

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
Bluegill-Lepomis macrochirus
4. Study Identification: Acute Toxicity of Lindane (25% WP) to Bluegill Sunfish (Lepomis macrochirus); Analytical Bio-Chemistry Laboratories, Inc., Report No. 34550. Submitted by Rhone-Poulenc, Inc. for CIEL; July 7, 1986. EPA Accession No. 263947.

5. Reviewed by: Ann Stavola
Aquatic Biologist
EEB/HED
6. Approved by: Doug Urban
Supervisory Biologist
EEB/HED

Signature: *Ann Stavola*

Date: *9 Dec 86*

Signature: *Doug Urban*

Date: *12/31/86*

7. Conclusions:

The study is scientifically sound. Although the test material was a formulated product it meets EPA Guidelines requirements for acute toxicity testing with fish since we required testing with the formulation. With an LC₅₀ value of 200 (170-250) ug/L, Lindane 25% WP is highly toxic to warmwater fish.

8. Recommendations: N/A.
9. Background:

Submitted in response to data requirements of Lindane Registration Standard.

10. Materials and Methods:

a. Test Animals: Bluegill sunfish (Lepomis macrochirus) obtained from Osage Catfisheries, Osage Beach, Missouri.

Weight = 0.60 ± 0.19 g.
Standard length = 28 ± 2.6 mm.

b. Dosage: Lindane 25% WP. Dilution water was soft reconstituted water. Concentration measured by GLC at 0 hour and 96 hours.

c. Study Design: The test was conducted in 5-gallon glass vessels containing 15 liters of test solution. The nominal concentrations were 100, 180, 320, 560, and 1000 ug/L of the formulation. There were 10 fish per replicate concentration and duplicate controls. The test was conducted at 22 °C.

d. Statistics: The raw data were analyzed by a computerized LC50 program developed by Stephan.

11. Reported Results:

Nominal Conc. (ug/L)	Measured Conc. (ug/L)		No. Dead			
	as formulation	as lindane	24 hr	48 hr	72 hr	96 hr
1000	800	200	20	20	20	20
560	224	56	5	6	7	10
320	188	47	2	6	7	11
180	88	22	0	1	1	1
100	56	14	0	0	0	0
Control	--	--	0	0	0	0

Time	LC50 and 95% CI (ug/L)	
	as formulation	as lindane
24 hr	320 (270-390)	80 (67-97)
48 hr	260 (210-340)	65 (53-86)
72 hr	244 (201-321)	61 (50-80)
96 hr	200 (170-250)	50 (42-62)

D.O. levels were 8.8 mg/L at 0 hour and 5.7 mg/L at 96 hours; pH values were 7.5 at 0 hour and 6.9 at 96 hours.

The general symptoms of toxicity in the fish exposed to Lindane 25% WP were surfacing, loss of equilibrium, rapid respiration, excitability and fish on the bottom of the vessels.

12. Study Author's Conclusions/QA Measures:

The 96-hour LC₅₀ value for Lindane 25% WP to warmwater fish was 200 ug/L based on 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 (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 6, 1986. No deviations were noted. A final inspection of all data and records on June 26, 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 in this study follows Methods for Acute Toxicity Tests with Fish, Macroinvertebrates, and Amphibians, EPA-660/3-75-009. The test material was a formulated product as was required in the Registration Standard.
- b. Statistics: The data were analyzed by EEB's Toxanal program, which is based on Stephan's program. The 96-hour LC₅₀ values were computed to be 49.8 (41.8-62.4) ug/L as lindane and 199.3 (167-249.5) ug/L as the formulation.
- c. Discussion/Results: The reported LC₅₀ values are acceptable since they agree with the values computed by EEB. The data indicate that the 25% WP formulation of lindane is highly toxic to warmwater fish.

Conclusions:

1. Category: Core.
2. Rationale: We required testing with this formulation.

STAVOLA LINDANE 25WP BLUEGILL 11-24-86

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
200	20	20	100	9.536742E-05
56	20	10	50	58.80984
47	20	11	55	41.19014
22	20	1	5	2.002716E-03
14	20	0	0	9.536742E-05

THE BINOMIAL TEST SHOWS THAT 22 AND 200 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 44.08608

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS
3	.2539271	49.58538	41.28407 68.34861

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
5	.1843004	1	.6506538

SLOPE = 4.669765
95 PERCENT CONFIDENCE LIMITS = 2.665025 AND 6.674505

LC50 = 49.81663
95 PERCENT CONFIDENCE LIMITS = 41.7548 AND 62.37393

LC10 = 26.63251
95 PERCENT CONFIDENCE LIMITS = 16.95153 AND 33.08879

STAVOLA LINDANE 25WP BLUEGILL 11-24-86

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
800	20	20	100	9.536742E-05
224	20	10	50	58.80984
188	20	11	55	41.19014
88	20	1	5	2.002716E-03
56	20	0	0	9.536742E-05

THE BINOMIAL TEST SHOWS THAT 88 AND 800 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 176.3442

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
3	.2539271	198.3415	165.1365	273.3939

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
7	.1842775	1	.6505328

SLOPE = 4.669626
95 PERCENT CONFIDENCE LIMITS = 2.665069 AND 6.674181

LC50 = 199.2669
95 PERCENT CONFIDENCE LIMITS = 167.0192 AND 249.4961

LC10 = 106.5283
95 PERCENT CONFIDENCE LIMITS = 67.80721 AND 132.3529
