

US EPA ARCHIVE DOCUMENT

Data Evaluation Report  
Ecological Effects Branch

1. Chemical: Methylene bis thiocyanate
2. Test Material: MBT, technical - 100% ai received October 14, 1985 from Bromine Compounds LTD, Beer-Sheva, Israel.
3. Study Type: 96-Hour Static Acute Toxicity Test using bluegill Sunfish, Lepomis macrochirus.
4. Study Identification:  
Study Director: Surprenant, Donald C.  
Study Laboratory: Springborn Bionomics, Inc.  
Study Dates: December 23-27, 1985.  
Study Identification: Study No. 11, 192-1185-6101-100.  
Sponsor: Bromine Compounds, LTD, Israel  
EPA Identification: MRID 40518608 and Summary Report MRID 92116004.
5. Reviewed by: Brian Montague, Fisheries Biologist  
Ecological Effects Branch  
Environmental Fate and Effects Division (H7507C) *Brian Montague* 10/9/90
6. Approved by: Ray Matheny, Supervisory Biologist  
Ecological Effects Branch  
Environmental Fate and Effects Division *Ray Matheny* 10/9/90
7. Conclusions: The test has followed acceptable test procedures. The  $LC_{50}$  of MBT to bluegill sunfish has been demonstrated to be 0.25 mg/L (C.L.s 0.13 - 0.36 mg/L), and thus, is classified as highly toxic to temperate freshwater fishes.
8. Recommendations: N/A

9. **Submission Purpose:** Submitted to fulfill testing requirements under Phase 3 Reregistration.

10. **Study Design and Protocol:** The protocol was Bionomic's own protocol based on ASTM's Standard Practice for Conducting Acute Toxicity Tests with Fishes, Macroinvertebrates, and Amphibians (1980).

**Test Organisms:** Bluegill sunfish were obtained from a commercial supplier in Nebraska (not identified) and measured from 25-37 mm (mean = 30mm) in total length and from 0.15 - 0.54 gms (mean 0.31g ms) in weight. The young fish were held in 500 L fiberglass tanks for 14 days prior to test initiation. Water quality parameters during acclimation were as follows: pH - 6.5-6.8, D.O. - 91-93% saturation, hardness of 29-33 mg/L as CaCO<sub>3</sub>, alkalinity of 25-26 mg/L as CaCO<sub>3</sub>, temperature of 21-22°, and conductivity of 110-120 micro ohms/cm. During acclimation fish were fed commercial pellet food until 48 hours prior to testing, Mortality during the acclimation period was 1.3%.

**Test Solution Preparation:** The MBT stock solution was prepared to a concentration of 15 mg/ml using dimethyl formamide as a solvent. Test solutions were then prepared to selected nominal concentrations in 15 liters of dilution water (soft water reconstituted from dionized water as outlined by ASTM). This soft water had a hardness of 43mg/L as CaCO<sub>3</sub>. The pH was 7.5.

**Test Procedures and Materials:** The bluegill were randomly selected in groups of 10 and placed in 19.6 L glass test jars containing 15 liters of test solution. Temperature control systems maintained constant temperatures of 22±1°C. Nominal test concentrations were 1.0, 0.6, 0.36, 0.22, 0.13, 0.080, and controls included two vessels, one containing DMF solvent and one containing only dilution water. Replicates of the test concentrations are not mentioned in the original report, but are mentioned in the summary. Test solutions were not aerated. Photo period was maintained at 16D/8N. The estimated average loading factor was 0.21 grams per liter of test solution. Fish were not fed during the test exposure and were observed at 0, 24, 48, 72, and 96 hours for behavioral abnormalities or mortality. Dissolved oxygen, temperature, and pH were also monitored at this time.

11. **Reported Test Results:** Temperature, pH, and dissolved oxygen remained within acceptable limits. Mortality levels of 100% occurred after 24 hours at 1.0 ppm, after 48 hours

at 0.60 ppm, and after 72 hours at 0.36 ppm. A 30% mortality occurred after 96 hours at the 0.22 ppm level. The NOEL was reported to be 0.13 ppm the concentration at which no abnormal behavioral signs were noted. Observations of abnormal behavior were omitted from the original report. However, additional data provided in the summary indicated that loss of equilibrium, rapid respiration, lethargy, and surfacing were observed in concentrations above 0.22 mg/L. No evidence of the dissipation of MBT out of solution was observed.

12. **Study Author's Conclusions:** "The 96-hour  $LC_{50}$  for bluegill exposed to methylene bithiocyanate was estimated by nonlinear interpolation to be 0.25 mg/L with a 95% confidence interval calculated by binomial probability to be between 0.13 and 0.36 mg/L."

13. **Reviewer's Disussion:** The test appears to have followed ASTM guidelines for fish. Some areas of concern are as follows:

1. The test material is listed as being tested "as" 100% ai, but was not stated to actually be labeled as 100% ai.

2. No mention is made of replicate test vessels in the original report, nor have individual mortality or water quality parameters been provided for replicate test vessels. This contradicts the study summary provided by Bromine Compounds, Ltd.

3. The original report received by the Agency does contain data which the Summary Report stated was not included.

4. A minimal number of test fish (10) were employed.

From the reported test results MBT would appear to be highly toxic to bluegill sunfish within 72 hours of exposure at concentrations  $\geq 0.36$  mg/L. The NOEL based on lack of mortality or abnormal behavior would be 0.13 mg/L. The calculated  $LC_{50}$  is supported by Agency calculations.

**Adequacy of Study:**

**Classification:** Core

**Rationale:** The study has followed acceptable procedures and the study author's conclusions are supported by the data presented.

**Repairability:** N/A