C-24-83

CASE GS0097 CHLOROTHALONIL PM 400 ~~08/03/82~~

CHEM 081901 Chlorothalonil (tetrachloroisophthalon

BRANCH EEB DISC 40 TOPIC 05103043

FORMULATION

FICHE/MASTER ID RI 0 CHL 03 CONTENT CAT

Beavers, J. and R. Fink. 1981. Nine-day dietary LC50 - Mallard Duck. T-114-2 Unpublished study submitted by Diamond Shamrock Corp. Acc # 071097.

SUBST. CLASS = S.

DIRECT RVW TIME = (MH) START-DATE END DATE

REVIEWED BY: Daniel Rieder
TITLE: Wildlife Biologist
ORG: EEB/HED
LOC/TEL:
SIGNATURE: Daniel Rieder DATE: 6/24/83

APPROVED BY:
TITLE:
ORG:
LOC/TEL:
SIGNATURE: DATE:

1

DATA EVALUATION RECORD

1. CHEMICAL: 4-hydroxy -2,5,6-trichloroisophthalonitrile. (DS-3701).

2. Formulation: 99%; analytical grade.

3. Citation: Beavers, J. and R. Fink. 1981. Nine-day dietary LC_{50} - mallard duck. T-114-2. Final report. Unpublished study submitted to Diamond Shamrock Corp., Plainesville, Ohio by Wildlife International Ltd., St. Michael's, MD. Registration No. 677-313. Accession No. 071097.

4. Reviewed by: John J. Bascietto
Wildlife Biologist
EEB/HED

5. Date Reviewed: Nov 8, 1982

6. Test Type: Subacute toxicity - Avian Dietary LC_{50}.

A. Test Species: Mallard duck (Anas platyrynchos)

7. Reported Results:

The dietary LC_{50} of this compound in the Mallard duck is 2000 ppm, confidence limits 1499 - 2678 ppm.

8. Reviewer's Conclusion:

The study is scientifically sound and with an LC_{50} = 2000 (1499-2678) ppm, DS-3701, (a degradation product of chlorothalonil), is "slightly" toxic to mallard ducks. The study fulfills the requirement for an avian dietary toxicity test of this compound.

At levels as low as 562 ppm (and probably lower) this compound elicits sufficiently severe subacute toxic effects so as to significantly interfere with normal life functions such as feeding, locomotion, reaction to sights and sounds, and also severely depressess body weight gain in young birds because of interference with feeding. A "no observable effect level" was not established by this study.

9. Materials and Methods -

A. Test procedures: the protocol and procedures closely follow the E.P.A. recommended protocol for an 8-day dietary LC_{50} test with mallards discussed in the July 10, 1978 Proposed Guidelines, except that the withdrawal phase (no test substance administered) was extended by one (1) day because of severe and continuing subacute toxic effects.

B. Statistical Analysis: LC_{50} and 95% confidence limits were calculated from raw dose-mortality data by the "Probit" program of the Statistical Analysis System (SAS; Carey, North Carolina).

10. Results

Dose - Mortality Reponse

Test conc. (ppm)	No. Dead/ No. tested (On Day 9)
0 (Control)	0/10
0 "	0/10
0 "	0/10
0 "	0/10
0 "	0/10
562	0/10
1000	1/10
1780	5/10
3160	7/10
5620	10/10

LC_{50} + 95% c.i. = 2000 ppm (1499 - 2678 ppm)

Body weight and Food Copsumption - there was a significant dose -related effect which reduced food consumption and depressed body weight gains at all concentratons of DS-3701 tested, as compared to controls. In addition to the significant quantitative evidence from pen data,, this was also reflected in necropsy results of birds which died on test. Lesions associated with reduced feeding, i.e., no body fat, loss of body muscle mass, empty or gas and fluid filled gastro-intestinal tract, and enlarged gall bladders were revealed upon necropsy of these birds. Many birds also had small dark spleens and small pale livers.

Symptoms of toxicity - toxic symptoms were noted at all doses tested. At 562 ppm lethargy developed on Day 4 and continued throughout. One bird lost coordination of Day 5; two other birds were depressed, lost reaction to stimuli, and lost coordination on Day 6. An additional bird was severely affected by depression, lost reactions, wing droop, no coordinations and lower limb weakness on Day 7. A final bird exhibited reduced reactions to stimuli, and lost coordination by Day 8. All birds at this level were asymptomatic by Day 9 (toxicant treatment ended on Day 5).

At 1000 ppm - birds were lethargic on Day 4. By Day 5 depression was observed in all birds, as well as reduced reaction to stimuli. Same

birds lost coordination and righting reflex. Symptoms, which later included wing droop, were exhibited by all birds through Day 8. By Day 9 all but a few birds were asymptomatic.

At 1780 ppm lethargy began on Days 2 and 3; depression was apparent by Day 4. All birds were depressed and had reduced reactions by Day 5. All birds lost coordination and righting reflex by Day 5. One bird continued exhibiting the latter symptoms to Day 6. Most birds at this level exhibited all the above symptoms plus wing droop, prostrate posture on Day 7, with lower limb weakness continuing through Day 8. By Day 9 reduced reactions, loss of coordination and lower limb weakness were still observed.

At the highest levels, 3160 and 5620 ppm, symptoms prior to death included lethargy progressing to depression, reduced reaction to stimuli, wing droop, loss of coordination, lower limb weakness, prostrate posture, and loss of righting reflex. Symptoms appeared by Day 2 and remained apparent by Day 9 in the three surviving birds (at both levels).

11. Reviewer's Evaluation

A. Test procedure: this test was performed in substantial agreement with the protocols recommended by the Registration Guidelines.

B. Statistical Analysis: EEB uses the Branch "Stephans's" computer program to calculate LC_{50} & 95% c.i.. We agree with the LC_{50} range obtained by the authors.

C. Results - (DS-3701 is a product of chlorothalonil degradation).

Dietary toxicity results are in agreement with the raw data obtained, so that with an LC_{50} = 2000 (1499-2678) ppm, DS-3701 is "slightly" toxic to mallards, when administered in the diet.

The toxic symptoms exhibited during this test were many and quite severe. In this reviewer's experience the symptoms were unusual in their variety and severity. It is surprising that more birds did not die at the lower levels tested. The toxic symptoms discussed were sufficiently severe so as to disrupt normal life functions necessary for survival in the wild, especially for these young birds. Feeding and weight gain were the two most obviously adversely affected parameters. However all other symptoms noted would tend (alone or in combination) to render these young birds helpless in their natural environment. These toxic effects are also expected to occur at lower levels than those tested (< 500 ppm). (N.B. - this study did not establish a "no observable effect level").

D. Conclusions

1. Category: Core
2. Rationale: Guidelines study
3. Repair: N/A