(TDR03B) DATA EVALUATION RECORD PAGE 1 OF

CASE GS0109 TERBUFOS

CHEM 105001 Terbufos (S-(((1,1-dimethylethyl)thio) PM 04/15/82

BRANCH EEB DISC 40 TDPIC 05100542

FORMULATION 00 = ACTIVE INGREDIENT

FICHE/MASTER ID 00035120 CONTENT CAT 01

Krize, J.W.; Terrell, Y. (1978) Report: Avian Dietary LC50 (5-Day Dietary Exposure) of Enlist Technical (Terbufos Technical) EPA File Symbol 2749 UEL to Mallard Duck: Laboratory No. 8E-3451, (Unpublished study received Mar 27, 1979 under 2749-425; prepared by Cannon Laboratories, Inc.,; submitted by Aceto Chemical Co., Inc.,; Flushing, N.Y.; CDL:241730-A)

SUBST. CLASS = S.

DIRECT RVW TIME = .2 hrs.(MH) START-DATE 10/4/82 END DATE 11/20/82

REVIEWED BY: James D. Felkel
TITLE: Wildlife Biologist
ORG: Ecological Effects Branch, Hazard Evaluation Division (TS-769)
LOC/TEL: 703-557-7667

SIGNATURE: James D. Felkel DATE: 12/10/82

APPROVED BY:
TITLE:
ORG:
LOC/TEL:

SIGNATURE: DATE:

9 pages

DATA EVALUATION RECORD

1. Chemical: Terbufos (Shaughnessy #105001)

2. Formulation: Technical, 86% a.i. (F. Betz review)

3. Citation: Krize, J.W.; Terrell, Y. (1978) Report: Avian Dietary LC_{50} (5-Day Dietary Exposure) of Enlist Technical (Terbufos Technical) EPA File Symbol 2749 UEL to Mallard Duck: Laboratory No. 8E-3451. (Unpublished study received 3/27/79 under 2749-425; prepared by Cannon Laboratories, Inc., submitted by Aceto Chemical Co., Inc., Flushing, N.Y.; CDL:241730-A) MRID#00035120

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

5. Date Reviewed: November 3, 1982

6. Test Type: Avian dietary LC_{50}

A. Test Species: Mallard Duck (Anas platyrhynchos)

7. Reported Results:

The 5-day dietary exposure LC_{50} for the mallard is 520 (400-676) ppm.

8. Reviewer's Conclusions:

Severe food rejection particularly at higher dose levels, prevents calculation of an accurate LC_{50} value. However, no adverse effects (other than food rejection) were seen at the lowest dietary levels of 100 and 150 ppm. Without a comparable LC_{50}, the study does not fully meet the intent of proposed guidelines (7/10/78), although it is scientifically sound in the sense that methods used were consistent with proposed guidelines. Because of the food rejection further mallard dietary testing is not warranted.

METHODS REPORTED

A preliminary toxicity study, conducted on October 21, 1976 in Mallard ducks using this same compound, indicated that the general toxic level was between 100 and 750 ppm. Based on this finding, five concentrations were selected for toxicity determination. The birds for the 5-day dietary exposure were randomly selected and placed in groups as follows:

GROUP NUMBER	SPECIES	BIRDS/PEN	TEST MATERIAL	DIETARY CONCENTRATION RANGE
1-5	Mallard ducks	10	'Enlist Technical (Terbufos Technical) EPA File Symbol 2749 UEL'	100-750 ppm
6	Mallard ducks	10	Control	--

A total of 60 Mallard ducks, ranging in age between 10 and 15 days, were utilized. The birds were obtained as day-old chicks from Whistling Wings, Hanover, Illinois. The birds were housed in thermostatically controlled quarters for the acclimatization period of ten days and for the duration of this study. Incandescent lighting was maintained continuously 24 hours per day.

Diet Preparation

The test material 'Enlist Technical (Terbufos Technical) EPA File Symbol 2749 UEL' was dissolved in edible grade corn oil and incorporated into the ration such that the concentration of the solution represented two parts (by weight). An equivalent amount of vehicle was added to the control diet. Diets were mixed by commercial, mechanical food mixers and stored at room temperature until used.

Treatment

During the pre-treatment acclimatization period, all of the birds received normal control ration.

During the test period, the birds received diets containing their respective dosage leve of the test material for the first five days, then standard bird ration was substituted and fed for an additional three days. Feed and water were available ad libitum.

Throughout the test, all toxic signs and abnormal behavior were noted. The date of death for any mortality was recorded. Food consumption was measured on a daily basis.

Results Reported

Mallard ducks, administered a diet with 'Enlist Technical (Terbufos Technical) EPA File Symbol 2749 UEL' incorporated in the feed, did not exhibit any untoward behavioral reactions at 100 or 150 ppm. Mortality of 20% occurred at 250 ppm, while 10% mortality occurred at 500 ppm and 60% mortality occurred at 750 ppm.

Mortality data is presented in Table 2. Mean body weight values are shown in Table 3, while the average food consumption per bird per day is presented in Table 4.

Body weight values decreased in all treated groups between days 0 and 5, but increased between days 5 and 8 when the birds were returned to normal diet. This decrease in body weight corresponded with the decrease in food consumption shown between days 1 and 5. The greater the concentration of test material in the food, the greater was the decrease in food consumption.

Reviewer's Evaluation

This study was previously reviewed by F. Betz of EEB (6/30/79). This review is appended.

