

DATA EVALUATION RECORD

1. Chemical: Lindane
2. Test Material: Lindane 40% Flowable
3. Study/Action Type: Invertebrate Acute Toxicity Test
Daphnia magna
4. Study Identification: Acute Toxicity of Lindane 40% WP
Flowable to Daphnia magna. By
Analytical Bio-Chemistry Laboratories,
Inc., July 7, 1986. Submitted by
Rhone-Poulenc, Inc. for CIEL. EPA
Accession No. 263949.

5. Reviewed by: Ann Stavola
Aquatic Biologist
EEB/HED

Signature: *Ann Stavola*

Date: 9 Dec 86

6. Approved by: Doug Urban
Supervisory Biologist
EEB/HED

Signature: *Douglas J. Urban*

Date: 12/31/86

7. Conclusions:

The study is scientifically sound and meets EPA Guidelines requirements for acute toxicity testing with freshwater invertebrates. With an LC₅₀ value of 6.5 (5.0-9.2) mg/L, Lindane 40% Flowable is moderately toxic to freshwater invertebrates.

8. Recommendations: N/A.

9. Background:

This study was submitted in response to the data requirements of the Lindane Registration Standard.

10. Materials and Methods:

- a. Test Animals: First instar Daphnia magna less than 24 hours old. Cultures maintained on a diet of algae and yeast at 20 °C on a 16-hour day.
- b. Dosage: Lindane 40% Flowable. ABC Lab aged wellwater (hard quality) was used to prepare all working stock solutions. Concentrations were measured by GLC.
- c. Study Design: The test was conducted in 250 mL glass beakers containing 200 mL of test solution. There were three beakers per concentration, and each beaker contained 10 Daphnia. The test was conducted at 20 °C with a 16L:8D photoperiod.
- d. Statistics: The LC₅₀ values were calculated with a computerized version of Stephan's program.

11. Reported Results:

| Nominal Conc. (ug/L) | Measured Conc. (ug/L) | | % Mortality | |
|-------------------------|--------------------------|------------|-------------|-------|
| | as formulation | as lindane | 24 hr | 48 hr |
| 10,000 | 9200 | 3700 | 23.3 | 100 |
| 5000 | 5000 | 2000 | 6.7 | 6.7 |
| 2500 | 2500 | 1000 | 0 | 0 |
| 1300 | 1200 | 480 | 0 | 0 |
| 650 | 650 | 260 | 0 | 0 |
| 330 | 280 | 110 | 0 | 0 |
| Control | -- | -- | 0 | 0 |

Time LC₅₀ and 95% CI (mg/L)
 as formulation as lindane

24 hr > 9.2 > 3.7
 48 hr 6.5(5.0-9.2) 2.6(2.0-3.7)

D.O. levels were 8.3 mg/L in the controls and 8.8 mg/L in the test beakers at 0 hour and 8.8 mg/L in the controls and 8.5 mg/L in the test beakers at 48 hours; pH values were 8.1 at 0 hour and 8.2 at 48 hours. The beakers containing the nominal concentrations of 5 and 10 mg/L were cloudy throughout the study period.

12. Study Author's Conclusions/QA Measures

The 48-hour LC₅₀ value of Lindane 40% Flowable to Daphnia magna was 6.5 (5.0-9.2) mg/L as measured formulation.

QA Statement "In accordance with ABC Laboratories intent that all studies conducted at our facilities are designed and function in conformance with good laboratory practice regulations and the protocols for individual laboratory studies, an inspection of the final report for Lindane 40% Flowable was conducted and found to be in acceptable form by a member of our Quality Assurance Unit. A procedure audit was conducted on May 21, 1986. A final inspection of all data and records on June 23, 1986 indicated that the report submitted to you is an accurate reflection of the study as it was conducted by ABC Laboratories."

13. Reviewer's Evaluation:

- a. Test Procedures: The protocol is acceptable since it follows Methods for Acute Toxicity Tests with Fish, Macroinvertebrates, and Amphibians, EPA-660/3-75-009. The test material was a formulated product as required in the Registration Standard. The beakers containing the nominal concentrations of 5 and 10 mg/L were cloudy throughout the study period. However, this is not considered significant since the concentrations were measured.
- b. Statistics: The data were analyzed with EEB's Toxanal program, which is based on Stephan's program. The 48-hour LC₅₀ and 95% CI values were 6.45 (5.0-9.2) mg/L as measured formulation and 2.59 (2.0-3.7) mg/L as lindane. The reported values are valid.
- c. Discussion/Results: With a 48-hr LC₅₀ value of 6.5 (5.0-9.2) mg/L Lindane 40% Flowable is moderately toxic to aquatic invertebrates.
- d. Conclusions:
 1. Category: Core.
 2. Rationale: Testing with a formulated product was required in the Standard.

STAVOLA LINDANE 40 FLOWABLE DAPHNIA MAGNA 11-26-86

| CONC. | NUMBER EXPOSED | NUMBER DEAD | PERCENT DEAD | BINOMIAL PROB. (PERCENT) |
|-------|-------------------|----------------|-----------------|-----------------------------|
| 9200 | 30 | 30 | 100 | 9.313226E-08 |
| 5000 | 30 | 2 | 6.666666 | 4.339964E-05 |
| 2500 | 30 | 0 | 0 | 9.313226E-08 |
| 1200 | 30 | 0 | 0 | 9.313226E-08 |
| 650 | 30 | 0 | 0 | 9.313226E-08 |
| 280 | 30 | 0 | 0 | 9.313226E-08 |

THE BINOMIAL TEST SHOWS THAT 5000 AND 9200 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 6450.76

WHEN THERE ARE LESS THAN TWO CONCENTRATIONS AT WHICH THE PERCENT DEAD IS BETWEEN 0 AND 100, NEITHER THE MOVING AVERAGE NOR THE PROBIT METHOD CAN GIVE ANY STATISTICALLY SOUND RESULTS.

STAVOLA LINDANE 40 FLOWABLE DAPHNIA MAGNA 11-26-86

| CONC. | NUMBER EXPOSED | NUMBER DEAD | PERCENT DEAD | BINOMIAL PROB. (PERCENT) |
|-------|-------------------|----------------|-----------------|-----------------------------|
| 3700 | 30 | 30 | 100 | 9.313226E-08 |
| 2000 | 30 | 2 | 6.666666 | 4.339964E-05 |
| 1000 | 30 | 0 | 0 | 9.313226E-08 |
| 480 | 30 | 0 | 0 | 9.313226E-08 |
| 260 | 30 | 0 | 0 | 9.313226E-08 |
| 110 | 30 | 0 | 0 | 9.313226E-08 |

THE BINOMIAL TEST SHOWS THAT 2000 AND 3700 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 2586.154

WHEN THERE ARE LESS THAN TWO CONCENTRATIONS AT WHICH THE PERCENT DEAD IS BETWEEN 0 AND 100, NEITHER THE MOVING AVERAGE NOR THE PROBIT METHOD CAN GIVE ANY STATISTICALLY SOUND RESULTS.
