12-19-90

DATA EVALUATION RECORD

1. CHEMICAL: Methyl isothiocyanate

2. TEST MATERIAL: Methyl isothiocyanate, Technical

3. STUDY TYPE: Mallard Duck Dietary LC_{50} Test

4. CITATION:
Ross, D. B., Cameron, M. M., Roberts, N. L., 1977. The Subacute Toxicity (LC_{50}) of Methyl Isothiocyanate (ZK3318)To The Mallard Duck, Performed By Huntingdon Research Center, Huntingdon, Cambridgeshire, England, Project No. SHG 135-WL/77638, For Nor-Am Chemical Company, 3509 Silverside Road, P.O. Box 7495 Wilmington, DE 19803, MRID #00119182

5. REVIEWED BY:

Dennis J. McLane
Ecological Effects Branch
Environmental Fate and Effects Division (H7507 C)

12-19-90

6. APPROVED BY:

Les Touart, Acting Section Head
Ecological Effects Branch
Environmental Fate and Effects Division (H7507 C)

2/26/91

7. CONCLUSION:

The study is not scientifically sound and does not meet the guideline requirements.

8. Background:

A summary submitted in connection with list B procedure resulted in the review of this study.

9. MATERIALS AND METHODS:

A. Test Organisms:

Species-mallard duck

Supplier-Lincolnshire Pheasantries

Age-12 days

Acclimation period-12 days

B. Test System:

Pen size-not reported

Environmental temperature-not reported

Relative humidity-not reported

Ventilation-"Because of the volatility of the test compound, and to avoid contamination between treatment, the birds offered diet containing ZK3318 were housed in a building to provide increased air extraction."(excerpted from study)

Photoperiod-not reported

Dose preparation-"A bulk mix of the basal diet containing all ingredients with the exception of maize oil was prepared by a local foodstuffs compounder. The composition of this diet is given in Appendix 4. Immediately prior to using the diets on appropriate amount of edible grade maize oil (Mazola - Corn products) was mixed with some of the 'dry' diet to give the required quantity of basal diet. In preparing each experimental diet an accurately weighed amount of ZK3318 or dieldrin was thoroughly mixed with a small amount of maize oil and then combined with the 'dry' diet to give the Final test diet. Fresh batches of treated diet were prepared daily as the test compound was known to be volatile."

C. Test Design:

Range finding test-not reported

Definitive test

Nominal concentrations-2500, 5000, 7500, 10000, and 11500 ppm

Controls- 3 control levels were used.

Number of test organisms-10 birds per level

Biological observations-bodyweight, food consumption, mortalities, signs of toxicity, and gross post-mortem examinations

Pen conditions-The report did not contain the following:

1. Size of the pen
2. Temperature
3. Humidity
4. Lighting

10. REPORTED RESULTS:

Mean measured concentrations-Not performed

Recovery of chemical-Not applicable

Bodyweights-"Birds offered diet containing ZK 3318 showed a loss in bodyweight over the treatment period, but the bodyweight increase of these birds over the post-treatment oberservation period was greater than either the negative or positive control groups of birds. The decrease in bodyweight may well be associated with the food consumption results which are discussed on the next page."

Food consumption- "Food consumption was markedly reduced during the treatment period in groups with ZK3318 in the diet."

Mortality and observations- "Birds offered diets containing ZK3318 appeared lethargic.Lethary and loss loss of muscle function were marked in birds offered diets containing dieldrin."

5 day treatment period- 11200 ppm level 8 deaths, 13000 ppm level 5 deaths, 15700 ppm 10 deaths, 19700 ppm 9 deaths, 25825 ppm 9 deaths

3 day observation period- 11200 ppm level 1 deaths, 13000 ppm level 1 death, 25825 ppm 1 death

Gross pathology-

"No abnormalities were detected."

11. STUDY AUTHORS'S CONCLUSIONS / QUALITY ASSURANCE MEASURES:

A signed statement indicated that the test was performed as reported.

Conclusion

Although it was not possible to determine an ???? LC_{50} value for ZK3318, it was apparent that, with an LC_{50} within the range of 5,000 - 10000 ppm. It was considerably less toxic to the Ring-necked mallard duck than dieldrin with an LC_{50} value of 43 ppm."

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

A. Test Procedure:

The following items were not reported:

1. Breeding history (Birds were of the same hatch)

2. Health of the birds

3. Size of the pens

4. Temperature

5. Humidity

6. Lighting

7. Amount of corn oil

8. Mix ratio

9. Food consumption per pen

10. Percent active ingredient

The following items do not meet guideline criteria:

1. The concentration in the feed was not measured.

B. Statistical Analysis:

Statistical analysis was not attempted by the laboratory, because the LC_{50} value was above 5000 ppm.

C. Discussion/Results:

The following items are expected the effect the results:

1. MITC is highly volatile and would be expected to evaporate from the food quickly. Therefore the relationship of the nominal concentration to the actual concentration is known. Not knowing the tested concentration makes deriving the LC_{50} value impossible.

2. Unreported items listed above.

D. Adequacy of the Study:

1. Classification: Invalid

2. Rationale:
MITC is highly volatile and would be expected to evaporate from the food quickly. Therefore the relationship of the nominal concentration to the actual concentration is known. Not knowing the tested concentration makes deriving the LC_{50} value impossible.

3. Repairability: This study can not be repair.

13. COMPLETION OF ONE-LINER FOR STUDY:

yes

mclane methyl isothiocyanate duck LC_{50}

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
25825	10	10	100	9.765625E-02
19700	10	9	90	1.074219
15700	10	10	100	9.765625E-02
13000	10	6	60.00001	37.69531
11200	10	9	90	1.074219
10000	10	0	0	9.765625E-02

THE BINOMIAL TEST SHOWS THAT 10000 AND 15700 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 10710.25

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
3	.1084321	11478.16	10742.95	12114.49

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
4	2.659886	4.179477	2.192855E-03

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = 8.563784
95 PERCENT CONFIDENCE LIMITS =-5.403029 AND 22.5306

LC50 = 11328.49
95 PERCENT CONFIDENCE LIMITS = 0 AND +INFINITY

LC10 = 8051.428
95 PERCENT CONFIDENCE LIMITS = 0 AND 11362.82

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