

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-602. (1-Octanesulfonic acid) (CAS # 2795-39-3).

Remarks: The 3M production lot number was 501. The test sample is FC-602-X. Current information indicates it is a mixture of 1% PFOS, 12% diethylene glycol butyl ether, 61.05% water, 20% ethylene glycol, 2% Sultone foamer, 1% sodium octyl sulfate, 1% sodium decyl sulfate, 1% magnesium sulfate, 0.7% xanthan gum, 0.1% starch, 0.1% n-(3-chloroallyl)hexaminium chloride, and 0.05% tolytriazole.

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: OECD Method 202, U.S. EPA Method EG-1.

Type: Acute static

GLP: No

Year completed: 1988

Species: *Daphnia magna*

Supplier: In-house cultures. Originally obtained from U.S. EPA ERL, Duluth, MN.

Analytical monitoring: Temperature, pH, and dissolved oxygen.

Exposure period: 48-hours

Test organism age: <24-hours old

Statistical method: LC₅₀ values calculated using a computer software program.

Test conditions:

Dilution water: Carbon-filtered well water

Dilution water chemistry:

Hardness: 240 mg/L as CaCO₃

Alkalinity: 220 mg/L as CaCO₃

Conductivity: 500 µmhos/cm

Lighting: Not given

Stock and test solution preparation: A primary stock solution of 1000 mg test substance added to 1L well water. Exposure concentrations prepared by addition of stock solution to dilution water in exposure vessels. Initial pH of the stock solution was 8.2.

Exposure vessels: 250 mL Pyrex® glass beakers with 200 mL exposure solution and a water depth of 6 cm.

Number of replicates: 2
Number of daphnids per replicate: 10
Number of concentrations: five plus a blank control

Water chemistry during the study:

pH range (0-48 hours):

8.1 – 8.2 (control exposure)

8.1 – 8.3 (1000 mg/L exposure)

Temperature range (0-48 hours): 20-22 °C

Dissolved oxygen range (0-48 hours):

8.7 – 9.2 mg/L (control exposure)

7.5 – 9.2 mg/L (1000 mg/L exposure)

RESULTS

Nominal concentrations: Bk control, 100, 180, 320, 560, and 1000 mg/L.

Element values: 48-hour EC₅₀ = 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 FC-602 48-hour EC₅₀ was determined to be 1000 mg/L, the highest concentration tested. Mortality observed was 50%.

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 it lacks 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 F1151, 1988.

OTHER

Last changed: 6/26/00.

ENVIRONMENTAL LABORATORY
DAPHNIA TOXICITY DATA SHEET

LR F1151

TEST TYPE 48-HR Acute Static CHEMICAL TESTED FC-602-X Light Water AIC Plus LOT 501
TEST ORGANISM Daphnia magna SOURCE USEPA ERL Duluth, MN DATE REC'D 8-14-86
AGE OF TEST ORGANISMS: 424 hrs. old instars (neonates) NO. ORGANISMS PER TREATMENT 10
TEST VESSEL: 250 ml Pyrex^R glass beaker TEST SOLUTION VOLUME: 200 ml WATER DEPTH: 6 cm
TIME STARTED 1:00 pm DATE STARTED 3-15-88 DATE COMPLETED 3-17-88
DILUTION WATER Carbon-filtered well water (Temp. 20 °C, D.O. 9.2 mg/L, pH 8.1)
ANALYST A. Beach EC₅₀ (95% Confidence Limits) 1000 mg/L induced 50% Mort

Test Vessel No.	Initial Conc. mg/L	Total Amount Added ml*	24 Hours			48 Hours		
			Total No. Dead	pH	D.O. mg/L	Total No. Dead	pH	D.O. mg/L
I	Control	—	0			0	8.2	8.7
1-1	100	20	0			0	8.2	8.0
1-2	180	36	0			0	8.2	8.0
1-3	320	64	0			0	8.2	8.0
1-4	560	112	0			0	8.2	7.8
1-5	1000	200	0			5	8.3	7.6
Test Temp. °C			22			22		
Initials & Date			SAB 3-16-88			SAB 3-17-88		

Comments: * Stock solution; 1000 mg/L well water (each ml = 1 mg)

Apparently completely miscible with well water.

Initial pH stock soln. = 8.2

Test methodology conforms with the following two test protocols:

- (1) OECD #202 "Daphnia sp., Acute Immobilization Test and Reproduction Test".
- (2) US-EPA #EG-1 "Daphnid Acute Toxicity Test".

