

US EPA ARCHIVE DOCUMENT

Data Evaluation Report
Ecological Effects Branch

1. Chemical: Methylene bis thiocyanate
2. Test Material: MBT purity not verified - assumed to be 100%
ai by the laboratory. Received from Bromine Compounds, Ltd.
on 10/14/85.
3. Study Type: Static 96-hour Acute test using rainbow trout,
Onchorhynchus mykiss.
4. Study Identification:
Study Director: Surprenant, Donald C.
Study Laboratory: Springborn Bionomics, Inc.
Study Dates: December 23-27, 1985
Study Identification: No. 11192-1185-6101-103
Sponsor: Bromine Compounds, Ltd.
EPA Identification: MRID 405186-09
5. Reviewed by: Brian Montague, Fisheries Biologist *Brian Montague*
Ecological Effects Branch
Environmental Fate and Effects Division 10/9/90
6. Approved by: Ray Matheny, Supervisory Biologist *Ray M Matheny*
Ecological Effects Branch
Environmental Fate and Effects Division (H7507C) 10/1/90
7. Conclusions: Methylene bis thiocyanate has been shown to be
very highly toxic to rainbow trout with an LC₅₀ value of
0.089 mg/L (upper C.L. < 0.13 mg/L). The NOEL would fall
below 0.080 mg/L.
8. Recommendations: N/A

9. **Submission Purpose:** Submitted to satisfy 72-1 registration guideline requirements.

10. **Study Design and Protocol:** Springborn's own protocol design was employed and was stated to be based upon "Standard Practice for Conducting Acute Toxicity Tests with Fishes, Macroinvertebrates and Amphibians, (ASTM, 1980).

Test Organisms: Rainbow trout were obtained from a commercial source in Montana. The fish were acclimated for 14 days in 500 L fiberglass tanks under open system (flow rate 19-20 volume replacements/day). Fish were maintained at 10-13°C under a 16D/8N photo period regime. Fish were fed commercial pellet food until 48 hours prior to testing. Mean wet weight of the fish ranged from 0.08 to 0.46 gms (average was 0.30 gm.) and length ranged from 24-39 mm (average was 32 mm). During the final 48 hours of acclimation, a 0.6% mortality was experienced.

Test Solution: A stock solution of 15,000 ppm was prepared by combining 1.5 gm of MBT with dimethyl formamide as a solvent. One solvent control, 2 dilution water controls, and 6 test concentration solutions were prepared by addition of appropriate solvent or stock solution increments to 15 L of dilution water.

Test Procedures and Materials: Ten rainbow trout were impartially selected and added to 19.6 L glass jars containing the 15 liters of test solution. Soft, reconstituted well water was used as the dilution water and had the following initial characteristics: hardness as CaCO₃ = 43 mg/L, alkalinity as CaCO₃ = 31 mg/L, pH = 7.8, conductivity = 100 micro ohms/cm, temperature 13°C, and dissolved oxygen of 9.6 mg/L (90% saturation). Test vessels were temperature controlled to within 1°C. The resulting bioloading was estimated to be 0.20 gms of fish wt./liter. The trout were not fed during the exposure period and solutions were not aerated.

Observations of behavior abnormality, mortality, D.O. levels, pH, and temperature were made at 0, 24, 48, 72, and 96 hours, except in vessels where total mortality had occurred. Temperature was measured in one control vessel only.

11. **Reported Test Results:** The water quality parameters remained at acceptable levels over the 96-hour period. D.O. decreased to 72% of saturation, and pH to 6.9. Total mortality occurred at the 0.36, 0.60, and 1.0 ppm nominal test levels within 24 hours. By 48 hours a 100% mortality had occurred at 0.22 ppm. After 72 hours of testing

mortality was 100% at the 0.13 ppm test level. The 96-hour mortality was 30% at the 0.080 ppm test level and 0% in both control vessels. Stress indicators included accelerated respiration rates, lethargy, darkening pigmentation, surfacing, and loss of equilibrium. No precipitation of the MBT out of solution was seen during the test period.

12. Study Author's Conclusions: "The 96-hour LC₅₀ for rainbow trout exposed to methylene bithiocyanate was estimated by non-linear interpolation to be 0.089 mg/L with an upper 95% confidence level estimated by binomial probability to be 0.18 mg/L. The no-observed effect level was 0.080 mg/L."
13. Reviewer's Discussion: Water quality parameters remained within acceptable levels throughout the testing period. Mortality effectively established an LC₅₀ value, but failed to obtain an actual NOEL value, as effects were noted at the lowest concentration tested.

Of concern is the fact that the laboratory was apparently not informed of the actual percent of active ingredient in the test material. The assumption was made that the material was 100% active ingredient. However, based on other toxicity data contained in EEB files, the material would appear to have caused toxicity at levels comparable to other acute studies on rainbow trout with MBT technical products measuring above 95% ai (see review by Ken Clark, 2/6/86).

Adequacy of Study:

Classification: Core

Rationale: Test has followed acceptable testing requirements and test material is felt to have been of technical grade.

Repairability: N/A