MICROBICS MICROTOX® TOXICITY TEST

TEST SUBSTANCE

Identity: Perfluorooctanesulfonate, Lithium salt; may also be referred to as PFOS Li salt, FC-94, or FC-94-X. (1-Octanesulfonic acid, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-, lithium salt, CAS # 29457-72-5)

Remarks: The test sample is a mixture of the test substance in water (approximately 24.5% test substance and 75.5% water). No calculations were made to adjust for the actual concentration of the test substance in the test sample.

METHOD

Method: Microbics Microtox® "BASIC" Procedure
Test type: Static acute
GLP: No
Year Completed: 1994
Species: *Photobacterium phosphoreum*
Analytical monitoring: pH and osmotic condition
Statistical methods: EC10 and EC50 values calculated by statistical linear regression program provided for Microtox®
Test organism source: Microbics, Reagent Lot # AMO25.
Test conditions

Dilution water: Millipore Milli-Q™ water
Stock and test solutions preparation: A primary stock solution was prepared in dilution water at 2000 mg/L. The pH of the stock solution was then adjusted from 5.9 to 7.0 using 0.02N NaOH and an osmotic adjustment was made using 200 mg NaCl dissolved in 10 mL of stock solution. Appearance of test solutions was noted as "clear and colorless". All test solutions were made by proportional dilution.
Exposure vessels: 3 mL glass cuvettes.
Number of replicates: 2
Number of concentrations: Four concentrations and controls
Element basis: Percent light loss

RESULTS

Nominal concentrations: 125, 250, 500, 1000 mg/L
Element value: 15-minute EC_{10} = 564 (367-866) mg/L
15-minute EC_{50} = >1000 mg/L
30-minute EC_{10} = 487 (320-738) mg/L
30-minute EC_{50} = >1000 mg/L

Remarks: Values reported are for the test sample. No calculations were made to adjust for the concentration of the test substance in the test sample.

CONCLUSIONS

The test sample containing 24.5% Perfluorooctanesulfonate, Lithium salt exhibited a 30-minute EC_{50} for *Photobacterium phosphoreum* of >1000 mg/L.

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

DATA QUALITY

Reliability: Klimisch ranking 2. This study, while well conducted, lacks analytical data for: determination of the test substance concentration in the test solutions, and determination of the sample purity.

REFERENCES

This study was conducted by the 3M Company, Environmental Laboratory, Lab Request number M1018, 2/07/94.

OTHER

Last changed: 5/2/00

ENVIRONMENTAL LABORATORY

LR M1018
JBD 2/7/94

MICROBICS MICROTOX® TOXICITY TEST

SAMPLE: FC-94-X

Test Conc. (mg/L)	PERCENT LIGHT LOSS OF P. phosporeum AFTER: 5-Min. Exposure	15-Min. Exposure	30-Min. Exposure
125	0	7	8
250	0	5	7
500	0	9	10
1000	2	15	18
EC50, mg/L	> 1000	> 1000	> 1000
(95% C.I.)	(-)	(-)	(-)

Environmental Lab — Work Sheet

ample Description

FC-94-3X

Preparation of Stock Solution For Microtox Testing

Date: 2/7/94

Analyst: JBD

1) Preparation of stock solution:

* Diluted 500 mg (0.5g) of test substance in a 250 mL volumetric flask with Milli-Q™ water.

* Conc. = 500 mg / 0.250L = 2000 mg/L

2) pH adjustment of stock solution:

* Initial pH = 5.9

* pH adjusted to 7.0 with 0.02N NaOH

3) Osmotic adjustment of stock solution:

* 200 mg NaCl dissolved in 10 mL of stock solution (= 2% NaCl).

4) Appearance of test solutions: clear & colorless

30 min. EC_{50} : > 1000 mg/L

30 min.

