UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
PESTICIDES AND TOXIC
SUBSTANCES

AUG - 4 1994

MEMORANDUM:

SUBJECT: Baquacil - Avian Single Dose Oral LD50 Study for the mallard duck (MRID # 93191001) and Avian Dietary LC_{50} Study for the bobwhite quail (MRID # 93191002)

TO: Bruce Sidwell, Product Manager 53
Special Review and Reregistration Division

FROM: Anthony F. Maciorowski, Chief
Ecological Effects Branch
Environmental Fate and Effects Division (H7507C) 8/4/94

The EEB has completed a Data Evaluation Report (DER) for an Avian Single Dose Oral LD50 Study for the mallard duck (MRID # 93191001) and an Avian Dietary LC_{50} Study for the bobwhite quail (MRID # 93191002) for the chemical Baquacil. Both studies were scientifically sound and satisfy the 71-1(a) and 71-2(a) guideline requirements.

If you have any further questions, please contact Dick Felthousen (305-5829).

DATA EVALUATION RECORD

1. **CHEMICAL:** Poly(iminoimidocarbonylimi). Shaughnessey No. 111801.

2. **TEST MATERIAL:** Baquacil Mix #5889; (poly(hexamethylene) biguanide hydrochloride); CAS No. 27083-27-8: 20% purity; a pale, yellow liquid.

3. **STUDY TYPE:** Avian Single Dose Oral LD_{50} Test. Species Tested: Mallard duck (*Anas platyrhynchos*).

4. **CITATION:** Burt, M.E. 1990. Acute Oral LD50 - Mallard Duck, Baquacil Mix #5889, Final Report. Project No. 123-131. Performed by Wildlife International Ltd., Easton, MD. Submitted by ICI Americas, Inc., Wilmington, DE. EPA MRID No. 93191001.

5. **REVIEWED BY:**

Mark A. Mossler, M.S.
Associate Scientist
KBN Engineering and
Applied Sciences, Inc.

Signature: Mark A. Mossler
Date: 11/6/91

6. **APPROVED BY:**

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

Signature: Michael L. Whitten
Date: 11/6/91

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Supervisor, EEB/EFED
USEPA

Signature: Les Touart
Date: 5/4/94

7. **CONCLUSIONS:** This study is scientifically sound and meets the requirements for an acute oral toxicity test using the mallard duck. The LD_{50} value of >2,510 mg/kg classifies baquacil mix #5889 as practically non-toxic to the mallard duck. The NOEL was determined to be 2,510 mg/kg.

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 20-week-old mallard ducks (*Anas platyrhynchos*) obtained from an in-house production flock. The birds were from the same hatch and were pen-reared. They were acclimated to the testing facility for 2 weeks prior to testing and ranged in weight from 914 to 1,289 g at test initiation. Except for a 15-hour fasting period immediately prior to dosing, water and a game bird ration were offered ad libitum during acclimation and testing. No antibiotics were administered during the test.

B. **Test System:** All birds were housed indoors in pens illuminated for fourteen hours per day. The average temperature was 18-24°C and the average relative humidity was between 30 and 80%.

C. **Dosage:** Fourteen-day single dose oral LD_{50} test. Five nominal dosages (398, 631, 1,000, 1,590, and 2,510 mg/kg of body weight) and a diluent (distilled water) control were used in the test. The dosages were not corrected for the percent active ingredient (ai) of the test substance.

D. **Design:** Groups of ten birds (five males and five females) were assigned to each treatment group and five control groups by random draw. Each dosage and control group was assigned one pen.

The test substance was dissolved in distilled water and intubated directly into the crop of each bird using a stainless steel catheter. Each bird was individually weighed and dosed on the basis of milligrams of test substance per kilogram of body weight. The control birds received a corresponding volume of distilled water only. The ratio of test material to diluent was adjusted so that each bird received an approximately constant volume to body weight dose.

