

ACUTE TOXICITY TO AQUATIC INVERTEBRATES (DAPHNIA MAGNA)

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: Static acute

GLP: No

Year completed: 1981

Species: *Daphnia magna*

Supplier: Rand McNeilly

Analytical monitoring: Temperature, pH, and dissolved oxygen.

Exposure period: 48-hours

Test organism age: <24 hours old

Statistical methods: LC₅₀ values calculated using the moving average angle method.

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: A 5000 mg/L primary stock solution was prepared by diluting 500 mg of test substance in 100 mL of dilution water.

Aliquots were then added directly to dilution water in the test vessels.

Exposure vessels: 250 mL beakers containing 200 mL exposure solution and a solution depth of 6 cm.

Number of replicates: 2

Number of daphnids per replicate: 20

Number of concentrations: five plus a blank control

Water chemistry during the study:

pH range (0-48 hours):

8.0 - 8.1 (control exposure)

8.0 - 8.1 (1000 mg/L exposure)

Temperature range (0-48 hours): 18 – 20 °C
Dissolved oxygen range (0-48 hours):
7.9 – 9.3 mg/L (control exposure)
4.0 – 9.3 mg/L (1000 mg/L exposure)

RESULTS

Nominal concentrations: Blank control, 65, 100, 155, 240, and 370 mg/L.

Element values: 48-hour LC₅₀ = 259 (242 – 276) 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 substance 48-hour LC₅₀ was determined to be 259 mg/L with a 95% confidence interval of 242 to 276 mg/L.

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

DATA QUALITY

Reliability: Klimisch ranking = 2. This study meets the criteria for quality testing. However, the study lacks information on purity of the test substance and analytical confirmation of the amount of fluorochemical proportion in 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

1265085

Type Test 48 HR. ACUTE STATIC Material Tested FC 3041 Lot 2300
(12809-1)

Test Organism DAVID MCKENNA Source DAVID MCKENNA Date Rec'd 1/30/81 Batch No. 3-81

Age: First-Instar young (0.5-1.5cm) No. Organisms per treatment 20

Test Chamber: 250ml glass beaker Test Solution Vol.: 200ml Test Solution Depth: 6cm.

Time Started 4:30 PM Date Started 2/11/81 Date Completed 2/13/81

Dilution Water Carbon-filtered well water (Temp. 18 °C, p.O. 9.3 ppm, pH 8.1)

Investigator MJP LC₅₀ (95% Confidence Limits) 238 mg/l (212-273)
(Full Signature) MJP Comb LC₅₀ 259 mg/l (242-296 mg/l)

USED MOVING AVERAGE ANGLE METHOD

Tank No.	Conc. mg/l	Total Amount Added	24 Hours			48 Hours			72 Hours			96 Hours		
			Total No. Dead	pH	p.O. ppm	Total No. Dead	pH	p.O. ppm	Total No. Dead	pH	p.O. ppm	Total No. Dead	pH	p.O. ppm
Control		<u>MB</u>	0	8.0	7.9	0	8.0	8.0	X					
Control		—	0	8.0	8.0	0	8.0	8.0						
1A	1.5	13*	1	8.0	8.1	1	8.0	7.2						
2A	10.0	20	1	8.0	7.0	1	8.0	6.5						
3A	15.5	31	3	8.0	7.0	3	8.0	6.2						
4A	24.0	48	3	8.0	6.5	3	8.0	5.3	X					
5A	37.0	74	20	8.0	6.5	20	8.0	—						
Test Temp. °C.			19°C			20°C								
Initials & Date			J3 2/12/81			J3 2/13/81								

Comments: * COMMON STOCK SOLUTION: 500mg/100 ml EACH 1 ml = 5mg

AMOUNT ADDED: 2.16, 4, 12.2, 9.6, AND 14.8 ml.

