CASE G80088 DIMETHOATE PM 02/05/82

CHEM 035001 Dimethoate (O,O-dimethyl S-((methylcar

BRANCH EEB DISC 40 TOPIC 05054543

FORMULATION 12 = EMULSIFIABLE CONCENTRATE (EC OR E)

FICHE/MASTER ID 00077504 CONTENT CAT 01

McCann, J. (1970) Cygon 267: Goldfish ("Carassius auratus"): Test No. 292. (U.S. Agricultural Research Service, Pesticides Regulation Div.; Unpublished study; CDL:129659-A)

SUBST. CLASS = S.

DIRECT RVW TIME = 3hr. (MH) START-DATE 8/25/82 END DATE 8/27/82

REVIEWED BY: James D. Felkel
TITLE: Wildlife Biologist
ORG: EEB/HED
LOC/TEL: Crystal Mall #2/Room 1112; 557-3113

SIGNATURE: James D. Felkel DATE: 9/28/82

APPROVED BY:
TITLE:
ORG:
LOC/TEL:

SIGNATURE: DATE:

(1-30-92)

DATA EVALUATION RECORD

1. Chemical: Dimethoate (Shaughnessy #035001)

2. Formulation: Cygon 267 (30.5% a.i.)

3. Citation: U.S.E.P.A. 1970. Report on the toxicity of Cygon 267 to goldfish. (U.S.E.P.A. Chemical and Biological Investigations Branch, Beltsville, Maryland, Test No. 292, August 25-29, 1970, unpublished report). MRID No. 00077504

4. Reviewed by: James D. Felkel, Wildlife Biologist
Ecological Effects Branch
Hazard Evaluation Division (TS-769)

5. Date Reviewed: August 24, 1982

6. Test Type: Fish acute LC_{50} (96-hour)

A. Test Species: Goldfish (Carassius auratus)

7. Reported Results:

Cygon 267 containing 30.5% Dimethoate can be expected to kill goldfish at a concentration of 150 ppm. The 24-hour LC_{50} is 232 ppm. The 48-hour LC_{50} is 180 ppm. (Concentrations based on total formulation).

8. Reviewer's Conclusions:

Although scientifically sound, the study tested a fish species not native to the U.S. and concentrations tested were not adequate for calculation of a 96-hour LC_{50}. 180 ppm as an approximately 48-hour LC_{50} is confirmed. The study does not meet the intent of proposed subpart E guidelines, should formulated product testing be required.

Materials/Methods Reported

Test Species: Goldfish (Carassius auratus)

Conditions: Excellent

Average length: 36.2 mm.
Average weight: 0.624 gm.

Source: Harrison Lake National Fish Hatchery

Date received: July 15, 1970 Acclimation temperature: 65°F

Bioassay Conditions:

Test vessel: 5-gallon glass jar. Water volume: 15 l.
Fish/vessel: 5 Fish/concentration: 10 Concentrations tested: 5

Water Quality:

Test Water: Demineralized water 1,000,000 ohms resistivity reconstituted to U.S. Fish and Wildlife Service Standards.

Temperature: 65°F	pH: 7.0
Alkalinity: 41.04 ppm	Total hardness: 51.3 ppm
Calcium hardness: 17.1 ppm.	Dissolved O_2: 6.0 ppm
Dissolved CO_2: <10 ppm	

Fish Pretest History:

Upon arrival at the Laboratory, the fish were placed in a plastic swimmming pool of approximately 570 gallons capacity. Water in the pool was maintained at a temperature suitable for the species of fish and aerated continuously. The water was recirculated through a sand filter approximately once per hour.

The fish were fed commercial trout chow while at the Laboratory. They were treated with 2 ppm acriflavine for 2 days for columnaris disease control approximately 3 weeks before testing. No tests were made on these fish until they had undergone a minimum 10-day observation period.

Acclimation:

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 fish were not fed after being taken from the stock pool.

Test Procedure:

The handling of the fish and the organization of the test followed procedures described in Doudoroff (1951), Lennon (1964) and the Fish Pesticide Acute Toxicity Test Method as developed by the Animal Biology Staff, Pesticides Regulation Division, ARS in August 1966. Test results were analyzed and the LC_{50} concentrations were computed by use of the Litchfield and Wilcoxon (1949) method.

The bio-assay tests were made in 5-gallon-glass jars containing 15 liters of reconstituted water. Fish were placed in each jar one day before the test chemicals were added. Twenty fish were tested at each concentration. The stock solutions* of chemicals were mixed within 1 hour of the start of the test. The aliquot of chemical necessary to obtain the desired concentration of toxicant was added to the test jars and immediately stirred into the water to ensure an even distribution. All toxicity levels presented in this paper are based on the amount of active ingredient** present in the test solutions unless indicated otherwise.

The reaction of the fish to the toxicant was recorded at elapsed times of 3/4, 1 1/2, 3, 6, 12 and 24 hours. Readings were taken at 24-hour intervals after the first day of the test period. Observations made at non-scheduled intervals were also recorded.

* Direct application of liquid.

** Total formulation.

Results Reported

Concentration of Cygon 267 in ppm. expected by computation to kill from 10 to 90 percent of the goldfish at a temperature of 65°F.

Test Period	Initial Mortality May be Expected	Total Mortality May be Expected	LC 50
24 hr.	150	357	232
48 hr.	112	290	180
96 hr. 70% mortality at lowest concentration tested (155 ppm.)			

Reviewer's Evaluation

The test methods are generally consistent with proposed subpart E guidelines (7/10/78) However, the test species is not native to the U.S. and the test concentrations were too high to calculate a 96-hour LC_{50}. This is a formulated product test. 180 ppm as an approximate 48-hour LC_{50} is confirmed (see attached analysis).

Conclusions

1. Category: Supplemental

2. Rationale: Although scientifically sound, the study tested a fish species not native to the U.S. and concentrations tested were not adequate for calculation of a 96-hour LC_{50}.

3. Repairability: Not Repairable.

LITERATURE CITED

DOUDOROFF, P., B. G. ANDERSON. G. E. BURDICK, P. S. GALTSOFF, W. B. HART. R. PATRICK, E. R. STRONG, K. W. SURBER, and W. M. VAN HORN. 1951. Bio-assay methods for the evaluation of acute toxicity of industrial wastes to fish. Sewage and Industrial Waste, 23 (11); 1380-1397.

LENMON, ROBERT E. and CHARLES R. WALKER. 1964. Investigation in fish control; 1 laboratories and methods for screening fish control chemicals. Bureau of Sport Fisheries and Wildlife. Circular 185.

LITCHFIELD, J. T. Jr., and F. WILCOXON. 1949. A simplified method of evaluating dose-effect experiments. J. Phara. and Exp. Therap. 96:99-113 (May-August)

FELKEL DIMETHOATE GOLDFISH 48-HR LC50

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
280	10	10	100	0.09765625
240	10	10	100	0.09765625
210	10	9	90	1.074219
180	10	5	50	62.30469
155	10	0	0	0.09765625

THE BINOMIAL TEST SHOWS THAT 155 AND 210 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 180

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
3	0.1134549	185.0095	172.8822	195.5061

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

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