Methods reported were generally consistent with proposed guidelines (7/10/78). However, there was severe reduction in food consumption with increasing dietary level of terbufos. This problem was encountered in the first mallard dietary study on terbufos reviewed by F. Betz (MRID#00087717) and was part of the reason Mr. Betz invalidated the study.

Conclusions

1. Category: Supplemental

2. Rationale: Sever food rejection prevents calculation of a mallard dietary LC_{50} for comparison with the available bobwhite quail study. Because of the food rejection problem, further mallard testing is not deemed warranted.

3. Repairability: No

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TABLE 2
MORTALITY OF 'ENLIST TECHNICAL (TERBUFOS TECHNICAL)
EPA FILE SYMBOL 2749 UEL' IN MALLARD DUCKS

GROUP NUMBER	DIETARY LEVEL (PPM)	MORTALITY (DAYS) 1	2	3	4	5	6	7	8	TOTAL	%
1	100	0	0	0	0	0	0	0	0	0	0
2	150	0	0	0	0	0	0	0	0	0	0
3	250	0	0	0	1	0	1	0	0	2	20
4	500	0	0	0	0	0	1	0	0	1	10
5	750	5	0	0	0	0	1	0	0	6	60
6	Control	0	0	0	0	0	0	0	0	0	0

Cannon Laboratories, Inc.

TABLE 3
MEAN BODY WEIGHTS FOR 'ENLIST TECHNICAL (TERBUFOS TECHNICAL)
EPA FILE SYMBOL 2749 UEL' IN MALLARD DUCKS

GROUP NUMBER	DIETARY LEVEL (PPM)	DAYS 0	DAYS 5	DAYS 8
1	100	274.9 ±45.2	272.9 ±46.0	369.4 ±57.2
2	150	305.1 ±41.0	263.9 ±29.4	403.6 ±53.9
3	250	282.3 ±43.7	229.0 ±42.5	334.1 ±64.9
4	500	309.4 ±34.1	220.3 ±21.3	299.8 ±63.6
5	750	310.6 ±35.6	264.2 ±38.9	388.2 ±37.2
6	Control	267.5 ±33.1	384.1 ±30.9	495.3 ±40.4

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TABLE 4
FOOD CONSUMPTION FOR 'ENLIST TECHNICAL (TERBUFOS TECHNICAL)
EPA FILE SYMBOL 2749 UEL' IN MALLARD DUCKS

GROUP NUMBER	DIETARY LEVEL (PPM)	AVERAGE FOOD CONSUMED PER BIRD GM/DAY — TREATED DIET — DAYS 1	2	3	4	5	UNTREATED DIET 6	7	8
1	100	30.0	24.2	30.0	50.0	52.7	45.1	93.9	114.3
2	150	23.6	20.7	26.6	27.0	29.8	43.2	100.0	128.6
3	250	8.8	11.7	15.0	14.7	17.2	17.4	117.3	118.9
4	500	13.6	7.4	8.4	10.2	9.6	14.3	95.0	100.7
5	750	20.6	0.4	0.0	0.0	0.2	0.75	109.5	117.5
6	Control	30.0	30.0	60.0	96.2	103.9	108.0	66.5	112.6

Mean Bird Wgt = 267-310

TEST: Avian Dietary LC_{50}

SPECIES: Mallard

RESULTS: LC_{50} = 520 (400-676) ppm

CHEMICAL: Terbufos Technical (86% a.i.)

TITLE: Report Avian Dietary LC_{50} (5-Day Dietary Exposure) of Enlist Technical (Terbufos Technical) EPA File Symbol UEL to Mallard Duck.

AUTHOR: John W. Krize, Cannon Labs. Inc.

STUDY DATE: December 3, 1979

ACCESSION NO.

REGISTRANT: Aceto Chemical Co.

VALIDATION CATEGORY: Core

COMMENTS:

Age of birds was stated as 10-15 days. Mean body weights were 267 to 310 grams at beginning of test. Expected body weights for birds in this age class is 100-250 grams.

Food consumption was suppressed at all treatment levels, to the extent that birds in the highest treatment level ate 0.4 grams feed/day or less for four consecutive days (<0.2% of body weight/day). It is obvious that the toxicant acted as a repellent and that the true dietary toxicity of terbufos was not determined in this test. However, the study is acceptable in meeting agency registration requirements. For the purpose of hazard evaluation, the Bobwhite quail LC_{50} (140 ppm) should be used. This conclusion is based, in part, on discussions with Richard Tucker (EEB 6/26/79).

[illegible] THIS DATA SET DOES NOT MEET
THE CRITERIA ESTABLISHED BY THE COMMITTEE ON
METHODS FOR TOXICITY TESTS WITH AQUATIC ORGANISMS
BECAUSE NO PERCENT DEAD IS GREATER THAN 55 PERCENT.

FELKEL TERBUFOS MALLARD LC50

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
750	10	6	60	37.69531
500	10	1	10	1.074219
250	10	2	20	5.46875
150	10	0	0	0.09765625
100	10	0	0	0.09765625

THE BINOMIAL TEST SHOWS THAT 150 AND +INFINITY 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 696.5794

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
1	0.7206816	696.5794	583.6564	1616.322

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
5	0.4606176	1	0.2188884

SLOPE = 2.853948
95 PERCENT CONFIDENCE LIMITS = 0.9170073 AND 4.790889

LC50 = 760.9714
95 PERCENT CONFIDENCE LIMITS = 512.825 AND 2794.85

LC10 = 273.1309
95 PERCENT CONFIDENCE LIMITS = 79.52306 AND 403.4673