

MICROBICS MICROTOX® TOXICITY TEST

TEST SUBSTANCE

Identity: A mixture containing perfluorooctanesulfonate, which may also be referred to as PFOS, FC-95, or as a component of FC-603EF. (1-Octanesulfonic acid) (CAS # 2795-39-3).

Remarks: The 3M production lot number is not noted. The test sample is FC-603EF. Current information indicates it is a mixture of 1.30% PFOS, 10% diethylene glycol butyl ether, 54.15% water, 22.5% ethylene glycol, 2.6% propanesultone foamer, 5% Alkylether sulfate, 0.1% N-(3-Chloroallyl)hexaminium chloride, 0.9% Xanthan gum, 0.9% starch, 1.0% triethanolamine, and 0.05% tolyl triazole.

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

METHOD:

Method: Microbics Microtox® "BASIC" Procedure

Test type: Acute static

GLP: No

Year Completed: 1996

Species: *Photobacterium phosphoreum*

Analytical monitoring: pH and osmotic condition.

Exposure period: 30-minutes

Statistical methods: EC50 values calculated by statistical linear regression program provided for Microtox®

Test organism source: Microbics' Reagent.

Test conditions:

Diluent: Millipore Milli-Q™ water

Test temperature: Not noted.

Stock and test solution preparation: A 500 mg/L primary stock solution was prepared by dissolving 50 mg test substance in 100 mL Millipore Milli-Q™ water. The pH of the stock solution was 6.3. An osmotic adjustment was made using NaCl dissolved in 10 mL stock solution. Appearance of test solutions was noted as "clear and colorless." All test solutions were made by proportional dilutions..

Exposure vessels: Not given.

Number of replicates: two

Number of concentrations: Four plus a blank control

Element basis: Percent light loss

RESULTS

Nominal concentrations: Blank control, 31.25, 62.5, 125, and 250 mg/L

Element value: 5-minute EC₅₀ = 217 (215 – 219) mg/L
 15-minute EC₅₀ = 146 (143 – 149) mg/L
 30-minute EC₅₀ = 124 (118 – 131) 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 substance 30-minute EC₅₀ for *Photobacterium phosphoreum* was determined to be 124 mg/L with a 95% confidence interval of 118 to 131 mg/L.

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

DATA QUALITY

Reliability: Klimisch ranking = 2. This study 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 solution.

REFERENCES

This study was conducted by the 3M Company, Environmental Laboratory, St. Paul, MN, Lab Request number P2581, 1996.

OTHER

Last changed: 6/26/00.

LAB REQUEST NO. P2581

CONTRACT LAB(S): PACE
ASCI

REQUESTOR NAME: J MOHS-DAVIS PACE/SHARI LOUSHIN

EXP COMP DATE: 11/18/1996

DEPARTMENT: 3058

DATE COMPLETED: 01/28/1997

PROJECT NO: BILTWENVIR

PROJECT LEAD: SA BEACH

DATE RECEIVED: 08/14/1996

PHONE NO: 651-778-7452

DESC: FC-603EF LIGHT WATER(TM) ATC 3%,AR-AFFF

3M FAX NO: 651-778-6176

236-GL-04; 7-7490.

Standard Testing. Formulation is on document #07-7297-0.

Results from Microtox Toxicity Test:

Test Conc. mg/L	Percent Light Loss		
	5-min Exp.	15-min Exp.	30-min Exp.
31.25	5.1	9.6	13
62.5	14	20	21
125	35	45	50
250	54	66	72
EC50	220	146	124
95% C.I.	(215 - 219)	(143 - 149)	(118 - 131)

sab 10/31/96

Results from Activated Sludge Respiration Inhibition Test:

Test Conc. mg/L	Percent Inhibition in Respiration Rate	
	30-min Exp.	3-hr Exp.
10	0	0
100	0	0
1000	0	0
1000 (dup)	0	0
EC50	> 1000	> 1000

sab 10/31/96

Results from Daphnia magna acute toxicity testing:

Test Conc. mg/L	Percent Immobilization	
	24-hr Exp.	48-hr Exp.
62.5	0	0
125	0	0
250	0	0
500	15	60
1000	25	85
EC50	> 1000	480
95% C.I.	-	(380 - 610)

NOEC* 250

No Observed Effect Concentration

Results from toxicity test with Selenastrum capricornutum (green algae):

Test Conc. Percent Inhibition in Average Specific Growth Rate

P-CBOD-05 BOD-05 (CARBONACEOUS) 110000 MG/KG

* = CONTRACT LAB DATA

05/26/2000

ENVIRONMENTAL LABORATORY STATUS REPORT

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LAB REQUEST NO. P2581

CONTINUED

SAMPLE	DATE	CODE	DESCRIPTION	RESULT	MDL or (95% C.I.)
2		DUP #1	-----		
P-CBOD-10		BOD-10	(CARBONACEOUS)	326000	MG/KG
P-CBOD-20		BOD-20	(CARBONACEOUS)	439000	MG/KG
P-CBOD-28		BOD-28	(CARBONACEOUS)	318000	MG/KG

