

US EPA ARCHIVE DOCUMENT

DATA EVALUATION RECORD

1. Chemical: Lindane
2. Test Material: Lindane 40% Flowable
3. Study/Action Type: Fish Static Acute Toxicity Test
Rainbow Trout (Salmo gairdneri)
4. Study Identification: Acute Toxicity of Lindane 40% Flowable
to Rainbow Trout (Salmo gairdneri).
Analytical Bio-Chemistry Laboratories,
Inc. July 8, 1986. Submitted by
Rhone-Poulenc, Inc. for CIEL. EPA
Accession No. 263948.

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 coldwater fish. With an LC₅₀ value of 69 (50-80) ug/L, Lindane 40% Flowable is very highly toxic to coldwater fish.

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: Rainbow trout (Salmo gairdneri) from Mt. Lassen Trout Farm, Red Bluff, California.

Mean weight = 0.59 ± 0.21 g.

Mean standard length = 35 ± 4.3 mm.

- b. Dosage: Lindane 40% Flowable. The dilution water was soft reconstituted water. Concentration measured by GLC.

- c. Study Design: The test was conducted in 5-gallon glass vessels containing 15 liters of test solution. There were two vessels per test concentration with 10 fish per vessel. The biological loading was 0.37 g fish/liter. The study was conducted 12 °C with a 16-hour day.

- d. Statistics: The raw 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	72 hr	96 hr
180	160	62	100	100	100	100
100	80	32	20	70	75	80
58	50	20	0	0	0	0
32	20	8.2	0	0	0	0
18	14	5.4	0	0	0	0
10	7	2.8	0	0	0	0
Control	--	--	0	0	0	0

Time	LC ₅₀ and 95% CI (ug/L)	
	as formulation	as lindane
24 hr	99(80-160)	39(32-63)
48 hr	72(50-160)	29(20-62)
72 hr	70(50-80)	28(20-32)
96 hr	69(50-80)	28(20-32)

D.O. levels were 9.3 mg/L at 0 hour at 8.1 to 8.7 mg/L at 96 hours; pH values were 7.2 at 0 hour and 7.0 at 96 hours.

Signs of toxicity included surfacing, loss of equilibrium, excitability and fish on the bottom.

12. Study Author's Conclusions/QA Measures:

The 96-hour LC₅₀ value for Lindane 40% Flowable to rainbow trout was 69 (50-80) ug/L, as measured formulation and 28 (20-32) ug/L as lindane.

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 June 10, 1986. No deviations were noted. A final inspection of all data and records on June 26, 1986 and July 7, 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 Testing in Fish, Macroinvertebrates, and Amphibians, EPA-660/3-75-009. The test material was a formulated product as required in the Standard.
- b. Statistics: The data were analyzed by EEB's Toxanal program. The LC₅₀ values was 69.1 (50-80) ug/L as measured formulation.
- c. Discussion/Results: With a 96-hour LC₅₀ value of 69 (50-80) ug/L Lindane 40% Flowable is very highly toxic to coldwater fish.

Conclusions:

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

STAVOLA FISH ACUTE TOXICITY *Lindane 40% Flammable*

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
160	20	20	100	9.53674E-05
80	20	16	80	.590897
50	20	0	0	9.53674E-05
20	20	0	0	9.53674E-05
14	20	0	0	9.53674E-05
7	20	0	0	9.53674E-05

THE BINOMIAL TEST SHOWS THAT 50 AND 80 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 69.1243

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 FISH ACUTE TOXICITY *Lindane 40% Flawable*

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
62	20	20	100	9.53674E-05
32	20	16	80	.590897
20	20	0	0	9.53674E-05
8.2	20	0	0	9.53674E-05
5.4	20	0	0	9.53674E-05
2.8	20	0	0	9.53674E-05

THE BINOMIAL TEST SHOWS THAT 20 AND 32 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 27.6497

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.
