US EPA ARCHIVE DOCUMENT

Data Evaluation Report
Ecological Effects Branch

1. **Chemical:** Propetamphos

2. **Test Material:** Propetamphos technical 90% purity
Lot no. Z-19389, received 5/3/90.

3. **Study Type:** 96-Hour Acute Flow Through Toxicity test with bluegill sunfish.

4. **Study Identification:**

Study Author: Bowman, Jane
Study Laboratory: Analytical Bio Chemistry Laboratories, Columbia, Missouri
Study Dates: June 25-29, 1990
Study Identification: ABC Study no. 38676
Sponsor: Zoecon Corporation, Dallas Texas
EPA Identification: MRID 416074-09

5. **Reviewed by:** Brian Montague, Fisheries Biologist
Ecological Effects Branch
Environmental Fate and Effects Division

Brian Montague 1/9/91

6. **Approved by:** Les Touart, Acting Section Supervisor
Ecological Effects Branch
Environmental Fate and Effects Division(H7507C)

L. Touart 1/14/91

7. **Conclusions:** The 72-hour and 96-hour LC_{50} values estimated for exposure of bluegill sunfish to propetamphos technical are 1.1 mg ai/L(CL's 0.81-1.6 mg ai/L). This would classify propetamphos as moderately to highly toxic to bluegill sunfish. The NOEL was determined to fall below the lowest concentration tested, 0.20 mg ai/L, thus indicating that effects might occur at much lower concentrations.

8. Recommendations:N/A

9. Submission Purpose: Submitted to fulfill reregistration guideline requirements.

10. Study Design and Protocol: Protocol was based on EPA guidelines for toxicity testing of warmwater fish species.

Test Organisms: Bluegill sunfish, Macrochirus maculatus, were obtained from Osage Catfisheries in Osage Beach, Missouri and maintained for 12 weeks prior to test initiation. The young bluegill were fed live brine shrimp and commercial fish food daily. At 72 hours prior to test initiation the fish were placed in acclimation tanks and held without food. Fish were weighed and measured at the end of the test in the control group. The mean weight recorded was 1.76 ± 0.45 gms. and the mean length was 39±3 mm.

Test Solution Preparation: An 80,000 ppm stock solution was prepared by dissolving 22.2 gms of test material in 250 ml of dimethylformamide (DMF). The injector was set to deliver 0.1 ml of this stock to 2000 ml of dilution volume to produce the highest concentration of 4.0 mg/L. Solvent control chamber received 0.05 ml of DMF, equivalent to solvent levels in the 4.0 mg/L test concentration.

Test Materials and Methods: Twenty four hours prior to introduction of fish the test solutions were introduced into 45 liter glass test aquaria via a Mount & Brungs design proportional diluter system. Test vessels were set at 30 liter maximum volume level and received approximately 223 liters of solution per 24 hour period (7.4 volume additions/day). Aquaria were immersed in a recirculating water bath maintained at 22 ±1°C. The fish were randomly distributed to the 7 test aquaria, 20 fish per tank. Nominal concentrations used in the definitive test were 0.25, 0.50, 1.0, 2.0 and 4.0 mg/L. Samples for later analysis by gas liquid chromatography were removed at 0 and 96 hours. Observations for behavioral abnormality or death were made every 24 hours. Moribund fish were removed at this time.

11. Reported Test Results: Prior to selection of the definitive test concentrations, range studies conducted at 1, 10, and 100 mg/L concentrations had produced 40%, 100%, and 100% mortality, respectively. The 100% mortality occurred within 24 hours. Later testing at 0.3 mg/L produced behavioral aberrations, but no mortality. Thus the definitive range of 0.25 to 4.0 mg/L was decided upon.

The mean measured concentrations obtained during definitive testing were 0.20, 0.39, 0.72, 1.7, and 3.4 mg/L (72 to 85% of the estimated nominal levels). After 24 hours of exposure, behavior abnormalities were observed in all test concentrations, but only one mortality was seen in the 3.4 mg/L test group. After 48 hours 15% mortality occurred in the 0.72 mg/L group, 40% mortality had occurred in the 1.7 mg/L group, and 80% mortality had occurred at 3.4 mg/L concentration. Increased mortality was seen at 72 hours as well. By 96 hours 15% mortality was recorded for 0.20 and 0.39 mg/L, 30% mortality was recorded at 0.72 ppm, 55% mortality occurred at 1.7 ppm, and 95% mortality was seen at 3.4 mg/L. Behavioral observations of remaining fish and included bottom sitting, loss of equilibrium, labored respiration, and forward pointing pectorals in all test groups except controls.

Water quality parameters appear to have remained relatively stable based on the mean data values presented in the report. Temperature remained at 22°C, pH ranged from 7.9 to 7.6, and dissolved oxygen dropped from 8.3 to 7.6 mg/L.

12. Study Author's Conclusions: "From the data collected during this study, the 24-, 48-, 72-, and 96-hour LC_{50} values for bluegill were >3.4, 1.9, 1.1, and 1.1 mg/L, respectively, based on the average measured concentrations of Propetamphos .... Mortality occurred in all exposure test concentrations ....a no-effect concentration of Propetamphos Technical to bluegill was not within the 5 dose levels that permitted determination of an LC_{50} dose, but was shown to be <0.20 mg/L."

13. Reviewer's Discussion: The study has followed procedural guidelines as required by the Agency. It is preferable that dosage ranges provide a level at which no mortality occurs in order to determine a no-effect level. However, this study has produced a good dose response and the LC_{50} value correlates with statistical confirmation by the Agency. It would appear that Propetamphos exhibits effects on young bluegill at dosages of 0.20 mg/L after a 24 hour exposure. Mortality occurred by 48 hours exposure in all but the 0.39 mg/L exposure group. The final 96 hour LC_{50} levels and confidence limits indicate that Propetamphos may be moderately to highly toxic to bluegill sunfish after 72 hours of exposure (LC_{50} 1.1 with confidence limits of 0.81 to 1.6 mg/L).
Adequacy of Study:

Classification: Core
Rationale: Results confirm the study author's conclusions.
Repairability: N/A