

US EPA ARCHIVE DOCUMENT

## DATA EVALUATION RECORD

1. **CHEMICAL:** 70 Orchard Spray
2. **TEST MATERIAL:** clear, colorless liquid CAS No. 64742-55-8
3. **STUDY TYPE:** §72-2 Acute Aquatic Invertebrate Toxicity
4. **CITATION:**

Author: Rausina, G.A. and L.S. Glenn  
Title: 48-Hour Aquatic Toxicity Study in Daphnia with  
70 Orchard Spray  
Laboratory Report #: 82-069  
Any Other Study #:  
Sponsor: Gulf Refining and Marketing Co.  
Laboratory: Gulf Life Sciences Center, PA  
MRID No.: 413688-33

5. **REVIEWED BY:**

Conchi Rodríguez  
Biologist  
Ecological Effects Branch  
Environmental Fate and Effects Division

Signature: *Conchi Rodríguez*

Date: 6/16/94

6. **APPROVED BY:**

Harry Craven  
Supervisory Biologist  
Ecological Effects Branch  
Environmental Fate and Effects Division

Signature: *Harry Craven*

Date: 6/16/94

7. **CONCLUSIONS:** The study is not scientifically sound and does not meet the guideline requirements for an Acute Aquatic Invertebrate Toxicity. The study is classified as invalid. Polypropylene containers were used and the concentrations of the test material were not measured. The concentration at which the organisms were really exposed is not known.
8. **RECOMMENDATIONS:** A new study with the active ingredient is required. The active ingredient has to be identified.
9. **BACKGROUND**

10. MATERIALS AND METHODSA. Test Organisms:

| Guideline Criteria  | Reported Information   |
|---|--|
| Species (Scientific Name)   | <u>Daphnia magna</u>   |
| All organisms should be approximately the same size and weight.   | Daphnia were derived from a clone.                                       |
| Immature organism should be used. Daphnids 1 <sup>st</sup> (<24hrs). Amphipods, stoneflies, and mayflies in 2 <sup>nd</sup> instar; midges 2 <sup>nd</sup> & 3 <sup>rd</sup> instar | All organisms for the test were first instar approximately 24 hours old. |
| Supplier  | Sea Plantations, Inc, MA   |
| All organisms from same source (yes or no)  | Yes  |
| Other Comments  | N/A  |

B. Source/Acclimation

| Guideline Criteria  | Reported Information   |
|---|--|
| Acclimation Period (minimum 7 days)   | Not reported. However animals were received 4 months before the beginning of the test. |
| Wild caught 7 day quarantine (yes or no)  | No   |
| Check for signs of disease or injury (yes or no, if yes describe)   | Not reported   |
| If diseased it can be treated in 48-hr pretest no sign of the disease remains (Report hours prior to test in which no sign of disease or N/A) | N/A  |
| No feeding during the study (When last fed)   | Not reported   |
| <3% mortality 48 hours prior to testing (% mortality, if any)   | Not reported   |

C. Test System:

| Guideline Criteria  | Reported Information              |
|---|-----------------------------------|
| Describe source of dilution water (prefer soft reconstituted water) | Charcoal filtered municipal water |
| Does water support test animals without observable signs of stress? | Not reported.                     |

