

US EPA ARCHIVE DOCUMENT

DATA EVALUATION RECORD

1. Chemical: Lindane
2. Test Material: Lindane 25% WP
3. Study/Action Type: Fish Static Acute Toxicity Test  
Rainbow Trout (Salmo gairdneri)
4. Study Identification: Acute Toxicity of Lindane 25% WP to  
Rainbow Trout (Salmo gairdneri); By  
Analytical Bio-Chemistry Laboratories,  
Inc. Submitted by Rhone-Poulenc, Inc.  
for CIEL. July 3, 1986. EPA Accession  
No. 263948.

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

Signature: 

Date: 7 Dec 86

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

Signature: 

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 LC<sub>50</sub> value of 90 (83-100) ug/L, Lindane 25% WP 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 =  $0.8 \pm 0.28$  g.  
 Mean standard length =  $38 \pm 3.9$  mm.

b. Dosage: Lindane 25% WP. 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 0.53 g fish/liter. The study was conducted 12 °C with a 16L:8D photoperiod.

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
320	220	54	95	100	100	100
180	96	24	5	20	55	65
100	72	18	0	0	10	10
56	34	8.4	0	0	0	0
32	24	6	0	0	0	0
Control	--	--	0	0	0	0

Time	LC <sub>50</sub> and 95% CI (ug/L)	
	as formulation	as lindane
24 hr	150 (130-170)	36 (32-43)
48 hr	120 (96-220)	31 (24-54)
72 hr	94 (85-115)	23 (21-28)
96 hr	90 (83-100)	22 (21-25)

D.O. levels were 9.5 mg/L at 0 hour and 7.5 mg/L at 96 hours; pH values were 7.4 at 0 hour and 6.8 at 96 hours.

Signs of toxicity included surfacing, excitability, and fish on the bottom of the test vessels.

12. Study Author's Conclusions/QA Measures:

The 96-hour LC<sub>50</sub> value for Lindane 25 WP to rainbow trout was 90 (83-100) ug/L, as formulation and 22 (21-25) 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 25% WP was conducted and found to be in acceptable form by a member of our Quality Assurance Unit... A procedure audit was conducted on June 5, 1986. Results were reported to management on June 10, 1986. A final inspection of all data and records on July 3, 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 used 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, which is based on Stephan's program. The 96-hour LC<sub>50</sub> values were 96.2 (82.3-109.9) ug/L as measured formulation.
- c. Discussion/Results: With a 96-hour LC<sub>50</sub> value of 90 (83-100) ug/L Lindane 25 WP is very highly toxic to coldwater fish.

Conclusions:

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

STAVOLA LINDANE 25WP RAINBOW TROUT 11-28-86

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
220	20	20	100	9.536742E-05
96	20	13	65	13.1588
72	20	2	10	2.012253E-02
34	20	0	0	9.536742E-05
24	20	0	0	9.536742E-05

THE BINOMIAL TEST SHOWS THAT 72 AND 220 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 89.33313

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS		
2	7.602794E-02		96.18124	82.34379	109.9026

NO CONVERGENCE IN 25 ITERATIONS. THE PROBIT METHOD PROBABLY CANNOT BE USED WITH THIS SET OF DATA.

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STAVOLA FISH ACUTE TOXICITY *25% WP-Lindane*  
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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
54	20	20	100	9.53674E-05
24	20	13	65	13.1588
18	20	2	10	.0201225
8.4	20	0	0	9.53674E-05
6	20	0	0	9.53674E-05

THE BINOMIAL TEST SHOWS THAT 18 AND 54 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 22.3333

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
2	.076028	23.9878	20.5892	27.35

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
16	.316572	1	.999994

SLOPE = 13.3407  
 95 PERCENT CONFIDENCE LIMITS = 5.8346 AND 20.8468

LC50 = 22.4559  
 95 PERCENT CONFIDENCE LIMITS = 20.6953 AND 25.2311

LC10 = 18.0357  
 95 PERCENT CONFIDENCE LIMITS = 13.8964 AND 19.7842

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