

ACUTE TOXICITY TO FISH

TEST SUBSTANCE

Identity: N-methylperfluorooctane sulfonamidoethanol; may also be referred to as N-MeFOSE Alcohol, FC-790, or FM-3925. In one toxicity study on bluegill sunfish, referred to as FC-3925. (1-Octanesulfonamide, N-methyl-1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-N-(2-hydroxyethyl)-, CAS # 24448-09-7)

Remarks: Material is an off-white, waxy solid. Sample purity and lot number were not recorded.

METHOD**Summary of 2 Studies**

Method: U.S. EPA 660/3-75-009, April, 1975.

Type: Static acute

GLP: No

Year completed: 1978

Species: *Lepomis macrochirus*

Supplier: Dale Fattig Fish Hatchery, Brady, Nebraska

Analytical monitoring: Nominal concentrations only. Temperature, pH and dissolved oxygen recorded.

Exposure period: 96-hours

Carrier: Acetone – 0.5 mL per liter test solution

Statistical methods: LC₅₀ values were not calculated because the highest concentration tested induced less than 50% mortality. Concentrations tested exceed water solubility of the test substance.

Test fish age: Not noted.

Length and weight: Average length = 4.0 cm
Average weight = 0.5 g

Loading: 0.63 g fish / L

Pretreatment: None

Test conditions:

Dilution water: Carbon-filtered well water

Dilution water chemistry:

Hardness*:	236 mg/L as CaCO ₃
DO:	8.9 mg/L
COD*:	<1 mg/L
Alkalinity*:	221 mg/L as CaCO ₃
pH:	7.9
Conductivity*:	420 µmhos/cm
Total Solids*:	286 mg/L

* Values taken as averages from general laboratory water quality testing in 1978.

Stock and test solution preparation: Test solutions prepared by dissolving known weights of the test substance in 8 mL acetone before mixing with dilution water. This resulted in an acetone concentration of 0.5 ml per liter of dilution water. The test substance was noted to precipitate out gradually over the course of the test. It was generally noted that more precipitate formed in the higher concentration test solutions.

Concentrations dosing rate: Once

Stability of the test chemical solutions: Precipitate noted

Exposure vessels: 35x20x20cm (5 gallon) glass aquaria containing 16L of test solution.

Number of replicates: one

Number of fish per replicate: twenty

Number of concentrations: Five plus a solvent control and a negative control

Water chemistry during the study:

Dissolved oxygen range (24 – 96 hours):

5.7 - 6.1 mg/L (control exposure Test 1)

3.4 – 5.8 mg/L (control exposure Test 2)

5.0 – 6.0 mg/L (100 mg/L exposure Test 1)

3.4 – 5.2 mg/L (320 mg/L exposure Test 2)

pH range (24 – 96 hours)

8.2 - 8.2 (control exposure Test 1)

7.8 – 7.9 (control exposure Test 2)

7.8 – 7.9 (100 mg/L exposure Test 1)

7.8 – 7.9 (320 mg/L exposure Test 2)

Test temperature range (0 – 96 hours):

17 – 20°C

Remarks: Test fish were randomly allocated to each test chamber within 30 minutes following toxicant addition. Mortality, temperature, dissolved oxygen levels and pH of all test solutions were measured at 24-hour intervals

A first study was conducted at concentrations too low to induce sufficient mortality to allow the calculation of an LC50. The study was repeated at higher test substance concentrations. In the second study, fish mortality was observed to be lower than in the first study. This non-reproducible mortality was probably due to the insoluble nature of the test substance.

RESULTS

Nominal concentrations:

Test 1: One blank and one 0.5 ml/L solvent control, 13, 22, 36, 60, 100 mg/L

Test 2: One blank and one 0.5 ml/L solvent control, 4 test concentrations that are not legible on the test sheet, and 180 mg/L and 320 mg/L test solutions.

Element value: 96-hour LC_{50} : Not calculated for either test. Exceeds solubility.

Test 1 Percent Mortality

Nominal Test Concentration, mg/L	24-Hours	48-Hours	72-Hours	96-Hours
Negative Control	0	0	0	0
Solvent Control	0	0	0	0
13	0	0	5	5
22	0	0	10	10
36	0	0	10	10
60	0	0	15	15
100	0	0	35	35

Test 2 Percent Mortality

Nominal Test Concentration, mg/L	24-Hours	48-Hours	72-Hours	96-Hours
Negative Control	0	0	5	5
Solvent Control	5	10	15	15
22	5	5	5	5
36	0	0	0	0
60	0	0	0	15
100	0	5	5	5
180	5	10	15	15
320	5	5	5	5

CONCLUSIONS

The N-methyl FOSE alcohol 96-hour LC_{50} for bluegill sunfish was determined to be greater than the test substance solubility limit.

Submitter: 3M Company, Environmental Laboratory, P.O. Box 33331,
St. Paul, Minnesota, 55133

DATA QUALITY

Reliability: Klimisch ranking 3. These studies, while well conducted using the methodology acceptable at their time, lack analytical data for determination of the test substance concentration in the test solutions and determination of the sample purity. Testing was also done well above the solubility limit of the test substance with the aid of acetone to enhance solubility. The solvent control in the second test was greater than the allowable maximum of 10%. Testing should have been replicated.

REFERENCES

These studies were conducted by the 3M Company, Environmental Laboratory, 3M Lab Request number 4197, 1978.

OTHER

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St. Paul, Minnesota, 55133

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