

8-24-88

DATA EVALUATION RECORD

CASE: GS0249

METHOXYCLOR

CONT-CAT: 02 GUIDELINES: 72-1

MRID: 98800

McCann, J.A. (1971) Orthocide Methoxychlor 75-3: Rainbow Trout (#°Salmo gairdneri°#): Test No. 426. (U.S. Agricultural Research Service, Pesticides Regulation Div., Animal Biology Laboratory; unpublished study; CDL:108542-A)

REVIEW RESULTS:

VALID X INVALID _____ INCOMPLETE _____

GUIDELINE: SATISFIED X PARTIALLY SATISFIED _____ NOT SATISFIED _____

DIRECT RVW TIME = START DATE: END DATE:

REVIEWED BY: Kimberly Rhodes

TITLE: Aquatic Toxicologist

ORG: Hunter Environmental Services, Inc.

LOC/TEL:

SIGNATURE:

DATE: 6/22/88

APPROVED BY: Henry Craven

TITLE: Supervisor

ORG: EEB/HED

LOC/TEL: 557-0320

SIGNATURE:

Henry T. Craven

DATE: 8/24/88

DATA EVALUATION RECORD

1. CHEMICAL: Orthocide Methoxychlor 75-3
2. TEST MATERIAL: Orthocide Methoxychlor 75-3; Active Ingredients: 75% Captan, 3% Methoxychlor technical, 22% Inert ingredients
3. STUDY TYPE: Acute Freshwater Fish, Static
Species tested: Rainbow trout (Salmo gairdneri)
4. CITATION: McCann, J.A.; (1971) Orthocide Methoxychlor 75-3: Rainbow Trout (Salmo gairdneri): Test No. 426. U.S. Agricultural Research Service, Pesticide Regulation Div., Animal Biology Laboratory, Beltsville, MD. unpublished study; CDL:108542-A) MRID Number 98800.

5. REVIEWED BY:

Kimberly D. Rhodes
Aquatic Toxicologist
Hunter Environmental
Services, Inc.

Signature: *Kimberly D. Rhodes*

Date: 6/22/88

6. APPROVED BY:

Prapimpan Kosalwat, Ph.D.
Principal Scientist
KEN Engineering and
Applied Sciences, Inc.

Signature: *Prapimpan Kosalwat*

Date: 6/27/88

Henry T. Craven
Supervisor, EEB/HED
USEPA

Signature: *Henry T. Craven*

Date: 8/24/88

for Orthocide Methoxychlor 75-3.

7. CONCLUSIONS: This study ~~does not~~ meets the guideline requirements for a freshwater fish test. The 96-hour LC50 value of Orthocide Methoxychlor 75-3 for Salmo gairdneri was 0.132 ppm. Therefore, Orthocide Methoxychlor 75-3 is classified as highly toxic to rainbow trout.

8. RECOMMENDATIONS: N/A

9. BACKGROUND:
10. DISCUSSION OF INDIVIDUAL TESTS: N/A
11. MATERIALS AND METHODS:
 - A. Test Animals: Salmo gairdneri were obtained from a commercial fish supplier and maintained for a minimum of ten days. The fish had an average weight of 1.705 grams and average length of 55.75 millimeters. Fish were fed a commercial trout chow daily until 72 hours prior to testing. Three days prior to testing, fish from 35 to 75 mm in length were sorted from the stock tank and placed in acclimation tanks containing the quality and temperature of water to be used during the test. The acclimation temperature was 55°F.
 - B. Test System: The static fish test was conducted in five-gallon glass vessels containing 15 liters of reconstituted water. Fish were placed in each jar one day before the test chemicals were added. The test concentrations were 0.42, 0.32, 0.24, 0.18, 0.135 and 0.1 ppm. The stock solutions of chemicals were mixed within one hour of the start of the test.

The water parameters of the dilution water were: dissolved oxygen concentration, 8.6 mg/L; pH, 7.7; total hardness, 45 mg/L as CaCO₃; and total alkalinity, 35 mg/L as CaCO₃.
 - C. Dosage: 96-hour acute static test
 - D. Design: The six nominal concentrations of the test compound tested were 0.42, 0.32, 0.24, 0.18, 0.135, and 0.1 ppm. Twenty fish were tested at each concentration (ten per replicate level). Fish were placed in each jar one day before the test chemicals were added. The reaction of the fish to the toxicant was recorded at elapsed times of 0.75, 1.5, 3, 6, 12, and 24 hours. After the first day, readings were taken at 24-hour intervals until test termination.
 - E. Statistics: Test results were analyzed and the LC50 concentrations were computed by use of Litchfield and Wilcoxon (1949) method. Probit analysis was used to calculate the LC50 values.
12. REPORTED RESULTS: The Probit Analysis Work Sheet (attached) shows the 96-hour cumulative mortality observed during the acute toxicity test of Orthocide Methoxychlor 75-3 to rainbow trout. After 96 hours of exposure, the mortality ranged from 5 percent in 0.1ppm to 100 percent in test concentrations of 0.18 to 0.42 ppm. No mention was made about the control mortality. The 96-hour LC50 value for

Orthocide Methoxychlor 75-3 was 0.132 ppm with a 95 percent confidence interval of 0.1225 to 0.142 ppm.

13. STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES:

"Orthocide Methoxychlor containing 75% captan and 3% methoxychlor can be expected to kill rainbow trout at a concentration of 0.138 ppm within 24 hours of exposure. The 24-hour LC50 is 0.152 ppm."

14. REVIEWER'S DISCUSSION AND INTERPRETATION OF STUDY RESULTS:

- A. Test Procedure: The test procedures were generally in accordance with protocols recommended by the Guidelines, but deviated from the SEP as follows:

There is a discrepancy in the observation period prior to test initiation. The report states that "No tests were made on these fish until they had undergone a minimum 10-day observation period." However, the fish were received on November 11, 1971 and the test began five days later (November 16, 1971). The SEP states that when test animals are brought into the laboratory, they should be quarantined for at least seven days. It is recommended that fish be acclimated to study conditions for at least two weeks prior to testing.

The report did not state if any mortality occurred during the observation period. The SEP states that organisms must not be used if more than 3% die during the 48 hours immediately prior to testing.

The report did not mention if a control was used during the test. Furthermore, an inert ingredient control should have also been conducted.

Average length and average weight were only given in the report, therefore it could not be determined if the individual fish weight was between 0.5 and 5.0 grams and if the length of the longest fish was not more than twice the length of the shortest fish.

A photoperiod was not specified in the report. A 16-hour light and an 8-hour dark photoperiod with a 15- to 30-minute transition period between light and dark is recommended.

The report did not specify whether water quality measurements (temperature, DO, pH) were conducted throughout the test. The report also did not specify how the temperature was regulated.

Since two active ingredients were combined to comprise the testing material (Captan 75% and Methoxychlor technical 3%), the contribution of 3 percent Methoxychlor technical to the overall toxicity could not be determined. Furthermore, the SEP states that if more than one active ingredient constitutes a

technical product, then the technical grade of each active ingredient must be tested separately.

- B. Statistical Analysis: The reviewer used the computer program developed by Stephan et al. to calculate a 96-hour LC50 of 0.137 ppm with 95 percent confidence limits of 0.12 to 0.15 ppm. These calculations are attached. The moving average method provides a similar LC50 and 95 percent confidence limits to that reported by the study's authors. The program does indicate that the selection of probit analyses, as done by the author, is not recommended for reporting the LC50 values.
- C. Discussion/Results: The 96-hour LC50 value of Orthocide Methoxychlor 75-3 was 0.132 ppm. Therefore, Orthocide Methoxychlor 75-3 is classified as highly toxic to rainbow trout.
- D. Adequacy of the Study: PRF
8-15-88
- (1) Classification: ~~Invalid~~ *core* for *formulated* product as *formulated*
 - (2) Rationale: The report did not mention any information about a control or an inert ingredient control. Furthermore, the test report did not provide any water quality data. Also separate tests should be conducted with the technical product of both active ingredients.
 - (3) Repairability: No.

15. COMPLETION OF ONE-LINER FOR STUDY: Yes, 6/22/88.

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Orthocide 75-3

Chemical Name Methoxychlor Chemical Class _____

No. _____

Study/Species/Lab/Succession 14-Day Single Dose Oral LD50 Chemical LD50 Results 95% C.L. Reviewer/Date _____ Validation Status _____

Species _____ LC50 = mg/kg (95% C.L.) Concn. Mort.(%) = _____

Slope = # Animals/Level = Age(Days) = _____ Sex = _____

Lab _____ 14-Day Dose Level mg/kg/(% Mortality) _____

Acc. _____ () , () , () , () , ()

Comments: _____

Study/Species/Lab/Succession 14-Day Single Dose Oral LD50 Chemical LD50 Results 95% C.L. Reviewer/Date _____ Validation Status _____

Species _____ LC50 = mg/kg (95% C.L.) Concn. Mort.(%) = _____

Slope = # Animals/Level = Age(Days) = _____ Sex = _____

Lab _____ 14-Day Dose Level mg/kg/(% Mortality) _____

Acc. _____ () , () , () , () , ()

Comments: _____

Study/Species/Lab/Succession 8-Day Dietary LC50 Chemical _____ Results 95% C.L. Reviewer/Date _____ Validation Status _____

Species _____ LC50 = ppm (95% C.L.) Concn. Mort.(%) = _____

Slope = # Animals/Level = Age(Days) = _____ Sex = _____

Lab _____ 8-Day Dose Level ppm/(Mortality) _____

Acc. _____ () , () , () , () , ()

Comments: _____

Study/Species/Lab/Succession 3-Day Dietary LC50 Chemical _____ Results 95% C.L. Reviewer/Date _____ Validation Status _____

Species _____ LC50 = ppm (95% C.L.) Concn. Mort.(%) = _____

Slope = # Animals/Level = Age(Days) = _____ Sex = _____

Lab _____ 3-Day Dose Level ppm/(Mortality) _____

Acc. _____ () , () , () , () , ()

