

ACUTE TOXICITY TO FISH (FATHEAD MINNOW)

TEST SUBSTANCE

Identity: Perfluorooctanoic acid, tetrabutylammonium salt; may also be referred to as PFOA tetrabutylammonium salt, tetrabutylammonium perfluorooctanoate, N2803-2, or as a major component of L-13492. (Octanoic acid, pentadecafluoro-, tetrabutylammonium salt, CAS # 95658-53-0)

Remarks: The 3M production lot number was 2. The test sample is referred to by the testing laboratory as L-13492. The T.R. Wilbury study number is 839-TH. The 3M Environmental Laboratory Request Number is N2332. The purity of the sample was not sufficiently characterized, although current information indicates it is a solution of 44.9% tetrabutylammonium perfluorooctanoate, 27.9% water, and 27.2% isopropanol

The following summary applies to the test sample as a mixture of the test substance in an isopropanol/water solution with incompletely characterized concentrations of impurities. Data may not accurately relate toxicity of the test sample with that of the test substance.

METHOD

Method: U.S. EPA-TSCA Guideline 797.1400

Type: Acute static

GLP: Yes

Year completed: 1995

Species: *Pimephales promelas*

Supplier: Aquatic Biosystems, Fort Collins, CO

Analytical monitoring: DO, conductivity, pH and temperature were monitored daily.

Exposure period: 96-hours

Statistical methods: LC50 values calculated, when possible, by probit analysis, moving average method or binomial probability with non-linear interpolation using the computer software of C.E. Stephan.

Test fish age: Not noted.

Length and weight of fish in control: Average length = 32.8 mm
Average weight = 0.28 g

Loading: 0.19 g fish/L

Pretreatment: None

Test conditions:

Dilution Water: Deionized water adjusted to a hardness of 40 - 48 mg/L as CaCO₃/L

Dilution water chemistry: Not noted.

Lighting: Cool-white fluorescent bulbs with an intensity of 28 ft-c. Photoperiod of 16-hours light, 8-hours dark with a 15 minute transition period.

Aeration: Initiated after the 72-hour DO measurements.

Stock and test solutions preparation: Test substance was added directly to the dilution water in the test vessels on a weight/volume basis. No insoluble material was noted during the test.

Concentrations dosing rate: Once

Exposure vessels: 20 L glass aquaria containing approximately 15 L of test solution, water depth approximately 18 cm. Vessels were loosely covered during the test.

Number of replicates: 2

Number of fish per replicate: 10

Number of concentrations: five plus a negative control

Water chemistry during the study (from a representative sample of dilution water):

Hardness: 44 mg/L as CaCO₃

Alkalinity: 38 mg/L as CaCO₃

pH 7.9

Dissolved oxygen range (0 – 96 hours):

6.1 – 8.8 mg/L (control exposure)

5.1 – 8.9 mg/L (1,000 mg/L exposure)

Note: aeration was supplied to test vessels at 72-hours

Conductivity range (0 – 96 hours)

170 – 180 µmhos/cm (control exposure)

200 – 210 µmhos/cm (1,000 mg/L exposure)

pH range (0 – 96 hours)

7.2 – 7.9 (control exposure)

7.3 – 7.8 (1,000 mg/L exposure)

Test temperature range (0 – 96 hours)

22.1 – 22.2°C (control exposure)

21.9 – 22.2°C (1,000 mg/L exposure)

RESULTS

Nominal concentrations: Blank control, 130, 220, 360, 600, 1,000 mg/L.

Element value and 95% confidence interval:

24-hour LC_{50} = 1,000 (600 - >1,000) mg/L

48-hour LC_{50} = 940 (600 - >1,000) mg/L

72-hour LC_{50} = 890 (600 - >1,000) mg/L

96-hour LC_{50} = 890 (600 - >1,000) mg/L

96-hour NOEC = 600 mg/L

Element values based on nominal concentrations.

Remarks: Testing was conducted on the mixture as described in the Test Substance Remarks field. The values reported apply to that mixture and not the fluorochemical component alone.

Cumulative percent mortality:

Nominal Test Conc., mg/L	24-hours	48-hours	72-hours	96-hours
Control	0	0	0	0
130	0	0	0	0
220	0	0	0	0
360	0	0	0	0
600	0	0	0	0
1,000	50	60	70	70

Lowest concentration causing 100% mortality: None

Mortality of controls: None

CONCLUSIONS

The test substance 96-hour LC_{50} for fathead minnow was determined to be 890 mg/L with a 95% confidence interval of 600 - >1,000 mg/L. The test substance 96-hour no observed effect concentration (NOEC) was 600 mg/L.

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

DATA QUALITY

Reliability: Klimisch ranking 2. The study lacks analytical measurement of test substance concentrations in the test solutions and sample purity is not sufficiently characterized.

REFERENCES

This study was conducted at T.R. Wilbury Laboratories, Inc., Marblehead, MA, at the request of the 3M Company, Lab Request number N2332, 1995.

OTHER

Last changed: 4/01/01