

US EPA ARCHIVE DOCUMENT

DATA EVALUATION RECORD

1. CHEMICAL: Avermectin B₁
2. FORMULATION: Technical Avermectin B₁ (91.43% purity)
3. CITATION: Fink, Robert and Joann Beavers. 1981. Eight-day dietary LC₅₀ of L-676, 863-00V50 to bobwhite quail (Colinus virginianus). Final Report by Wildlife International to Merck Sharp + Dohm, Rahway, N.J. Accession No. 246358 in 618-EUP-10.
4. REVIEWED BY: Mary L. Gessner
Fishery Biologist
HED/EEB
5. DATE REVIEWED: 12/23/81
6. TEST TYPE: Avian 8-day dietary LC₅₀
Test species: bobwhite quail
7. REPORTED RESULTS: The subacute LC₅₀ (and 95% C.I.) of L-676, 863-00V 50 in bobwhite quail is 1417 (1127-1812) ppm.
8. REVIEWER'S CONCLUSIONS: This study is not adequate to fulfill the guideline requirement regarding an avian dietary test on upland game birds. Initial testing produced no partial mortalities, therefore an LC₅₀ could not be calculated. A statistically sound LC₅₀ cannot be derived from data generated in two separate studies. There were no controls run with the second group of birds.

Materials/Methods

Test Procedure

Bobwhite quail were obtained from the production flock at Wildlife International. During brooding and throughout the eight-day study no form of antibiotic medication was administered. Starter ration and water were available ad libitum throughout the study. A 14-hour light photoperiod was maintained. At 14 days of age the birds were randomly assigned to treatment groups without regard to sex (10 birds/pen). Five treatment levels and five control groups were run initially. The experimental material was dissolved in corn oil and added to the standard game bird starter ration. The birds were exposed to the appropriate dietary concentrations for five days, and then maintained on a toxicant-free diet for an additional three days. Control birds received the basal diet throughout the study. Body weights were recorded by pen at initiation and termination of the study. Food consumption was recorded by pen for the five-day exposure period. Symptoms of toxicity and mortality were recorded daily throughout the study.

Statistical Analysis

Mortality was analyzed statistically by probit analysis using SAS.

Discussion/Results

There were three mortalities in the negative control groups (3 of 50 birds). All mortalities were reportedly the result of toe and nostril picking, and the negative social interaction associated with these forms of cannibalism may have contributed to the reduction in food consumption and body weight gain observed in one group. The study was initially conducted with concentration levels of 56.2, 100.0, 178.0, 316.0 and 562.0 ppm. No mortalities occurred at any concentration level tested and no overt symptoms of toxicity were observed during the course of the study. A reduction in body weight gain was observed at the 178 ppm concentration level. A slight reduction in feed consumption was also observed at the 178 and 316 ppm concentration levels. A second study employing 1000 and 1780 ppm concentration levels was initiated. One bird died at the 1000 ppm level and eight died at 1780 ppm. At the 1000 ppm level some reduced reaction to external stimuli was first observed on Day 3, with loss of coordination observed on Day 4 and lethargy apparent on Day 5. A few birds remained lethargic on Day 6, but all birds at this concentration were asymptomatic by Day 7. Symptoms of toxicity observed at the 1780 ppm level included lethargy, depression, reduced reaction to external stimuli, loss of coordination, wing droop, and lower limb weakness. Lethargy and lower limb weakness continued to be observed in the two surviving birds, at the concentration, through Day 7. There was a dose-related reduction in both food consumption and body weight gain in surviving birds.

Reviewer's Evaluation

A. Test Procedure

Testing generally followed EPA-recommended protocol. However, the calculated LC₅₀ is based on information from two separate testing periods. Apparently no range-finding test was conducted, which led to a definitive test that produced no dose-response line. Both EPA and ASTM protocol say that for a test to be acceptable, at least three concentrations must produce between 0 and 100% mortality and at least one concentration must kill more than 50% and at least one less than 50% of the birds in a pen. Since none of the levels tested produced partial mortalities, a second test was run, utilizing two higher dose levels. No concurrent controls were run with the second test. It is statistically unsound to calculate an LC₅₀ from data collected in two separate tests.

B. Statistical Analysis

The 1000 and 1780 ppm levels cannot be included in the LC₅₀ calculation because they were not run concurrently with the other test levels. No partial mortalities resulted from the initial testing, so an accurate LC₅₀ cannot be determined from the data.

C. Discussion/Results

The data generated from this study cannot be used to calculate a statistically sound LC₅₀ for upland gamebirds. No partial mortalities were produced at the initial toxicant levels, so an LC₅₀ cannot be calculated. The additional doses tested produced partial mortalities, but were not run concurrently with the remaining toxicant levels. Variation in test animals and conditions is not controlled when dose levels are run at different times. Results indicate that the LC₅₀ probably is somewhere between 1000 and 1,780 ppm, but the data may not be used to satisfy guideline requirements.

D. Conclusions

1. Category: Invalid
2. Rationale: Initial testing produced no partial mortalities, therefore, an LC₅₀ cannot be calculated. A statistically sound LC₅₀ cannot be derived from data generated in two separate studies. There were apparently no controls run with the second group of test levels.
3. Repairability: None