

US EPA ARCHIVE DOCUMENT

DATA EVALUATION RECORD

1. **CHEMICAL:** Tetramethrin
Shaughnessey No. 69003
2. **TEST MATERIAL:** Neo-Pynamin; Lot No. 90304; 95.3% active ingredient; a white powder.
3. **STUDY TYPE:** Freshwater Fish Acute Flow-Through Toxicity Test. Species Tested: Oncorhynchus mykiss
4. **CITATION:** Bowman, J.H. and M. Gormley. 1990. Acute Flow-Through Toxicity of Neo-Pynamin to Rainbow Trout (Oncorhynchus mykiss). Final Report No. 38457. Prepared by Analytical Bio-Chemistry Laboratories, Inc., Columbia, MO. Submitted by Sumitomo Chemical Company, Osaka, Japan. EPA MRID No. 416096-08.

5. **REVIEWED BY:**

Louis M. Rifici, M.S.
Associate Scientist II
KBN Engineering and
Applied Sciences, Inc.

Signature: *Louis M Rifici*
Date: *2/22/91*

6. **APPROVED BY:**

Pim Kosalwat, Ph.D.
Senior Scientist
KBN Engineering and
Applied Sciences, Inc.

Signature: *P. Kosalwat*
Date: *2/22/91*

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

Signature: *Henry T. Craven*
Date: *3/20/92*

7. **CONCLUSIONS:** This study is scientifically sound and meets the guideline requirements for an acute flow-through toxicity test for freshwater fish. Based on mean measured concentrations, the 96-hour LC₅₀ was 3.7 µg/L. Therefore, Neo-Pynamin is classified as very highly toxic to rainbow trout. The NOEC was estimated as 2.2 µg/L.

Notes?

8. **RECOMMENDATIONS:** N/A

9. **BACKGROUND:**

10. DISCUSSION OF INDIVIDUAL TESTS: N/A**11. MATERIALS AND METHODS:**

- A. Test Animals:** Rainbow trout (Oncorhynchus mykiss) were obtained as eggs and sperm from Mt. Lassen Trout Farms in Red Bluff, CA. The eggs were fertilized at ABC Laboratories. Hatched larvae were held in well water and fed brine shrimp nauplii. Six weeks prior to testing, the fish were transferred to a "living stream" for acclimation to the test dilution water and approximate temperature. Forty-eight hours before the test, the fish were placed in a temperature acclimation unit and feeding was discontinued.

Mean weight and length of the control fish was 1.71 (± 0.36) g and 50 (± 4) mm. Biomass loading rate in the control was 0.17 g/L/day.

- B. Test System:** A 0.4 mg/mL diluter stock solution was prepared using 0.210 g of Neo-Pynamin in 250 mL of dimethyl formamide (DMF). The stock was delivered to the diluter using a syringe pump. The proportional diluter delivered 1 liter of test solution or control water to individual 30-liter aquaria at an average rate of 8.5 times per hour (or 6.8 volume replacements per day) over the course of the study. Soft blended water with the characteristics listed in Table 1 (attached) was used as diluent. The laboratory was maintained on a 16-hour daylight photoperiod. The test aquaria were immersed in a temperature-controlled water bath at $12^{\circ} \pm 1^{\circ} \text{C}$. The test was initiated after allowing the diluter to run for 48 hours.
- C. Dosage:** Ninety-six-hour static test. Based on preliminary tests, five nominal concentrations (2.5, 5.0, 10, 20, and 40 $\mu\text{g/L}$), a dilution water control and a solvent control (0.1 mL DMF/L) were used. The concentrations made were corrected for the purity of the test material.
- D. Design:** Twenty rainbow trout were randomly distributed to each aquarium; one aquarium per concentration. Observations of mortality and sublethal responses were made every 24 hours. Dead fish were removed from the containers. The temperature, dissolved oxygen (D.O.), and pH were measured in the control, solvent control and the low, middle and high concentrations every 48 hours.

Neo-Pynamin concentrations were measured by gas-liquid chromatography from samples taken at test initiation and termination.