All birds were observed daily for mortality and signs of toxicity. The birds were individually weighed at test initiation and by group on days 3, 7, and 14. Group food consumption was determined for days 1-7 and 8-14 by measuring the change in feed presented to the birds over a period of time. However, this is an estimate due to wastage by the birds.

E. **Statistics:** Due to the mortality pattern in this study, the LD_{50} and 95% confidence limits could not be calculated. The LD_{50} was estimated by visual assessment.

12. **REPORTED RESULTS:** There were no mortalities in the control or treatment groups. All birds in these groups were normal in appearance and behavior except for occasional fighting in one control pen.

There were no apparent differences in body weight and food consumption between treatment and control groups.

Necropsies were not conducted due to the lack of mortality in the test.

13. **STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES:** The acute oral LD_{50} of baquacil mix #5889 to the mallard duck is greater than 2,510 mg/kg. No NOEL was determined.

A Quality Assurance Unit Statement was included in the report indicating that the study conformed with Good Laboratory Practice Standards. However, it was stated that the study was conducted before GLP regulations were in place for this type of study.

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:

Necropsies were not performed. These are recommended, but not required by the guidelines.

Group body weights, rather than individual body weights were taken at the end of the test.

No cage size was reported.

B. **Statistical Analysis:** Since no birds died during the test period, the LD_{50} value and 95% confidence interval could not be obtained. Upon review of the data, the author's LD value (>2,510 mg/kg) is correct.

C. **Discussion/Results:** Since the test material had a purity of 20%, the results from this study are valid for baquacil mix #5889 only.

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This study is scientifically sound and meets the requirements for an acute oral toxicity test using the mallard duck. The LD_{50} value of >2,510 mg/kg classifies baquacil mix #5889 as practically non-toxic to the mallard duck. The NOEL was determined to be 2,510 mg/kg.

D. **Adequacy of the Study:**

(1) **Classification:** Core for baquacil mix #5889 only.

(2) **Rationale:** N/A.

(3) **Repairability:** N/A.

15. **COMPLETION OF ONE-LINER:** Yes, 10-11-91.

Shaughnessey # 111801 Chemical Name Poly(iminoiminidocarbonyliminiadipoyl) Chemical Class _____ Page 1 of 1

Study/Species/Lab/ MRID #	Chemical % a.i.	Results	Reviewer/ Date	Validation Status

14-Day Single Oral LD_{50}	20%	LD_{50} = >2510 mg/kg (* 95% C.L. N/A) Control Mortality (%) = 0%
		Slope = N/A # Animals/Level = 10/trt 50/cont Age (~~Days~~ Weeks) = 20
		Sex = 5♂ 5♀
		14-Day Dose Level mg/kg/(% Mortality)
		398 (0), 631 (0), 1000 (0), 1590 (0), 2510 (0)
		Comments: * Based on nominal concentrations of total product.
		NOEL = 2,510 mg/kg
			M. Massler 10/11/91	Core for Registrant mix only

Species: Anas platyrhynchos Lab: Wildlife Int. MRID #: 93191001				
8-Day Dietary LC_{50}	_____	LC_{50} = pp (95% C.L.) Control Mortality (%) = Slope = # Animals/Level = Age (Days) = Sex = 8-Day Dose Level pp /(% Mortality) ( ), ( ), ( ), ( ), ( )	_____	_____
Species Lab MRID #				

DATA EVALUATION RECORD

1. **CHEMICAL:** Poly(iminoimidocarbonylimi). Shaughnessey No. 111801.

2. **TEST MATERIAL:** Baquacil Mix #5889; (poly(hexamethylene) biguanide hydrochloride); CAS No. 27083-27-8; 20% purity; a pale, yellow liquid.

3. **STUDY TYPE:** Avian Dietary LC_{50} Test. Species Tested: Bobwhite quail (*Colinus virginianus*).

