

(9-2-92)

MRID No. 416100-03

DATA EVALUATION RECORD

1. **CHEMICAL:** Monosodium Methane Arsonate (MSMA).
Shaughnessey Number: 013803.
2. **TEST MATERIAL:** Arsonate liquid Blend; CAS No. 124-58-3; 51% purity; a clear liquid.
3. **STUDY TYPE:** Avian dietary LC₅₀ Test.
Species Tested: Bobwhite quail (Colinus virginianus).
4. **CITATION:** Long, R. D., J. Foster, K. A. Hoxter, and G. J. Smith. 1990. MSMA: A Dietary LC₅₀ Study with the Northern Bobwhite. Study performed by Wildlife International Ltd., Easton, Maryland. Laboratory study No. 296-102. Submitted by MSMA/DSMA Research Task Force Three, Luxembourg Industries (Pamol) Ltd., Tel Aviv, Israel. MRID No. 416100-03.
5. **REVIEWED BY:**

Rosemary Graham Mora, M.S.
Associate Scientist
KBN Engineering and
Applied Sciences, Inc.

Signature: *Rosemary G. Mora*
Date: 4/29/91
6. **APPROVED BY:**

Michael Whitten, M.S.
Wildlife Toxicologist
KBN Engineering and
Applied Sciences, Inc.

Signature: *Michael L. Whitten*
Date: 4/30/91

Henry T. Craven, M.S.
Supervisor, EEB/HED
USEPA

Signature: *Richard C. Catlin* 8/06/92
Henry T. Craven 8-31-92
Date: 9/2/92
7. **CONCLUSIONS:** The study is scientifically sound and meets the requirements for an avian dietary LC₅₀ test. With an LC₅₀ of 1667 ppm a.i. (3269 ppm formulated test substance), the test material is considered to be slightly toxic to bobwhite quail. The NOEC could not be determined.
8. **RECOMMENDATIONS:** N/A

9. BACKGROUND:

10. DISCUSSION OF INDIVIDUAL TESTS: N/A.

11. MATERIALS AND METHODS:

- A. Test Animals: The birds used in the study were 10 day old bobwhite quail (Colinus virginianus), obtained from Wildlife International Ltd., production stock, Easton, Maryland. Each of the treatment and control groups contained ten birds. The birds were immature, and therefore could not be differentiated by sex. All birds were acclimated to the facilities for 10 days prior to initiation of the test.
- B. Test System: All birds were housed indoors in pens constructed of galvanized wire and sheeting. Pen dimensions were 72 cm x 90 cm x 23 cm high. Fluorescent lights provided 16 hours of light per day. The average brooder compartment temperature was $37^{\circ}\text{C} \pm 2^{\circ}\text{C}$ (SD). The average ambient temperature was $26 \pm 2^{\circ}\text{C}$ (SD). The relative humidity was $37\% \pm 2\%$ (SD).
- C. Dosage: Avian Dietary LC_{50} Test. Based upon known toxicity data, nominal concentrations selected for the study were 562, 1000, 1780, 3160, and 5620 parts per million (ppm). Concentrations were not adjusted for purity of the test substance. Therefore, all concentrations and the LC_{50} value are reported as ppm of whole test substance.
- D. Design: Groups of ten birds were randomly assigned to each of five treatment groups and four control groups. Each concentration was assigned one pen. All treatment birds were fed Wildlife International Ltd.'s game bird ration with the appropriate amount of test substance. Food and water were supplied ad libitum during acclimation and during the test.

Appropriate amounts of the test substance were mixed into the ration with an industrial mixer. Chemical analysis of the test diet was performed (Appendix III, attached).

All birds were observed at least twice daily for mortalities, signs of toxicity, and abnormal behavior. Each group of control and treatment birds was weighed at test initiation, and on Day 5 and Day 8. Group food consumption was determined for days 0-5 and 6-8.

E. Statistics: The LC_{50} and 95% confidence limits were calculated by the probit test method using the computer program of C.E. Stephan (1978).

12. REPORTED RESULTS: There were no mortalities in the control groups. All birds appeared and behaved normally throughout the test period.

No mortality was observed in the 562 and 1000 ppm groups. No signs of intoxication in these concentrations were noted throughout the test period.

Ten percent, 30%, and 100% mortality was observed in the 1780, 3160, and 5620 ppm groups, respectively (Tables 1 and 2, attached). Signs of toxicosis in the 1780 ppm group began on Day 5 and continued through Day 7; signs of toxicosis included wing droop, ruffled appearance, and lethargy. In the 3160 ppm group loss of coordination, lethargy and ruffled appearance were illustrated on Days 3 to 8. Two birds at this concentration demonstrated wing droop on Days 6, 7, and 8. The birds in the 5620 ppm concentration illustrated signs of toxicosis including loss of coordination, ruffled appearance and lethargy all beginning on Day 3 and continuing until the final mortality on Day 6.

When compared to the control group, "a reduction in body weight gain occurred at the 562, 1000, and 1780 ppm test concentrations and a loss in body weight occurred at the 3160 and 5620 ppm test concentrations..." Feed consumption was reduced only at the two highest test concentrations during the treatment period (Tables 3 and 4, attached).

13. STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES:
The LC_{50} for bobwhite quail exposed to MSMA was 3269 ppm (95% confidence interval of 2558 to 4210 ppm) with a dose response slope of 7. The no mortality level was 1000 ppm.

The report stated that the study was conducted in conformance with Good Laboratory Practice regulations. This statement was signed by representatives of Wildlife International Ltd. and a representative of the study sponsor. The Quality Assurance Statement was signed by the Quality Assurance Officer.

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

A. Test Procedure: The test procedures were in accordance with Subdivision E and SEP guidelines with the following exceptions:

Food consumption for the pretreatment acclimation period was not presented in the report.

Necropsies were not performed.

Test material was a formulated product. Concentrations were not adjusted to reflect percent active ingredient.

Body weights were measured by group. Individual body weights should have been measured.

B. Statistical Analysis: The reviewer used EPA's Toxanal computer program to calculate LC_{50} values using two sets of test concentrations. Printout #1 (attached), derived using concentrations not adjusted for purity of the test substance, shows an LC_{50} 3269 ppm, the same value as reported by the authors. Using concentrations adjusted to reflect the 51% active ingredient in the test substance, the LC_{50} was 1667 ppm a.i. (95% confidence interval of 1304 - 2147) (Printout #2, attached).

C. Discussion/Results: With an LC_{50} of 1667 ppm a.i. the test material is considered to be slightly toxic to bobwhite quail.

Chemical analysis of test food indicated that food was prepared properly.

The NOEC could not be determined, due to reduced body weight gains at all concentrations tested.

The study is scientifically sound and meets the requirements for an avian dietary LC_{50} test.

D. Adequacy of the Study:

(1) Classification: Core.

(2) Rationale: N/A.

(3) Repairability: N/A.

15. COMPLETION OF ONE-LINER: Yes; April 29, 1991.