|   |  |
|---|--|
| Was dechlorinated water used<br>(not recommended)   | No   |
| Water Temperature<br>(Daphnia-20°C)<br>(Amphipods and mayflies-17°C)<br>(Midges and mayflies-22°C)<br>(Stoneflies-12°C)   | 20.8 to 21.3 °C  |
| pH  | 8.3 - 8.6  |
| Dissolved Oxygen<br>(Static 1 <sup>st</sup> 48 hrs 40%;<br>2 <sup>nd</sup> 48 hrs 60%; Flow-through 60%) (%<br>of lowest conc. & hour)  | DO ranged during the study from<br>83.8% (7.3 mg/l) to 89.6% (7.8 mg/l)<br>saturation                          |
| Total hardness<br>(40 to 48 mg/L as CaCO <sub>3</sub> well water)   | 130 - 148 mg/l as CaCO <sub>3</sub>  |
| Total Alkalinity  | 46 - 48 mg/l as CaCO <sub>3</sub>  |
| Specific Conductance  | 420 - 445 µmhos/cm   |
| Test Aquaria<br>1. Material (glass or stainless<br>steel)<br>2. a. Small organisms<br>(3.9 L (1 gal) with 2 to 3 L<br>solution)<br>b. Daphnids and midges (250 ml<br>glass beakers 200 mls of test<br>solution) | 1. Polypropylene container inside a<br>vessel<br>2. a. N/A<br>b. Vessel was 3.0 l                              |
| Type of Dilution System<br>(Reproducible supply of toxicant)  | Flow through proportional diluter<br>system calibrated to deliver 100 ml<br>of test water every 2.5 min/cycle. |
| Flow rate<br>Consistent flow rate-meter<br>systems calibrated before<br>study and checked 2*24 hours - 5<br>to 10 vol/24 hours  | System was examined daily. Flow<br>rate was 9.6 vol/24 hours.  |
| Biomass Loading Rate<br>Static: < 0.8 g/L at ≤ 17°C; 0.5<br>g/L > 17°C<br>Flow-through: 1 g/L/24 & must not be<br>>10 g/L at any time at or below 17°C<br>or 5 g/L at higher temperatures.                      | Not reported   |
| Photoperiod<br>(16 L & 8 D with a 15-30 min<br>transition)  | 12 hours light, 12 hours darkness  |
| Solvents<br>1. (Do not exceed 0.5 ml/L for<br>static tests)<br>2. (Do not exceed 0.1 ml/L for flow-<br>through)   | No solvents  |

D. Test Design:

| Guideline Criteria  | Reported Information  |
|---|---|
| <u>Range Finding Test</u><br>(LC <sub>50</sub> >100 mg/L with 30 fish, no definitive test required.)  | No data included  |
| <u>Definitive Test</u>  |   |
| Nominal Concentrations<br>(control+5 treatment levels; dosage should be 60% of the next highest concentration; concentrations should be geometric series)   | 5 concentrations 1.00, 1.8, 3.2, 5.6, 10.0 mg/l a negative control and a positive control (hexavalent chromium) |
| Controls<br>(Minimum control mortality; static 10%; flow-through 5%)  | 5% mortality (1/20)   |
| Number of Test Organisms;<br>(Minimum 20/level can be divided among containers)   | 20 /level, 2 vessels per test concentration   |
| All organisms must be randomly assigned to test vessels. (yes or no, describe if no)  | Yes   |
| Biological Observations   | No  |
| Water Parameter Measurements<br>1. Temperature - record every 6 hrs; >1°C.<br>2. D.O. beginning, 48 hrs, end for control high, medium, and low dose.<br>3. pH beginning, 48 hrs, end for control, high, medium, and low dose. | 1. Recorded daily in each vessel<br>2. Recorded daily in each vessel.<br>3. Recorded daily in each vessel       |
| Chemical Analysis<br>(needed if aeration, volatile, insoluble, precipitate, not steel or glass, known to adsorb, and flow-through) (yes or no)  | Not performed   |

11. REPORTED RESULTS:

| Guideline Criteria   | Reported Information  |
|--|---|
| Mean Measured Concentrations (report conc.)                                | Not measured  |
| Recovery of Chemical<br>(% recovery)                                       | N/A   |
| Mortality & Observations (Describe observations & attach mortality tables) | Mortality ranged from 100% in the highest concentration to 10 % in the lowest (see table) |

18

|                               |                                 |
|-------------------------------|---------------------------------|
| EC50 value (type of analysis) | 2.20 mg/l (Litchfield-Wilcoxon) |
|-------------------------------|---------------------------------|

12. **STUDY AUTHOR'S CONCLUSIONS / QUALITY ASSURANCE MEASURES:**

"The 48-hour EC50 was 2.2 mg/l nominal concentration of 70 Orchard Spray. The maximum saturated test concentration achievable in water under the conditions of the study could not be determined. The results of the hexavalent chromium positive control study indicated that the parameters were within acceptable limits."