Effects other than Mortality

EC₅₀

Tank No.	Symptoms or Reactions	Total No. Affected			
		24-Hr.	48 Hr.	72-Hr.	96-Hr.
Control					

Comments: TEST MATERIAL IS A DARK AMBER FOAMY LIQUID. SOLUBLE IN WATER AT AMBIENT ROOM TEMPERATURE

**ENVIRONMENTAL LABORATORY
AQUATIC TOXICITY DATA SHEET**

LR 65085

Type Test 48hr. Acute Static Material Tested EC 3041 lot 2300

Test Organism Daphnia magna Source BAND McNEIL Lot No. 1344 Batch No. 3-81

Age: First-Instar young (0.5-1.5mm) No. Organisms per treatment 20

Test Chamber: 250ml glass beaker Test Solution Vol.: 200ml Test Solution Depth: 6cm.

Time Started 4:30 PM Date Started 2/11/81 Date Completed 2/13/81

Dilution Water Carbon-filtered well water (Temp. 18 °C, D.O. 9.3 ppm, pH 8.1)

Investigator [Signature] LC (95% Confidence Limit) 274 mg/l (244-304)
(Full Signature) [Signature] Comb. LC50 259 mg/l (242-276 mg/l)

USED MOVING AVERAGE ANGLE METHOD

Tank No.	Dose, mg/l	Total Amount Added, mg	24 Hours		48 Hours		72 Hours		96 Hours	
			Total No. Dead	D.O., ppm	Total No. Dead	pH	Total No. Dead	D.O., ppm	Total No. Dead	D.O., ppm
Control			0	8.07.9	0	8.08.0	X	X	X	X
Control			0	8.08.0	0	8.08.0				
B 125	13*	1	0	8.07.9	2	8.07.0				
B 100	20	0	0	8.06.8	1	8.06.2				
B 155	31	3	0	8.06.8	3	8.06.0				
B 240	48	3	0	8.06.5	3	8.05.0				
B 370	74	7	0	8.06.5	11	8.04.0				

Test Temp. °C.

19°C

20°C

Initials & Date

[Signature] 2/12/81

[Signature] 2/13/81

Comments: * COMMON SICK SOLUTION: 500mg/100ml. EACH 1ml = 5mg.

AMOUNT ADDED: 2.6, 4, 6.2, 9.6, AND 14.8 ml.

Effects other than Mortality

BC₅₀

Tank No.	Symptoms or Reactions	Total No. Affected			
		24-Hr.	48 Hr.	72-Hr.	96-Hr.
Control					

Comments: TEST MATERIAL IS A DARK AMBER FOAMY LIQUID SOLUBLE IN WATER AT AMBIENT ROOM TEMPERATURE.

TABLE 2

ENVIRONMENTAL LABORATORY
BLDG. 2-3E
ST. PAUL, MINNESOTA

FIRST QUARTERLY REPORT, 1981
WELL WATER SUPPLY FOR AQUATIC TOXICITY TESTING

PARAMETER	JAN. 28	FEB. 26	MAR. 25	AVERAGE ($\pm$ S)
TOTAL HARDNESS* as mg/l CaCO ₃	256	252	252	253 $\pm$ 2
TOTAL "M" ALKALINITY* as mg/l CaCO ₃	232	220	210	221 $\pm$ 11
ELECTRICAL SPECIFIC CONDUCTANCE* as umhos per cm ² at 25°C	360	305	320	328 $\pm$ 28
TOTAL SOLIDS* as mg/l	267	299	311	292 $\pm$ 23
pH**	7.7	7.7	7.7	7.7 $\pm$ 0
STANDARD PLATE COUNT*** per 1.0 ml	19	6	11	12 $\pm$ 7

CRITERIA OF CONSTANT QUALITY

- * Monthly ranges should be less than 10% of their respective averages. (ASTM Standard E729-1980.)
- ** Monthly range of pH should be less than 0.4 unit. (ASTM Standard E729-1980.)
- *** Total bacterial densities should not be greater than 500 organisms per ml. (USEPA-600/8-78-017, p. 101.)