4. **CITATION:** Burt, M.E. 1990. Eight Day Dietary LC50 - Bobwhite Quail Baquacil Mix #5889, Final Report. Project No. 123-129. Performed by Wildlife International Ltd., Easton, MD. Submitted by ICI Americas, Inc., Wilmington, DE. EPA MRID No. 93191002.

5. **REVIEWED BY:**

Mark A. Mossler, M.S.
Associate Scientist
KBN Engineering and
Applied Sciences, Inc.

Signature: Mark Mossler
Date: 11/6/91

6. **APPROVED BY:**

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

Signature: Michael T. Whitten
Date: 11/6/91

LES TOUART
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Supervisor, EEB/EFED
USEPA

Signature: Les Touart
Date: 8/4/94

7. **CONCLUSIONS:** This study is scientifically sound and meets the guideline requirements for an avian dietary LC_{50} toxicity test. Based on nominal concentrations, the LC_{50} value of baquacil mix #5889 for bobwhite quail was >5620 ppm. Therefore, this compound is classified as practically non-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:** Bobwhite quail (*Colinus virginianus*) were obtained from an in-house production flock. The birds were pen-reared. All birds were acclimated to the caging and facilities from the day of hatch. The birds were 14 days of age at test initiation.

B. **Test System:** The birds were housed indoors in thermostatically controlled brooding pens. The pen floor measured 70 x 95 cm. The ceiling height was 25 cm. The external walls, ceilings, and the floor were constructed of galvanized wire and the internal walls were made of galvanized sheeting. During the test, the average temperature in the brooding pens was 38°C. A 14-hour photoperiod was used throughout the study.

The test diets were prepared by dissolving the test substance in corn oil and blending into the diet. The concentration of corn oil in the treated diets was 2%. Control birds (negative control) received basal diet throughout the study. The birds were offered water and feed *ad libitum* throughout the study. A list of the ingredients in the feed was given in the report and it appeared to be free of unfamiliar ingredients and medications.

C. **Dosage:** Acute Dietary LC_{50} test. Dosage levels selected for the study were 562, 1000, 1780, 3160, and 5620 ppm. The dose levels were not corrected for the percent active ingredient (ai) of the test material.

D. **Design:** Ten chicks per test level and in each of five controls were randomly assigned to pens. Signs of toxicity, abnormal behavior, and mortality were assessed daily. Body weights by group were measured at initiation and day 8 of the test. Average feed consumption was determined by group for days 0-5 (the exposure period). Feed consumption was determined by pen, but this is an estimate due to wastage by birds.

A positive control (dieldrin) was administered concurrently to verify the responses of the bobwhite quail.

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E. **Statistics:** The LC_{50} value was estimated by visual assessment of the data due to the mortality pattern in this study.

12. **REPORTED RESULTS:** Toe-picking and nostril-picking became evident by day 4, which lead to the single death on day 4 and the two mortalities on day 7 in the 3160 ppm concentration pen (page 6, attached). Toe-picking was also responsible for the 6% mortality observed in the negative controls. No other abnormal behavior was observed in the control or treatment groups during the study.

There were 0, 1, 5, 10, and 10 mortalities at the 15.9, 25.1, 31.6, 63.1, and 100 ppm concentrations, respectively, of the positive control (dieldrin).

There was no apparent body weight differences between treated and control groups. The estimated food consumption by the treated groups was, on the whole, slightly lower than the control group. No obvious trend between feed consumption and increased test concentrations was observed (page 7, attached).

13. **STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES:** "The acute LC50 of Baquacil Mix #5889 in the Bobwhite Quail is greater than 5620 ppm. 95% confidence levels are not necessary since the LC50 is greater than 5000 ppm. (5620 ppm, highest dose tested). A NOEL was not determined."

A Quality Assurance Unit Statement was included in the report indicating that the study conformed with Good Laboratory Practice standards. However, it was stated that the study was conducted before GLP regulations were in place for this type of study.

