

US EPA ARCHIVE DOCUMENT

12-19-90

DATA EVALUATION RECORD

1. CHEMICAL: Methyl isothiocyanate
2. TEST MATERIAL: Methyl isothiocyanate, Technical
3. STUDY TYPE: Acute Oral Toxicity (LD₅₀) Mallard Duck
4. CITATION: Ross, D. B., Cameron, M. M., Roberts, N. L., 1977. The Acute Oral Toxicity (LD₅₀) of Methyl Isothiocyanate To The Mallard Duck According To E.P.A. Guidelines, Performed By Huntingdon Research Center, Huntingdon, Cambridgeshire, England, Project No. SHG 135-WL/77330, For Nor-Am Chemical Company, 3509 Silverside Road, P.O. Box 7495 Wilmington, DE 19803, MRID #00119180
5. REVIEWED BY:
Dennis J. McLane, Wildlife Biologist *Dennis J. McLane 12-11-90*
Ecological Effects Branch
Environmental Fate and Effects Division (H7507 C)
6. APPROVED BY:
Les Touart, Acting Section Head *LT 2/23/91*
Ecological Effects Branch
Environmental Fate and Effects Division (H7507 C)
7. CONCLUSION:
The ducks vomited the test material. Based on this the study is not scientifically sound and does not meet the guideline criteria for an oral LD₅₀.
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 Ltd.
Age-Unknown
Acclimation period-Not reported

B. Test System:

Pen size-Not reported

Environmental temperature-Not reported

Relative humidity-Not reported

Photoperiod-Not reported

Dose preparation- "Preliminary range finding [determined] that a spread of mortalities would be obtained using the compound at a concentration of 2.5% w/v suspension in corn oil. Control birds were dosed with 10ml corn oil."
(excerpted from the study)

C. Test Design:

Range finding test- The only mention of a range finding study was the statement above under "Dose Preparation".

Definitive test

Nominal concentrations-
12, 24, 42, 72, 143, and 188 mg/kg

Controls- One control level with 10 ml of corn oil.

Number of test organisms- 10 per level that includes control

Biological observations-

"The post-dose observation period lasted for 14 days and the following observations were made:

Mortalities	daily
Bird health	daily
Bodyweight	0, 3, 7 and 14 days
Gross post-mortem evaluation	All surviving birds were examined at termination of the study.

Feeding- "It was not possible to record feed consumption as the Mallard duck is a very untidy feeder and a considerable amount of spillage occurred."

10. REPORTED RESULTS:

Body weights-

"The majority of the ducks lost weight during the first

week after treatment. As the controls also showed this loss in bodyweight, this was not considered to be a result of the administration of the test compound."
(excerpted from the study)

Food consumption- Not recorded

Mortality and observations

Group	Dose mg/kg	No. per Group	Hours after dosing						Total
			2	4	6	12	24	36	
1	0	10							
2	12	10							
3	24	10							
4	42	10		1			1		2
5	72	10		1					1
6	143	10		2			1		3
7	188	10		7			2		9

"Bird health

"After dosing with test compound, all ducks vomited within about five minutes, except birds in Groups 2 and 3 which attempted to vomit, not all succeeding. Birds in Groups 5, 6 and 7 defecated often, and lay with their eyes closed, panting vigorously. Birds in Groups 6 and 7 became very weak and lethargic.

"After three hours two very weak ducks (no.s 144 and 165) were found to have slight constriction of the pupils. No. 144 died shortly afterwards, No. 165 died within the next 10 hours.

"Surviving birds had recovered in 2 -3 days, and appeared to remain in good health until termination of the study."
(excerpted from study)

Gross pathology-

"No abnormalities were observed either in mortalities or in these birds which survived to the termination of the study."(excerpted from study)

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

A signed statement was provided which indicated that the procedures described in the report are an accurate description of the study.

The study concluded that the mallard duck oral LD₅₀ is 136 (79 - 235) mg/kg and "As the ducks vomited shortly

after dosing the amount of dose released was not known. Consequently the above values are approximations of doses administered."

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

A. Test Procedure:

The following items were not reported:

1. Percent active ingredient
2. Age of the ducks
3. Length of the acclimation period
4. Ducks of the same hatch
5. Day but not time of death
6. Food consumption
7. Health/physical condition of birds prior to testing
8. The method of assigning birds to pens
9. The size of the pens
10. Photoperiod or ducks reproductive condition

The following items do not follow guideline criteria:

1. The dose were not geometrically spaced.
2. The birds vomited the test substance.

B. Statistical Analysis:

The LD₅₀ value reported in the study was 136 (79 - 235 mg/kg. The "toxanal" results for the probit were 132 (94 - 228) mg/kg. The graph method used is sufficient.

C. Discussion/Results:

The study is invalid. Due to the regurgitate of the test material, the test does not show how much material was administered at each test level.

D. Adequacy of the Study:

1. Classification: Invalid
2. Rationale: Due to the regurgitate of the test material, the test does not show how much material was administered at each test level.
3. Repairability: The study can not be repaired.

13. COMPLETION OF ONE-LINER FOR STUDY:

yes

mclane methyl isothiocyanate duck ld50

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
188	10	9	90	1.074219
143	10	3	30	17.1875
72	10	1	10	1.074219
42	10	2	20	5.46875
24	10	0	0	9.765625E-02
12	10	0	0	9.765625E-02

THE BINOMIAL TEST SHOWS THAT 24 AND 188 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 155.7519

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
3	.2886829	131.5622	96.56811	227.2782

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H
4	.2826837	1

GOODNESS OF FIT PROBABILITY
8.825326E-02

SLOPE = 2.933209
95 PERCENT CONFIDENCE LIMITS = 1.37368 AND 4.492738

LC50 = 132.0349
95 PERCENT CONFIDENCE LIMITS = 94.40117 AND 227.9696

LC10 = 48.72098
95 PERCENT CONFIDENCE LIMITS = 18.71799 AND 71.34983
