

US EPA ARCHIVE DOCUMENT

DATA EVALUATION RECORD

1. Chemical: Lindane
2. Test Material: Lindane 20% EC
3. Study/Action Type: Invertebrate Acute Toxicity Test
Daphnia magna
4. Study Identification: Acute Toxicity of Lindane 20% EC 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 Urban*
Date: *12/31/86*

7. Conclusions:

The study is scientifically sound and meets EPA Guidelines requirements for acute toxicity testing with aquatic invertebrates. With an LC₅₀ value of 8.0 (4.8-9.5) mg/L, Lindane 20% EC is moderately toxic to aquatic 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 20% EC. ABC Labs 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 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 data were analyzed by 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
20,000	20,000	4000	0	100
10,000	9500	1900	3.3	73.3
5000	4800	970	0	0
2500	2200	440	0	0
1300	1200	240	0	0
650	600	120	0	0
Control	--	--	0	0

Time	<u>LC₅₀ and 95% CI (mg/L)</u>	
	<u>as formulation</u>	<u>as lindane</u>
24 hr	> 20	> 4
48 hr	8.0(4.8-9.5)	1.6(0.97-1.9)

D.O. levels were 8.3 mg/L in the controls and 8.7 mg/L in the test beakers at 0 hour and 8.5 mg/L in the controls and 8.3 mg/L in the test beakers at 48 hours; pH values were 8.3 at 0 hours and 8.1 at 48 hours.

12. Study Author's Conclusions/QA Measures

The 48 hour LC₅₀ value of Lindane 20% EC to Daphnia magna was 8.0 (4.8-9.5) 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 20% EC 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 24, 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 as 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.
- 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 8.0 (4.8-9.5) mg/L as formulation and 1.6 (0.97-1.9) mg/L as lindane. The reported values are valid.
- c. Results/Discussion: With an LC₅₀ value of 8.0 (4.8-9.5) mg/L Lindane 20% EC is moderately toxic to freshwater invertebrates.

Conclusions:

1. Category: Core.
2. Rationale: Testing with a formulated product was required in the Standard.

STAVOLA LINDANE 20EC DAPHNIA MAGNA 11-26-86

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
20000	30	30	100	9.313226E-08
9500	30	22	73.33334	.8062402
4800	30	0	0	9.313226E-08
2200	30	0	0	9.313226E-08
1200	30	0	0	9.313226E-08
600	30	0	0	9.313226E-08

THE BINOMIAL TEST SHOWS THAT 4800 AND 9500 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 7997.34

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 20EC DAPHNIA MAGNA 11-26-86

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
4000	30	30	100	9.313226E-08
1900	30	22	73.33334	.8062402
970	30	0	0	9.313226E-08
440	30	0	0	9.313226E-08
240	30	0	0	9.313226E-08
120	30	0	0	9.313226E-08

THE BINOMIAL TEST SHOWS THAT 970 AND 1900 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 1603.652

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.

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