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ENVIRONMENTAL LABORATORY
DAPHNIA TOXICITY DATA SHEET

LR F1151

TEST TYPE 48-Hr Acute Static CHEMICAL TESTED FC-602-X Light Water ATC Plus
TEST ORGANISM Daphnia magna SOURCE USEPA-ERL Duluth, MN LOT 501
AGE OF TEST ORGANISMS: 424 hrs. old instars (neonates). NO. ORGANISMS PER TREATMENT 10
TEST VESSEL: 250 ml Pyrex^R glass beaker TEST SOLUTION VOLUME: 200 ml WATER DEPTH: 6 cm
TIME STARTED 1:00 pm DATE STARTED 3-15-88 DATE COMPLETED 3-17-88
DILUTION WATER Carbon-filtered well water (Temp. 20 °C, D.O. 9.2 mg/L, pH 8.1)
ANALYST Juan A. Beach EC₅₀ (95% Confidence Limits) > 1000 1000 mg/L induced
50% mortality

Test Vessel No.	Initial Conc. mg/L	Total Amount Added ml*	24 Hours			48 Hours		
			Total No. Dead	pH	D.O. mg/L	Total No. Dead	pH	D.O. mg/L
<u>II</u>	<u>Control</u>	<u>-</u>	<u>0</u>			<u>0</u>	<u>8.1</u>	<u>8.7</u>
<u>2-1</u>	<u>100</u>	<u>20</u>	<u>0</u>			<u>0</u>	<u>8.2</u>	<u>8.3</u>
<u>2-2</u>	<u>180</u>	<u>36</u>	<u>0</u>			<u>0</u>	<u>8.2</u>	<u>8.1</u>
<u>2-3</u>	<u>320</u>	<u>64</u>	<u>0</u>			<u>0</u>	<u>8.2</u>	<u>8.0</u>
<u>2-4</u>	<u>560</u>	<u>112</u>	<u>0</u>			<u>0</u>	<u>8.2</u>	<u>7.8</u>
<u>2-5</u>	<u>1000</u>	<u>200</u>	<u>0</u>			<u>5</u>	<u>8.3</u>	<u>7.5</u>
Test Temp. °C			<u>22</u>			<u>22</u>		
Initials & Date			<u>3-16-88 SHB</u>			<u>SHB 3-17-88</u>		

Comments: * Stock Solution: 1000 mg/L well water (each 1ml = 1mg)
Apparently completely miscible with well water
Initial pH = 8.2

Test methodology conforms with the following two test protocols:
(1) OECD #202 "Daphnia sp., Acute Immobilization Test and Reproduction Test".
(2) US-EPA #EG-1 "Daphnid Acute Toxicity Test".

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03/24/1988

ENVIRONMENTAL LABORATORY FINAL REPORT

1

LAB REQUEST NO. F1286

REQUESTOR NAME: RR ROBIDEAU/SAB

DEPARTMENT: 0222

PROJECT NO: 06

DATE RECEIVED: 03/02/1988

DESC: CARBON-FILTERED WELL WATER - FEB. 1988

CONTRACT LAB: PACE

CONTRACT LAB COST: 144

3M E-L HOURS: 1

EXP COMP DATE: 03/23/1988

DATE COMPLETED: 03/23/1988

ORIGINAL SOURCE OF, WELL WATER, 3M WELL #2, ST. PAUL, MN.

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MIN DET LIMIT
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1	03/02/88	ROOM 4	WELL WATER		
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*COD

<5 MG/L

5

*SPECIFIC CONDUCTANCE

500 UMHOS/CM

*AMMONIA NITROGEN - as N

<0.1 MG/L

*PH

8.6 UNITS

7.6 typo 0.1

*SOLUBLE FLUORIDE (PROBE)

0.1 MG/L

*STANDARD PLATE COUNT

17 COL/ML

*TOTAL DISSOLVED SOLIDS

280 MG/L

*TOTAL ALKALINITY (PH 4.5)

220 MG/L

*TOTAL COLIFORM

<1 COL/100ML

1

*TOTAL HARDNESS

240 MG/L

TOTAL RESIDUAL CHLORINE

<0.02 MG/L

*TOTAL SOLIDS

280 MG/L

*TOTAL SUSPENDED SOLIDS

<1 MG/L

1

* = CONTRACT LAB

SUBMITTED BY: V. Hoffman DATED: 3-24-88

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