The study was performed prior to the effective date of the Environmental Protection Agency's Good Laboratory Practice Standard (40 CFR 160, October 16, 1989) and thus do not comply with 40 CFR 160.

13. **REVIEWER'S DISCUSSION AND INTERPRETATION**

A. **Test Procedure:**

The following items did not meet the guideline criteria:

1. The purity of the test material was not reported.
2. The photoperiod was not as recommended
3. The test vessels material was polypropylene. This is not a recommended material.

B. **Statistical Analysis**

| Test                  | Results                              |
|-----------------------|--------------------------------------|
| Binomial              | EC50 = 2.4 mg/l (95% CI 1 - 5.6)     |
| Moving Average Method | EC50 = 2.38 mg/l (95% CI 1.8 - 3.07) |
| Probit Method         | EC50 = 2.36 mg/l (95% CI 1.8 - 2.9)  |

C. **Discussion/Results:** The major fault of the study is that the organisms were placed into polypropylene containers. The recommended materials for test vessels are glass or stainless steel. The test solution must have been analyzed to know the exact amount of the test material that the organisms were exposed to. It is known that some materials can adsorb the pesticide tested.

The purity of the test material was not reported. It is not

know if this test material is a typical end use product or the technical grade of the active ingredient.

The study is not scientifically sound and does not meet the guideline requirements for an acute aquatic invertebrate toxicity. Based on the conditions of this study, the EC50 for Daphnia magna is 0.41 mg/l. This classifies 100 Paraffin Oil as moderately toxic. A new study is required.

D. Adequacy of the Study:

1. Classification: Invalid
2. Rational: Polypropylene containers were used and the concentrations of the test material were not measured
3. Repairability: No

NOTE: BECAUSE THERE WAS CONTROL MORTALITY, AND NONE OF THE LOWER CONCENTRATIONS PRODUCED ZERO MORTALITY, THE DATA HAS BEEN SUBJECTED TO ABBOTT'S CORRECTION.

Rodriguez 70 Orchard Spray EC50 Daphnia

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| CONC. | NUMBER EXPOSED | NUMBER DEAD | PERCENT DEAD | BINOMIAL PROB. (PERCENT) |
|-------|----------------|-------------|--------------|--------------------------|
| 10    | 19             | 19          | 100          | 1.907348E-04             |
| 5.6   | 19             | 17          | 89.4737      | 3.643036E-02             |
| 3.2   | 19             | 13          | 68.42111     | 8.353423                 |
| 1.8   | 19             | 6           | 31.5789      | 8.353423                 |
| 1     | 19             | 2           | 10.5263      | 3.643036E-02             |

THE BINOMIAL TEST SHOWS THAT 1 AND 5.6 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 2.4

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

| SPAN | G        | LC50     | 95 PERCENT CONFIDENCE LIMITS |          |
|------|----------|----------|------------------------------|----------|
| 3    | .1357467 | 2.388013 | 1.850083                     | 3.077528 |

RESULTS CALCULATED USING THE PROBIT METHOD

| ITERATIONS | G        | H |
|------------|----------|---|
| 3          | .1125373 | 1 |

GOODNESS OF FIT PROBABILITY  
.942728

SLOPE = 3.599218  
95 PERCENT CONFIDENCE LIMITS = 2.391804 AND 4.806633

LC50 = 2.361692  
95 PERCENT CONFIDENCE LIMITS = 1.873035 AND 2.924905

LC10 = 1.048018  
95 PERCENT CONFIDENCE LIMITS = .6277577 AND 1.398516

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7  
21