

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 FX-601. (1-Octanesulfonic acid) (CAS # 2795-39-3).

Remarks: The 3M production lot number was cc 835-34. The test sample is L-9235 (FX-601). Current information indicates it is a mixture of 1% PFOS, 12% diethylene glycol butyl ether, 81.25% water, 2% propane Sultone foamer, 1% sodium octyl sulfate, 1% sodium decyl sulfate, 0.1% N-(3-chloroallyl) hexaminium chloride, 0.8% xanthan gum, 0.8% starch, and 0.05% tolyltriazole.

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

METHOD:

Method: Not given.

Type: Acute static-renewal range-finder

GLP: No

Year completed: 1984

Species: *Pimephales promelas*

Supplier: Commercial supplier, Brady, NE.

Analytical monitoring: Temperature, pH, and dissolved oxygen.

Exposure period: 96-hours

Statistical methods: LC₅₀ values not calculated based on study results.

Test fish age: Juveniles

Length and weight: Average length = 35.4 mm
Average weight = 0.312 g (wet)

Loading: 0.52 g/L

Pretreatment: 250 mg/L Tetracycline HCl.

Test conditions:

Dilution water: Carbon-filtered well water.

Dilution water chemistry:

Hardness: 250 mg/L as CaCO₃

Alkalinity: 240 mg/L as CaCO₃

Conductivity: 350 µmhos/cm

Lighting: A daily photoperiod of 16 hours light and 8 hours dark with a 15 to 30 minute transition period was maintained throughout the testing period.

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

Concentrations dosing rate: Test solutions renewed.

Stability of the test chemical solutions: Not noted.

Exposure vessels: 1 gallon all-glass round tanks containing 3 L test solution.

Number of replicates: 1, except for highest concentration and blank controls.

Number of fish per replicate: 5.

Number of concentrations: five plus a blank control

Water chemistry during the study:

pH range (0-96 hours):

8.0 – 8.1 (control exposure)

7.8 – 8.1 (1000 mg/L exposure)

Temperature range (0-96 hours): 20 - 22 °C

Dissolved oxygen range (0-96 hours):

6.5 – 9.4 mg/L (control exposure)

0.5 – 9.4 mg/L (1000 mg/L exposure)

RESULTS

Nominal concentrations: Blank control, 1, 10, 100, 500, and 1000 mg/L. The blank control and 1000 mg/L exposure solutions were evaluated in duplicate.

Element values: 96-hour LC_{50} = >1000 mg/L

Element values based on nominal concentrations

Remarks: Testing was conducted on a 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. Ten percent mortality was observed in this concentration when the replicates are viewed as combined.

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

DATA QUALITY

Reliability: Klimisch ranking = 3. The study is a range-finding, with limited test organisms. There is a lack of characterization of the test sample and the study lacks analytical confirmation of the amount of fluorochemical proportion in the solutions.

REFERENCES

This study was conducted by the 3M Company, Environmental Laboratory,
St. Paul, MN, Lab Request number B1684, 1984.

OTHER

Last changed: 6/26/00

002095

ENVIRONMENTAL LABORATORY
CHEMICAL ENVIRONMENTAL EFFECTS EVALUATION
TOXICITY TEST: SUMMARY REPORT

Chemical Tested L-9235 (EX1001) PC835-34 Test Type: RANGE-FINDER (EXPLORE)
LC50/EC50/IC50/GR50 (95% C.L.): 912NR, LC50 95% NIK TONIC 1000 mg/l
Test Species: FATHEAD MINNOWS (PIMEPHALES PROMELAS)
Test Date: 10-11-84 10-15-84 L.R. #: JB1084-1
Analyst(s): [Signature]

(Exposure/Test Conditions)

Exposure Type:

Static _____ Static/Continuous
Orbital Shaking _____
Static Recirculatory _____ Static Renewal ACUTE Flow-Through _____

Diluent:

Aerated Well Water (Initial D.O. 9.4 mg/l; pH 6.1; Temp. 20 °C (68 °F))

Water Hardness: 250 ppm Hardness Classification: HARD

Dissolved Oxygen & Saturation:

	<u>48-hr</u>	<u>96-hr</u>	<u>Extended Exposure</u>
Control(s)	<u>46</u>	<u>95</u>	_____
Lowest Experimental Dose 1mg/l	<u>41</u>	<u>98</u>	_____
Highest Experimental Dose 1000mg/l	<u>10</u>	<u>51</u>	_____

pH Levels:

	<u>48-hr</u>	<u>96-hr</u>	<u>Extended Exposure</u>
Control(s)	<u>8.0</u>	<u>8.0</u>	_____
Lowest Experimental Dose 1mg/l	<u>8.0</u>	<u>8.0</u>	_____
Highest Experimental Dose 1000mg/l	<u>7.8</u>	<u>7.8</u>	_____

Test Temperature °C (°F):

<u>48-hr</u>	<u>96-hr</u>	<u>Extended Exposure</u>
<u>22°C (72)</u>	<u>22°C (72)</u>	<u>°C ()</u>

Photoperiod: Sixteen hours light with a 15-30 minute transition period.