ENVIRONMENTAL LABORATORY: MICROTOX PREP SHEET

LR: 02581

Date: 10-22-9

Analyst: TKS

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TEST SUBSTANCE: L2 1437.8

1. Preparation of Stock Solution

- Mass/Vol. Test Substance: 50 mg / 100 ml
- Final Dilution Volume: 500 mg / L
- Diluent: M. H. 2 O (water)
- Final Concentration of Stock Solution: 500 mg / L

2. pH Adjustment of Stock Solution

- Initial pH of Stock Solution: _____
- pH Adjusted to: _____
- pH Adjusted with: _____

3. Osmotic Adjustment of Stock Solution

- Osmotic Adjuster: NaCl
- Comments: _____

4. Appearance of pH and Osmotically Adjusted Stock Solution

- CLEAR or OPAQUE (circle one)
- Color: _____
- Comments: _____

5. Comments

MICROTOX DATA REPORT
Basic Test

FILE P2581 K5
10-22-96 TKS

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TKS
P2581

Test Time: 5 minutes

Osmotic Adjustment: NaCl

NUMBER	IO/IT	CONC	CR/GAMMA	Vol. Light Loss (*)	Dark Light Loss
Control	94.25/ 92.18	0.0	0.9780 #		
Control	95.09/ 94.15	0.0	0.9901 #		
1	90.37/ 84.73	31.2500	0.050 *	48	5.1
2	90.97/ 84.58	31.2500	0.058	54	
3	88.85/ 76.45	62.5000	0.144	12	14
4	89.29/ 74.60	62.5000	0.178	15	
5	91.06/ 57.81	125.0000	0.550	35	35
6	91.22/ 59.59	125.0000	0.506 #	34	
7	91.42/ 40.99	250.0000	1.195 #	54	50
8	91.88/ 41.28	250.0000	1.190 #	54	

CR = CoCORRECTION FACTOR = 0.9841

Used for calculations

* Invalid data or controls

EC50 216.7934 MG/L (95% CONFIDENCE RANGE: 215.0684 TO 218.5322)

Signature *Andy Slifert*

TEST DATE: 10-22-96
TIME: _____

(*) (30.0000)

MICROTOX DATA REPORT
Basic Test

FILE P2581 K15
10-22-96 TKS

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TKS

Test Time: 15 minutes

Osmotic Adjustment: NaCl

NUMBER	10/17	CONC.	CR/GAMMA	% Total Loss	Mean of Lipids
Control	94.25/ 95.98	0.0	1.0184 #	—	—
Control	95.09/ 95.82	0.0	1.0077 #	—	—
1	90.37/ 82.31	31.2500	0.112	10	9.6
2	90.97/ 83.59	31.2500	0.102	22	—
3	88.85/ 72.32	62.5000	0.245	20	2.0
4	89.29/ 72.40	62.5000	0.249	20	—
5	91.06/ 50.89	125.0000	0.813 #	45	4.5
6	91.22/ 50.54	125.0000	0.828 #	45	—
7	91.42/ 31.12	250.0000	1.976 #	66	6.6
8	91.88/ 31.28	250.0000	1.976 #	66	—

CR = CoCORRECTION FACTOR = 1.0130
Used for calculations

EC50 146.1180 MG/L (95% CONFIDENCE RANGE: 143.3303 TO 148.9619)

Signature: *[Signature]*

TEST DATE: 10-22-96
TIME: —

(S) Gamma
(S) Gamma

MICROTOX DATA REPORT
Basic Test

FILE P2581.K30
10-22-96 TKS

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TKS

Test Time: 30 minutes

Osmotic Adjustment: NaCl

NUMBER	IO/IT	CONC.	CR/GAMMA	% Light Loss (+)	mean °C Light Loss
Control	94.25/101.52	0.0	1.0771 #	-	-
Control	95.09/ 99.35	0.0	1.0448 #	-	-
1	90.37/ 83.70	31.2500	0.146	13	13
2	90.97/ 84.39	31.2500	0.144	13	
3	88.85/ 75.43	62.5000	0.250	20	21
4	89.29/ 74.58	62.5000	0.271 #	31	
5	91.06/ 48.25	125.0000	1.002 #	50	50
6	91.22/ 47.94	125.0000	1.019 #	50	
7	91.42/ 27.83	250.0000	2.485	71	72
8	91.88/ 27.58	250.0000	2.535	72	

CF = CORRECTION FACTOR = 1.0010
Used for calculations

EC50 124.3101 MG/L (95% CONFIDENCE RANGE: 117.5475 TO 131.4817)

Signature: *Ludy Shuford*

TEST DATE: 10-22-96
TIME: _____

(*) $\left(\frac{\text{gamma}}{\text{gamma}_0} \right) \times 100$