gal). 3. <u>Fill volume:</u> 200 ml (daphnids and midges) or 2-3 L.</p>	1. Glass 2. 250-ml beakers 3. 200 ml of test solution
<p><u>Type of Dilution System</u> Must provide reproducible supply of toxicant.</p>	N/A
<p><u>Flow Rate</u> Consistent flow rate of 5-10 vol/24 hours, meter systems calibrated before study and checked twice daily during test period.</p>	N/A
<p><u>Biomass Loading Rate</u> Static: ≤ 0.8 g/L at ≤ 17°C, ≤ 0.5 g/L at > 17°C; flow-through: ≤ 1 g/L/day.</p>	Not reported.
<p><u>Photoperiod</u> 16 hours light, 8 hours dark.</p>	16 hours light, 8 hours dark
<p><u>Solvents</u> Not to exceed 0.5 ml/L for static tests or 0.1 ml/L for flow-through tests.</p>	No solvent was used.

D. Test Design

Guideline Criteria	Reported Information
<p><u>Range Finding Test</u> If EC₅₀ >100 mg/L, then no definitive test is required.</p>	<p>The results of a range-finding test indicated little or no effect at the maximum water solubility of captan under the test conditions (3.3 ppm @ 25°C).</p>
<p><u>Nominal Concentrations of Definitive Test</u> Control & 5 treatment levels; a geometric series with each concentration being at least 60% of the next higher one.</p>	<p>Dilution water control and 4 test concentrations. The highest test concentration was a saturated solution of captan in water, then serially diluted using a 60% dilution factor to prepare the three lower test concentrations.</p>
<p><u>Number of Test Organisms</u> Minimum 20/level, may be divided among containers.</p>	<p>10 daphnids per vessel, 3 vessels per level</p>
<p><u>Test organisms randomly or impartially assigned to test vessels?</u></p>	<p>Not reported.</p>
<p><u>Water Parameter Measurements</u></p> <ol style="list-style-type: none"> 1. <u>Temperature</u> Measured continuously or, if water baths are used, every 6 h, may not vary > 1°C. 2. <u>DO and pH</u> Measured at beginning of test and ever 48 h in the high, medium, and low doses and in the control. 	<ol style="list-style-type: none"> 1. The temperature of the water bath was measured continuously. 2. DO and pH were measured at test initiation and test termination in representative test solutions.
<p><u>Chemical Analysis</u> 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</p>	<p>Chemical analysis of the test solutions was performed at test initiation and at test termination.</p>

12. REPORTED RESULTS:

Guideline Criteria	Reported Information
Quality assurance and GLP compliance statements were included in the report?	Yes
<u>Control Mortality</u> Static: ≤10% Flow-through: ≤5%	0%
<u>Percent Recovery of Chemical</u>	>90% based on preliminary work
Raw data included?	Yes

Mortality

Concentration (ppm)		Number of Organisms	Cumulative Number Immobile			
0 Hour	48 Hours		Hour of Study			
			24	48	72	96
Control	<0.002	30	0	0	NA	NA
0.693	<0.002	30	0	0	NA	NA
1.10	<0.002	30	0	0	NA	NA
1.93	<0.002	30	3	4	NA	NA
3.25	<0.002	30	7	7	NA	NA

Other Significant Results: None.

B. Statistical Results

Method: Iteratively reweighted linear regression on the logit transformation of percent response on \log_{10} (concentration).

48-hr EC_{50} : 4.7 ppm
Probit Slope: Not reported.

95% C.I.: 3.5-17.1 ppm
NOEC: 1.1 ppm

13. VERIFICATION OF STATISTICAL RESULTS:

Parameter	Result
Binomial Test EC ₅₀ (C.I.)	N/A
Moving Average Angle EC ₅₀ (95% C.I.)	N/A
Probit EC ₅₀ (95% C.I.)	N/A
Probit Slope	N/A
Visual inspection EC ₅₀	>3.25 ppm initial measured concentration
NOEC	1.1 ppm initial measured concentration

- 14. REVIEWER'S COMMENTS:** The maximum water solubility of captan was reported to be 3.3 mg/L at 25°C. The highest test concentration was prepared by adding 100 mg of captan technical to 2.1 L of the dilution water to obtain a saturated solution. The remaining test concentrations were prepared by serially diluting the highest concentration solution. At test initiation, measured concentrations were at the expected levels. However, all concentrations were below the detection limit (<0.002 mg/L) when measured at test termination. Since captan is unstable in the water (DT50 8.3 hours at pH 7 and <2 minutes at pH 10) and the test concentrations were not measured during the exposure period, it is not known when captan disappeared from the test solutions. When initial measured concentrations were used to represent the exposure concentrations, the EC₅₀ and NOEC would probably be much higher than the actual values and would underestimate the toxicity of captan. This test should have been conducted using a flow-through system or a static-renewal procedure with solutions renewed, preferably, every 8 hours. The reviewer also questions why a solvent was not used in the test when the test material had a low water solubility.

This study is scientifically sound but does not fulfill the guideline requirements. An EC₅₀ could not be determined due to unknown test concentrations. The study is classified as ~~Invalid:~~ *supplemental*