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ENVIRONMENTAL LABORATORY
AQUATIC TOXICITY DATA SHEET
EXPLORATORY (RANGE-FINDER)

LR B1684

Type Test STATIC ACUTE Material Tested 1-9235 (EXC-01) Lot 10835-37
 Test Organism FATHEAD MINNOW Source BEADY, NEG Date Rec'd 5/17/84 Batch # 4-84
 Wt. 0.312 grams Avg. Size 3.54 cm No. Organisms per dose 5 Loading Factor 0.52 g/l
 Fish Disease Treatment: 250 mg/l Tetracycline N/C
 Test Solution Volume 3 liters/All-Glass Tank Tank Dimensions: OPEN 1-GALLON ALL-GLASS TANK
25x20 cm and 25 cm deep
 Time Started 11:00 AM Date Started 6/11/84 Date Completed 6/15/84
 Dilution Water Carbon-filtered well water (Temp. SEE ATTACHED SHEET °C., D.O. ppm, pH ppm)
 Investigator [Signature] EC₅₀ (95% Confidence Limits) >1000 mg/l
 Full Signature [Signature]

Tank No.	Initial Conc. mg/l	Total Amount Added	24 Hours			48 Hours			72 Hours			96 Hours		
			Total No. Dead	pH	D.O. ppm	Total No. Dead	pH	D.O. ppm	Total No. Dead	pH	D.O. ppm	Total No. Dead	pH	D.O. ppm
I	Control	<u>44*</u>	0	8.0	7.8	0	8.0	7.8	0	8.0	7.8	0	8.0	7.8
II	Control	—	0	8.0	7.7	0	8.0	7.5	0	8.0	7.8	0	8.0	7.5
1	1	3	0	8.1	7.9	0	8.1	7.2	0	8.0	7.8	0	8.0	7.5
2	10	30	0	8.0	7.7	0	8.0	5.9	0	8.0	7.7	0	8.0	7.0
3	100	300	0	8.0	7.5	0	8.0	4.7	0	8.0	7.5	0	8.0	7.2
4	500	1500	0	8.0	7.1	0	7.9	4.5	0	7.9	6.5	0	7.9	4.4
5	1000	3000	0	7.9	5.1	0	7.8	0.6	0	7.8	5.0	0	7.8	4.1
5A	1000	3000	0	7.9	4.8	1	7.8	0.5	1	7.8	4.6	1	7.8	4.2

Test Temp. °C 21.0 22.0 22.0 22.0
 Initials & Date ES 6/12/84 ES 6/11/84 ES 6/14/84 ES 6/15/84
 Comments: * MINIMUM WEIGHTS, LIGHT NUMBER FEEDING VISUALS LIQUID.

Secondary Effects (other than Mortality):

BEST COPY AVAILABLE
EC₅₀

Tank No.	Symptoms or Reactions	Total Number Affected			
		24-Hr.	48-Hr.	72-Hr.	96-Hr.
Control	I & II				
1		NONE	NONE	NONE	NONE
2					
3					
4	SURFACING	3	5	1	1
5	SURFACING	2	5	2	4
5A	SURFACING	2	4	2	4

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Environmental Lab – Work Sheet

Sample Description

FISH TOXICITY TESTING
DILUENT WATER QUALITY
(INITIAL READINGS)

Date: 6/11/84

Analyst: [Signature]

[illegible]

002098

7-18-84

ENVIRONMENTAL LABORATORY STATUS REPORT
ALL RESULTS TENTATIVE

LAB REQUEST NO. B1750

QUESTER NAME: RRR
PT: 0222
OBJECT NO: 06
TE RECEIVED: 6-14-84
SC: MAY-CARBON FILTERED WELL WATERCONTRACT LAB:
CONTRACT LAB COST: 0
3M E-L HOURS: 3
EST CMPLT DATE: 7-27-84
DATE COMPLETED:

SAMPLE	DATE	CODE	DESCRIPTION	TEST	RESULT
1	6-01-84	RM#4		PH	7.9
				RES-CL	<0.02 MG/L
				COND	350UMHOS/CM2
				TOT-HARD	240 MG/L
				TOT-ALK	240 MG/L
				TS	320 MG/L
				NH3-N	#<0.4 MG/L
				SOL-F	0.2 MG/L
				COD-LOW	4 MG/L
				TOT-COLIF	NEGATIVE
				SPC	49 PER/ML
2		DI	WATER	PH	6.8
				RES-CL	<0.02 MG/L
				COND	2.1UMHOS/CM2
				SPC	9 PER/ML

= UPDATED DATA
* = CONTRACT LAB

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