

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-3041. (1-Octanesulfonic acid) (CAS # 2795-39-3).

Remarks: The 3M production lot number was 2300. The test sample is FC-3041 (cc 809-1). Current information indicates it is a mixture of 6% PFOS, 36% diethylene glycol butyl ether, 36.05% water, 12% Sultone foamer, 9% sodium octyl sulfate, 0.55% sodium lauryl sulfate, and 0.4% 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

GLP: No

Year completed: 1981

Species: *Pimephales promelas*

Supplier: Commercial supplier, Brady, NE.

Analytical monitoring: Temperature, pH, and DO.

Exposure period: 96-hours

Statistical methods: LC₅₀ values calculated by moving average angle method.

Test fish age: Juveniles

Length and weight: Average length = 41 mm
Average weight = 0.49 g (wet)

Loading: 0.61 g/L

Pretreatment: None

Test conditions:

Dilution water: Carbon-filtered well water, St. Paul, MN

Dilution water chemistry:

Hardness: 253 mg/L as CaCO₃

Alkalinity: 221 mg/L as CaCO₃

Lighting: Not given.

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

Concentrations dosing rate: Once.

Stability of the test chemical solutions: Not noted.

Exposure vessels: All-glass tanks (35x20x25 cm) containing 16 L of test solutions.

Number of replicates: 2

Number of fish per replicate: 20.

Number of concentrations: five plus a blank control

Water chemistry during the study:**pH range (0-96 hours):**

7.9 – 8.1 (control exposure)

7.8 – 8.1 (320 mg/L exposure)*

Temperature range (0-96 hours): 18 – 19 °C**Dissolved oxygen range (0-96 hours):**

5.0 – 9.2 mg/L (control exposure)

0.2 – 9.2 mg/L (320 mg/L exposure)*

* 320 mg/L (second highest concentration) exposure values used because the highest concentration used resulted in total mortality by 48 hours.

RESULTS

Nominal concentrations: Blank control, 87, 135, 210, 320, and 490 mg/L**Element values:** 96-hour LC₅₀ = 240 (217 – 265) 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 LC₅₀ for fathead minnow was determined to be 240 mg/L with a 95% confidence interval of 217 to 265 mg/L.

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

DATA QUALITY

Reliability: Klimisch ranking 2. Testing meets the criteria for quality testing. However, 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 6508S, 1981.

OTHER

Last changed: 6/26/00

ENVIRONMENTAL LABORATORY
AQUATIC TOXICITY DATA SHEET
DEFINITIVE (FULL SCALE TEST)

LR 65085

Type Test 96HR. ACUTE STATIC Material Tested EC-3041(CC809-1) Lot 2300
Test Organism FATHNEAL MINNINUS Source JBROADY, NEVS Date Rec'd 1/5/81 Batch # 2-81
Avg. Wt. 0.49 grams Avg. Size 4.1 cm No. Organisms per dose 20 Loading Factor 0.61 g/l
Fish Disease Treatment: NONE

Test Solution Volume 16 Liters/All-Glass Tank Tank Dimensions: 35x20 cm and 25 cm deep

Time Started 11:30 AM Date Started 2/9/81 Date Completed 2/13/81

Dilution Water Carbon-filtered well water (Temp. 18 °C., D.O. 9.2 ppm, pH 8.1)

Investigator W. J. O. S. ^{N=2}
(Full Signature) W. J. O. S. ^{IC₅₀ (95% Confidence Limits) 235 mg/l (202-269 mg)}
^{COMB. LC₅₀ 240 mg/l (217-265 mg/l)}

USED MOVING AVERAGE ANGLE METHOD

Tank No.	Initial Conc. mg/l	Total Amount Added mg	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
CI	Control	—	0	8.0	6.5	0	8.0	6.3	0	7.9	5.6	0	7.9	5.3
CII	Control	—	0	8.1	6.2	0	8.0	6.0	0	7.9	5.5	0	7.9	5.0
1B	87	1392*	0	8.0	4.4	1	8.0	2.5	3	7.9	2.4	4	7.9	2.5
2B	135	2160	0	8.0	3.0	2	8.0	1.5	2	7.9	1.4	4	7.9	1.6
3B	210	3360	0	8.0	2.6	2	8.0	1.3	2	7.9	1.3	6	7.9	1.4
4B	320	5120	4	8.0	2.5	14	8.0	0.2	14	7.8	0.9	14	7.8	1.0
5B	490	7840	13	8.0	2.0	20	7.9	0.2	20	—	—	20	—	—

Test Temp. °C

Initials & Date

Comments: * INDIVIDUAL WEIGHTS. TEST MATERIAL IS A DARK AMBER, EASILY

SOLUBLE IN WATER AT AMBIENT ROOM TEMPERATURE.

Secondary Effects (other than Mortality):

EC₅₀

Tank No.	Symptoms or Reactions	Total Number Affected			
		24-Hr.	48-Hr.	72-Hr.	96-Hr.
Control	—	NONE	NONE	NONE	NONE
Control	—	NONE	NONE	NONE	NONE
1B	SURFACING	All	All	All	All
2B	—	All	All	All	All
3B	—	All	All	All	All
4B	—	All	All	All	All
5B	—	All	All	All	All

ENVIRONMENTAL LABORATORY
AQUATIC TOXICITY DATA SHEET
DEFINITIVE (FULL-SCALE TEST)

LR 65085

Type Test 96HR. ACUTE STATIC Material Tested EC 3041 (11809-1) Lot 2300
Test Organism FATHREAD MINNOWS Source BRADY, NER Date Rec'd 1/5/81 Batch # 201
Avg. Wt. 0.49 grams Avg. Size 4.1 cm No. Organisms per dose 20 Loading Factor 0.61
Fish Disease Treatment: NONE

Test Solution Volume 16 Liters/All-Glass Tank Tank Dimensions: 35x20 cm and 25 cm deep

Time Started 11:30 AM Date Started 2/9/81 Date Completed 2/13/81

Dilution Water Carbon-filtered well water (Temp. 18 °C., D.O. 9.2 ppm, pH 8.1)

Investigator MAF 983 IC₅₀ (95% Confidence Limits) 246 mg/l (211-284 mg)
(Full Signature) USED MOVING AVERAGE ANGLE METHOD COMB. IC₅₀ 240 mg/l (211-265 mg/l)

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
CI	Control	mg	0	8.06.5		0	8.06.3		0	19.5.6		0	19.5.2	
CII	Control	—	0	8.16.2		0	8.06.0		0	19.5.5		0	19.5.0	
1C	84	1392*	0	8.03.9		1	8.02.6		2	19.2.2		4	18.2.2	
2C	135	2160	0	8.03.3		0	8.01.9		2	19.1.8		5	18.1.9	
3C	210	3360	0	8.02.3		2	8.01.3		2	18.1.4		6	18.1.4	
4C	320	5120	2	8.03.5		7	8.00.2		10	18.0.8		11	18.0.5	
5C	490	7840	17	8.03.9		20	7.90.2		20	—		20	—	
Test Temp. °C			19°C			19°C			19°C			19°C		
Initials & Date			MS 2/10/81			MS 2/11/81			MS 2/12/81			MS 2/13/81		

Comments: * INDIVIDUAL WEIGHTS. TEST MATERIAL IS A DARK, THICK, FOAMY LIQUID.
SOLUBLE IN WATER AT AMBIENT ROOM TEMPERATURE.

Secondary Effects (other than Mortality):

EC₅₀

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