Comments: _____

Study/Species/Lab/Succession 96-Hour Dietary LC50 Chemical _____ Results 95% C.L. Reviewer/Date _____ Validation Status _____

Species _____ LC50 = ppm (95% C.L.) Concn. Mort.(%) = _____ Sol. Concn. Mort.(%) = _____

Slope = # Animals/Level = Age(Days) = _____ Sex = _____ Temperature = _____

Lab _____ 96-Hour Dose Level ppm/(Mortality) _____

Acc. _____ () , () , () , () , ()

Comments: _____

Study/Species/Lab/Succession 96-Hour LC50 Chemical LD50 = 0.132 ppm (95% C.L.) Results 0.12-0.14 Reviewer/Date _____ Validation Status Invalid

Species Salmo gairdneri not Reported Animals/Level = 20 Concn. Mort.(%) = not reported Sol. Concn. Mort.(%) = not reported KDR _____

Lab U.S. Ag Research Service 75% Captan Temp. = 55° F 6/22/88

Acc. 98800 37% Methoxychlor 96-Hour Dose Level ppm/(Mortality) _____

0.01 (5) 0.135 (25) 0.18 (100) 0.24 (100) 0.32 (100) 0.42 (100)

Comments: Based on Nominal Concentrations

Study/Species/Lab/Succession 96-Hour LC50 Chemical _____ Results 95% C.L. Reviewer/Date _____ Validation Status _____

Species _____ LC50 = ppm (95% C.L.) Concn. Mort.(%) = _____ Sol. Concn. Mort.(%) = _____

Slope = # Animals/Level = Age(Days) = _____ Sex = _____ Temperature = _____

Lab _____ 96-Hour Dose Level ppm/(Mortality) _____

Acc. _____ () , () , () , () , ()

Comments: _____

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (%)
.42	20	20	100	9.536743E-05
.32	20	20	100	9.536743E-05
.24	20	20	100	9.536743E-05
.18	20	20	100	9.536743E-05
.135	20	5	25	2.069473
.1	20	1	5	2.002716E-03

THE BINOMIAL TEST SHOWS THAT .135 AND .18 CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS SINCE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS 97.93044 PERCENT. AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .1458625

>>>>>>>RESULTS CALCULATED USING THE MOVING AVERAGE METHOD
SPAN G LC50 95 PERCENT CONFIDENCE LIMITS
3 6.715758E-02 .1372299 .1237381 .1494237
NO CONVERGENCE IN 25 ITERATIONS. THE PROBIT METHOD PROBABLY CANNOT BE USED WITH THIS SET OF DATA.

PESTICIDES REGULATION DIVISION
Animal Biology Section (Fish)
PROBIT ANALYSIS WORK SHEET

Test Species Rainbow
Source Wytheville RFB
Exp. Period 96 hr.

Chemical Orthocide methoxychlor
Date Tested 11/15/71

Analysis by: John McCann, Biologist 12/6/71

Concentration ppm	No. dead / No. tested	Observed % Mortality	Expected % Mortality	O-E	Contributions to Chi (Nomo #1)
.24	20/20	100 ()			
.18	20/20	100 (99.84)	99.4	.44	.0025
.135	5/20	25	32	7	.0225
.1	1/20	5	1.2	3.8	.12

Total Fish Tested = 60 Total = .14575
 Number of Doses (K) = 3 Chi² = Total Cont. X Total fish = 2.9150
 Degrees of Freedom (K-2) = 1 to Chi
 Chi²(p=.05) for 1 deg of freedom = 3.84

1. DETERMINE flC_{50} :

LC_{84} .15
 LC_{50} .132
 LC_{16} .117

$S = \frac{LC_{84}/LC_{50} + LC_{50}/LC_{16}}{2} = \underline{1.13}$

N' (Fish used between 16% and 84% E) = 20
 $\sqrt{N}' = \underline{4.47}$
 $flC_{50} = s^{2.77/\sqrt{N}'} = s \cdot \underline{.62}$ (Nomo. #2) = 1.078

2. DETERMINE fs :

R (Largest/Smallest dose plotted) _____
 S (As determined above) _____
 A (Nomo. #3 using R and S) _____

$fs = A^{10(K-1)/K\sqrt{N}'}$ = A _____ (Nomo. #2) = _____

3. DETERMINE flC_y :

$(fs)^x = fs^{2.30}$ or 1.30 (Table 3 and Nomo. #2) = _____

flC_y (Nomo. #4 using $(fs)^x$ and flC_{50}) = _____

4. RESULTS (LC_x and Confidence Limits at $p = .05$):

LC_{10} .112
 Lower Limit (LC_{10}/flC_y) _____
 Upper Limit ($LC_{10} \times flC_y$) _____

LC_{50} = .132
 Lower Limit (LC_{50}/flC_{50}) .1225
 Upper Limit ($LC_{50} \times flC_{50}$) .142

LC_{99} = .155
 Lower Limit (LC_{99}/flC_y) _____
 Upper Limit ($LC_{99} \times flC_y$) _____

J