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

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

Group weights were used during the study. Individual body weights of the birds are recommended for monitoring weight gain or loss.

Necropsies were not conducted. These are recommended, but not required, by the guidelines.

The relative humidity was not reported.

The vehicle (corn oil) was not added to the control diet.

The concentration of test substance in the diet was not confirmed by chemical analysis.

The feed consumption during the observation period (days 6-8) was not monitored.

The temperature (38°C) was higher than recommended (35°C).

At test termination, 72 consecutive hours without mortality in the treatment groups had not occurred.

B. **Statistical Analysis:** Since a dose response was not evident by the end of the testing period, an LC_{50} value and 95% confidence limits could not be obtained. Upon review of the data, the LC_{50} reported by the authors (>5620 ppm) appears correct.

C. **Discussion/Results:** Although there were three deaths in the second highest test concentration, the author stated that this was due to cannibalism rather than toxicity of the test material. While this conclusion cannot be proven, the deaths do not appear to be treatment related. The food consumption data are difficult to assess. Food consumption in each treatment group was lower than the mean food consumption in the five control groups (433 g). However, no trend between food consumption and increasing test concentration existed. The lowest value was at the lowest concentration, while the highest value was at the middle concentration. Therefore, although food consumption in the treatment groups tended to be lower than in the control groups, an NOEC cannot be determined.

Since the test material had a purity of 20%, the results from this study are valid for baquacil mix #5889 only.

This study is scientifically sound and meets the guideline requirements for an avian dietary LC_{50} toxicity test. Based on nominal concentrations, the LC_{50} value of baquacil mix #5889 for bobwhite quail was >5620 ppm. Therefore, this compound is classified as practically non-toxic to bobwhite quail. The NOEC could not be determined.

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D. **Adequacy of the Study:**

(1) **Classification:** Core for baquacil mix #5889 only.

(2) **Rationale:** N/A.

(3) **Repairability:** N/A.

15. **COMPLETION OF ONE-LINER:** Yes, 10-10-91.

Page _____ is not included in this copy.

Pages 12 through 13 are not included in this copy.

The material not included contains the following type of information:

_____ Identity of product inert ingredients.

_____ Identity of product impurities.

_____ Description of the product manufacturing process.

_____ Description of quality control procedures.

_____ Identity of the source of product ingredients.

_____ Sales or other commercial/financial information.

_____ A draft product label.

_____ The product confidential statement of formula.

_____ Information about a pending registration action.

X FIFRA registration data.

_____ The document is a duplicate of page(s) _____.

_____ The document is not responsive to the request.

The information not included is generally considered confi by product registrants. If you have any questions, please the individual who prepared the response to your request.

Shaughnessey # 111801 Chemical Name Poly(iminoiminidocarbonyliminohexamethylene) Chemical Class _____ Page 1 of 1

Study/Species/Lab/ MRID #	Chemical % a.i.	Results	Reviewer/ Date	Validation Status
14-Day Single Oral LD_{50}	_____	LD_{50} = mg/kg (95% C.L.) Control Mortality (%) =		
Species		Slope = # Animals/Level = Age (Days) =		
Lab		Sex =		
MRID #		14-Day Dose Level mg/kg/(% Mortality) ( ), ( ), ( ), ( ), ( )		
		Comments:		

8-Day Dietary LC_{50}	20%	LC_{50} = >5620 ppm* (95% C.L. N/A) Control Mortality (%) = 6%		
Species: Colinus virginianus		Slope = N/A # Animals/Level = 10/rpt 5o/cont Age (Days) = 14 Sex = N/A		
Lab: Wildlife Intern.		8-Day Dose Level ppm* /(% Mortality) 562 (0), 1000 (0), 1780 (0), 3160 (30), 5620 (0)	M. Mossler 10/10/91	Core for formulation only.
MRID # 431 91002		Comments: * Based on nominal concentrations of total test material NOEC could not be determined.		

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