The fish were not fed during the test.

E. **Statistics:** The median lethal concentration (LC₅₀) and associated 95% confidence interval (C.I.) for each 24-hour interval were calculated using a computer program developed by Stephan et al. (1978).

12. **REPORTED RESULTS:** The mean measured concentrations were 2.2, 3.3, 6.4, 13, and 29 µg/L. These values represent 71 ±10% of nominal concentrations (Table 2, attached). Measured concentrations at 0 and 96 hours were similar.

The responses of rainbow trout are given in Table 6 (attached). The 96-hour LC₅₀ based on mean measured concentrations was 3.7 µg/L (95% C.I. = 2.2-6.4 µg/L). The slope of the dose-response curve was given as 10 (calculated by least squares regression analysis). The no-observed-effect concentration (NOEC) was determined to be 2.2 µg/L.

Dissolved oxygen ranged from 8.4 to 9.0 mg/L or 84 to 87% of saturation. The pH values ranged from 7.6 to 7.8. The temperature was 12°-13°C throughout the test.

13. **STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES:**

The authors presented no conclusions.

Quality Assurance and Good Laboratory Practice Regulation Statements were included in the report, indicating that the study was conducted in accordance with FIFRA Good Laboratory Practice Standards set forth in 40 CFR Part 160.

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

A. **Test Procedure:** The test procedures were generally in accordance with protocols recommended by the guidelines, but deviated from the SEP as follows:

A 30-minute transition period between light and dark is recommended in the SEP. A transition period was not used in the study.

Each selected nominal concentration was approximately 50% of the next highest concentration. The SEP

recommends that each concentration be 60% of the next highest concentration.

- B. **Statistical Analysis:** The reviewer used EPA's Toxanal program to calculate the EC₅₀ value and obtained similar results (see attached printout).
- C. **Discussion/Results:** The loss of Neo-Pynamin may be the result of temperature related decomposition. A memo from the manufacturer to ABC Laboratories in the Appendix of the bluegill study report (MRID No. 416096-07; p. 170) indicated that Neo-Pynamin decomposed under static range-finding conditions. It is unlikely that rapid decomposition would take place under flow-through conditions. However, the three studies reviewed experienced 29 to 87% reductions from nominal test concentrations. The greatest decreases are found in tests using higher temperatures. The largest decrease (87% reduction) is found at 19°-20°C and 5.0 volume replacements per day in the daphnid test (MRID No. 416096-09). The temperature in the bluegill test was 22°-23°C with 6.8 tank volume replacements per day but the loss of active ingredient averaged only 55%. In any future tests of this product, increasing the number of volume replacements to near ten per day may be helpful in keeping measured concentrations close to nominal levels.

This study is scientifically sound and satisfies the guideline requirements for an acute flow-through toxicity test. The 96-hour LC₅₀ of 3.7 µg/L (based on mean measured concentrations) classifies Neo-Pynamin as very highly toxic to rainbow trout. The NOEC can be estimated as 2.2 µg/L.

- D. **Adequacy of the study:**
- (1) **Classification:** Core
 - (2) **Rationale:** N/A
 - (3) **Repairability:** N/A

15. **COMPLETION OF ONE-LINER FOR STUDY:** Yes, 02-06-91.

LOUIS M. RIFICI NEO-PYNAMIN ONCORHYNCHUS MYKISS 2-5-91

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
29	20	20	100	9.536742E-05
13	20	20	100	9.536742E-05
6.4	20	20	100	9.536742E-05
3.3	20	7	35	13.1588
2.2	20	0	0	9.536742E-05

THE BINOMIAL TEST SHOWS THAT 2.2 AND 6.4 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 3.710001

WHEN THERE ARE LESS THAN TWO CONCENTRATIONS AT WHICH THE PERCENT DEAD IS BETWEEN 0 AND 100, NEITHER THE MOVING AVERAGE NOR THE PROBIT METHOD CAN GIVE ANY STATISTICALLY SOUND RESULTS.

MRSD* 416 096-08

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Pages 6 through 8 are not included.

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.
- 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 confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.
