

ACUTE TOXICITY TO FISH (FATHEAD MINNOW)

TEST SUBSTANCE

Identity: A mixture containing perfluorooctanesulfonate, which may also be referred to as PFOS, FC-95, or as a component of FC-3017. (1-Octanesulfonic acid) (CAS # 2795-39-3).

Remarks: The 3M production lot number was not noted. The test sample is FC-3017. Current information indicates FC-3017 is a mixture of 0.67% PFOS, 20% diethylene glycol butyl ether, 55.41% water, 21% ethylene glycol, 1.33% Hydroxy foamer, 1% sodium octyl sulfate, 0.5% polyoxyethylene monooctylphenyl ether, 0.04% sodium lauryl sulfate, and 0.05% tolyltriaizole.

The following summary applies to a mixture with incompletely characterized concentrations of impurities. Data may not accurately reflect toxicity of the fluorochemical component of the test sample.

METHOD:

Method: OECD Guideline 203

Type: Acute static-renewal

GLP: No

Year completed: 1995

Species: *Pimephales promelas*

Supplier: Aquatic Biosystems, Inc., Fort Collins, CO.

Analytical monitoring: Temperature, pH, and DO.

Exposure period: 96-hours

Statistical methods: Not given.

Test fish age: Juveniles (121 – 132 days)

Length and weight: Average length = 23 mm
Average weight = 0.0908 g (wet)

Loading: 0.504 g/L

Pretreatment: None

Test conditions:

Dilution water: Carbon-filtered well water

Dilution water chemistry:

Dissolved Oxygen: 8.4 mg/L

pH: 8.4

Lighting: Not given.

Stock and test solution preparation: The test material was added directly to the dilution water on a weight/volume basis and mixed well with a glass rod.

Concentrations dosing rate: Once for the control, 1.0 and 10 mg/L exposures. Twice for the 100 mg/L exposure, and three times for the 1000 mg/L exposure.

Stability of the test chemical solutions: Not noted.

Exposure vessels: 2.0 L beakers containing 1.8 L test solution.

Number of replicates: 1 for 1, 10, and 100 mg/L exposures, control and 1000 mg/L exposure were duplicate.

Number of fish per replicate: 10.

Number of concentrations: four plus a blank control

Water chemistry during the study:

pH range (0-96 hours):

8.0 – 8.4 (control exposure)

7.7 – 8.4 (1000 mg/L exposure)

Temperature range (0-96 hours): 17.8 – 19.9 °C

Dissolved oxygen range (0-96 hours):

6.5 – 8.4 mg/L (control exposure)

0.7 – 8.4 mg/L (1000 mg/L exposure)

RESULTS

Nominal concentrations: Blank control, 1, 10, 100, and 1000 mg/L

Element values: 96-hour LC_{50} = >1000 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 proportion alone.

CONCLUSIONS

The test sample 96-hour LC_{50} for fathead minnow was determined to be >1000 mg/L, the highest concentration tested. No mortality was observed at this concentration.

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

DATA QUALITY

Reliability: Klimisch ranking = 3. Testing approach inconsistent among exposure concentrations, with a combination of static and static-renewal techniques used. Sample purity was not properly characterized and the study lacks analytical confirmation of the amount of fluorochemical proportion in the solution.

REFERENCES

This study was conducted by the 3M Company, Environmental Laboratory, St. Paul, MN, Lab Request number N3188, 1995.

OTHER

Last changed: 6/26/00

Environmental Lab — Work Sheet

Sample Description

Lab Request No. N3158

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Date: 9/27/95

Analyst: GWJ

96-Hr Acute Toxicity to Fathead minnow, *Pimephales promelas*

Test Type: Static Renewal

Test Substance: FC-3017

Test Preparation Procedure: Monday 9/25/95 Added the following concentrations to individual beakers filled to the 1.8L mark with preconditioned carbon filtered well water. Mixed well with glass rod. Note Blank Control and 1000mg/L were duplicated.

A Conc. mg/L Conc. mg/L

Blank Control (Duplicate)

1.0 1.8

10 1.8

100 180

1000 1800 (Duplicate)

Fathead minnows were then placed in each beaker. Beaker were then put into an environmental chamber.

Wednesday 9/27/95 D.O. in the 1000mg/L beakers were <60% of the air-saturation value. Fresh preconditioned carbon filtered well water was added to fresh beakers (two to the mark of 1.8L).

Then 1800mg of sample was added to each beaker and mixed.

Fathead minnows from the previous set of 1000mg/L beakers were then transferred to the fresh beakers.

Renewal Dilution H₂O Temp. 19.3°C, pH 8.4, D.O. 8.7mg/L

Initial pH of 1000mg/L, pH = 8.3

Thursday 9/28/95 D.O. in the 100mg/L and 1000mg/L beakers were <60% of the air-saturation value. Fresh preconditioned carbon filtered well water was placed into fresh beakers (2-1000mg/L and 1-100mg/L) to the mark of 1.8L.

continued

Environmental Lab — Work Sheet

Sample Description

Lab Request No. 03188Page 2 of 4Date: 9/28/95Analyst: G.W.J.

Then sample concentrations were added to each beaker per table
A and mixed. Fathead minnows from the previous sets of beakers
were then transferred to the fresh beakers.

Reveal Dilution H₂O Temp 19.8°C, pH 8.4, D.O. 8.8 mg/L

Initial pH at 1000 mg/L, pH = 8.4

LA N3188

TYPE TEST: STATIC ~~STATIC~~ 10/3/95 STATIC RENEWAL X

DILUTION WATER: CARBON-FILTERED WELL WATER (3M WELL #2, ST. PAUL, MN)
Temp. 19.9 °C, pH 8.4 , D.O. 8.4 mg/L

FISH AGE: 121-132 days **AVG. WT.:** 0.0409 ± 0.0026 g **AVG. SIZE:** 2.3 ± 0.1 cm

TEST SOLUTION VOLUME: 1.8 L **SIZE OF TEST VESSELS:** 2.0 L BEAKER

DATE TERMINATED: 9/29/95

COMMENTS: *INDIVIDUAL WEIGHTS, mg/L. Initial pH of highest concentration, as tested 1000 mg/L, pH = 8.3. The 1000 mg/L conc. was renewed after 48 hrs. and 72 hrs. The 100 mg/L conc. was renewed after 72 hrs. (See pg #1 for details)

SECONDARY EFFECTS: S = Surfacing; E = Loss of Equilibrium; Q = Quiescent; R = Erratic Swimming; H = Hemorrhaging

ANALYST:

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Environmental Laboratory

LR N3188
Date 9/29/95

96-Hour Acute Toxicity To Fathead Minnow, *Pimephales Promelas*

Loading Rate Data Sheet

Test Substance: EC-3017

Minnow #	Weight, (g)	Length, (cm)
1	0.1231	2.6
2	0.1190	2.4
3	0.1016	2.3
4	0.0688	2.2
5	0.0796	2.3
6	0.0889	2.5
7	0.0825	2.2
8	0.0845	2.4
9	0.0861	2.3
10	0.0743	2.2
Mean Avg.	0.0908	2.3501

Loading Rate Calculation:

Mean Avg. wt., (g) 0.0908 x 10 = 0.908 g.

(n) g/1.0L = 0.908 g/1.8L

(n) g = 0.504

Loading Rate = 0.504 g/L.