# DATA EVALUATION RECORD
## § 72-2 -- ACUTE $LC_{50}$ 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:** [signature] for RGM **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:** [signature] **Date:** 4/3/97

6. **STUDY PARAMETERS:**

| | |
|---|---|
| **Scientific Name of Test Organism:** | *Daphnia magna* |
| **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 $EC_{50}$ and NOEC could not be determined.

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**Results Synopsis**

$EC_{50}$: 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 $EC_{50}$ 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**<br>Preferred species is *Daphnia magna* | *Daphnia magna* |
| **All organisms are approximately the same size and weight?** | Not Reported. |

| Guideline Criteria | Reported Information |
|---|---|
| **Life Stage**<br>Daphnids: 1st instar (<24 h).<br>Amphipods, stoneflies, and mayflies: 2nd instar.<br>Midges: 2nd & 3rd instar. | <24 hours |
| **Supplier** | In-house cultures |
| **All organisms from the same source?** | Yes |

B. **Source/Acclimation**

| Guideline Criteria | Reported Information |
|---|---|
| **Acclimation Period**<br>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**<br>No feeding during the study. | No feeding during the study. |
| **Pretest Mortality**<br>No more than 3% mortality 48 hours prior to testing. | N/A |

C. **Test System:**

| Guideline Criteria | Reported Information |
|---|---|
| **Source of dilution water**<br>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 |
|---|---|
| **Water Temperature**<br>Daphnia: 20°C<br>Amphipods and mayflies: 17°C<br>Midges and mayflies: 22°C<br>Stoneflies: 12°C | 19.9-20.2°C |
| **pH**<br>Prefer 7.2 to 7.6. | 7.2-8.0 |
| **Dissolved Oxygen**<br>Static: ≥ 60% during 1st 48 h and ≥ 40% during 2nd 48 h, flow-through: ≥ 60%. | ≥74% saturation throughout the study |
| **Total Hardness**<br>Prefer 40 to 48 mg/L as $CaCO_3$. | 160-180 mg/L as $CaCO_3$ |
| **Test Aquaria**<br>1. Material:<br>Glass or stainless steel.<br>2. Size:<br>250 ml (daphnids and midges) or 3.9 L (1 gal).<br>3. Fill volume:<br>200 ml (daphnids and midges) or 2-3 L. | 1. Glass<br>2. 250-ml beakers<br>3. 200 ml of test solution |
| **Type of Dilution System**<br>Must provide reproducible supply of toxicant. | N/A |
| **Flow Rate**<br>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**<br>Static: ≤ 0.8 g/L at ≤ 17°C, ≤ 0.5 g/L at > 17°C; flow-through: ≤ 1 g/L/day. | Not reported. |
| **Photoperiod**<br>16 hours light, 8 hours dark. | 16 hours light, 8 hours dark |
| **Solvents**<br>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**<br>If $EC_{50}$ >100 mg/L, then no definitive test is required. | 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). |
| **Nominal Concentrations of Definitive Test**<br>Control & 5 treatment levels; a geometric series with each concentration being at least 60% of the next higher one. | 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. |
| **Number of Test Organisms**<br>Minimum 20/level, may be divided among containers. | 10 daphnids per vessel, 3 vessels per level |
| **Test organisms randomly or impartially assigned to test vessels?** | Not reported. |
| **Water Parameter Measurements**<br>1. Temperature<br>Measured continuously or, if water baths are used, every 6 h, may not vary > 1°C.<br>2. DO and pH<br>Measured at beginning of test and ever 48 h in the high, medium, and low doses and in the control. | 1. The temperature of the water bath was measured continuously.<br><br>2. DO and pH were measured at test initiation and test termination in representative test solutions. |
| **Chemical Analysis**<br>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 | Chemical analysis of the test solutions was performed at test initiation and at test termination. |

**12. REPORTED RESULTS:**

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

Mortality

| Concentration (ppm) | | Number of Organ-isms | Cumulative Number Immobile | | | |
|---|---|---|---|---|---|---|
| | | | Hour of Study | | | |
| 0 Hour | 48 Hours | | 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 95% C.I.: 3.5-17.1 ppm
Probit Slope: Not reported. 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 $EC_{50}$ 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 $EC_{50}$ could not be determined due to unknown test concentrations. The study is classified as ~~**Invalid.**~~ supplemental