MICROTOX DATA REPORT

FILE NAME: M1018.K30

TEST DATE: 2-7-94
TEST TIME: _____
Approved by: _____

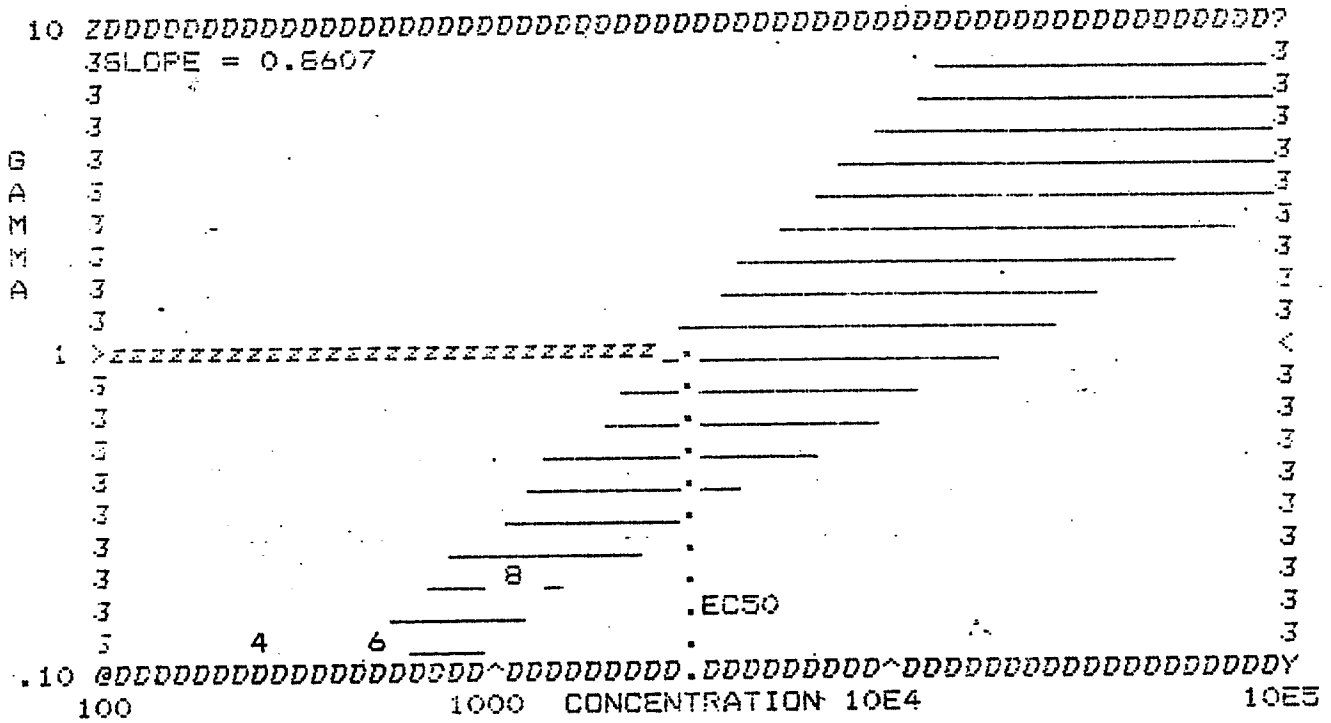
Investigator: JBD
Sample Description: Microtox Testing of FC-94-X
Procedure: BASIC
Initial Concentration : 1000 mg/L
Test Time: 30 minutes

Osmotic Adjustment: NaCl
Dilution Factor : 2
Concentration Units: mg/L

Microtox Reagent Lot # AM025

NUMBER	IO/IT	CONC.	GAMMA
1	97.94/ 77.55	125.0000	0.07276
2	97.79/ 73.86	125.0000	0.09498
3	89.54/ 73.12	250.0000	0.04017#
4	86.83/ 74.15	250.0000	0.10924#
5	96.54/ 73.54	500.0000	0.11509#
6	90.53/ 70.23	500.0000	0.09495#
7	93.75/ 64.43	1000.0000	0.23597#
8	91.26/ 64.48	1000.0000	0.20221#
CONTROL IT/IO =	81.28/ 96.69	83.78/ 97.62**	
RATIOS =	0.8406	0.8582**	

CORRECTION FACTOR = 0.8494



EC50=3048.3767 (95% CONFIDENCE RANGE: 600.9686 TO %15462.1895)

Used for calculations

30 min.

STATISTICAL REPORT FOR DATA FILE M1018.K30

ESTIMATING EQUATION: LOG C = 0.8351 x LOG *b* +3.4841

NUMBER OF DATA PAIRS USED: 6

RESIDUAL VARIANCE: 0.02548

95% CONFIDENCE FACTOR: 5.07227 FOR EC50

CORRELATION COEFFICIENT: R = 0.84781

COEFFICIENT OF DETERMINATION: R^2 = 0.71879

EFFECTIVE CONCENTRATIONS (95% CONFIDENCE RANGE):

EC50	=3048.3767 mg/L	(600.9886 TO	%15462.1895)***
EC20	= 957.7798 mg/L	(474.9458 TO	1931.4672)
EC10	= 486.5695 mg/L	(320.5834 TO	738.4969)
EC01	= 65.6808 mg/L	(10.7405 TO	401.6549)***

*** EXTRAPOLATED RESULTS

30 min.

INITIAL DATA M1013.K30

NUMBER	CONCENTRATION	GAMMA	% EFFECT	
1	125.0000	0.073	6.78	
2	125.0000	0.095	8.67	7.73
3	250.0000	0.040	3.86	
4	250.0000	0.109	9.85	6.86
5	500.0000	0.115	10.32	
6	500.0000	0.095	8.67	9.50
7	1000.0000	0.236	19.09	
8	1000.0000	0.202	16.82	17.96

Touch SPACE BAR to continue....

MICROTOX DATA REPORT

FILE NAME: M1018.K15

TEST DATE: 2-7-94
TEST TIME: _____

Investigator: JBD
Approved by: _____

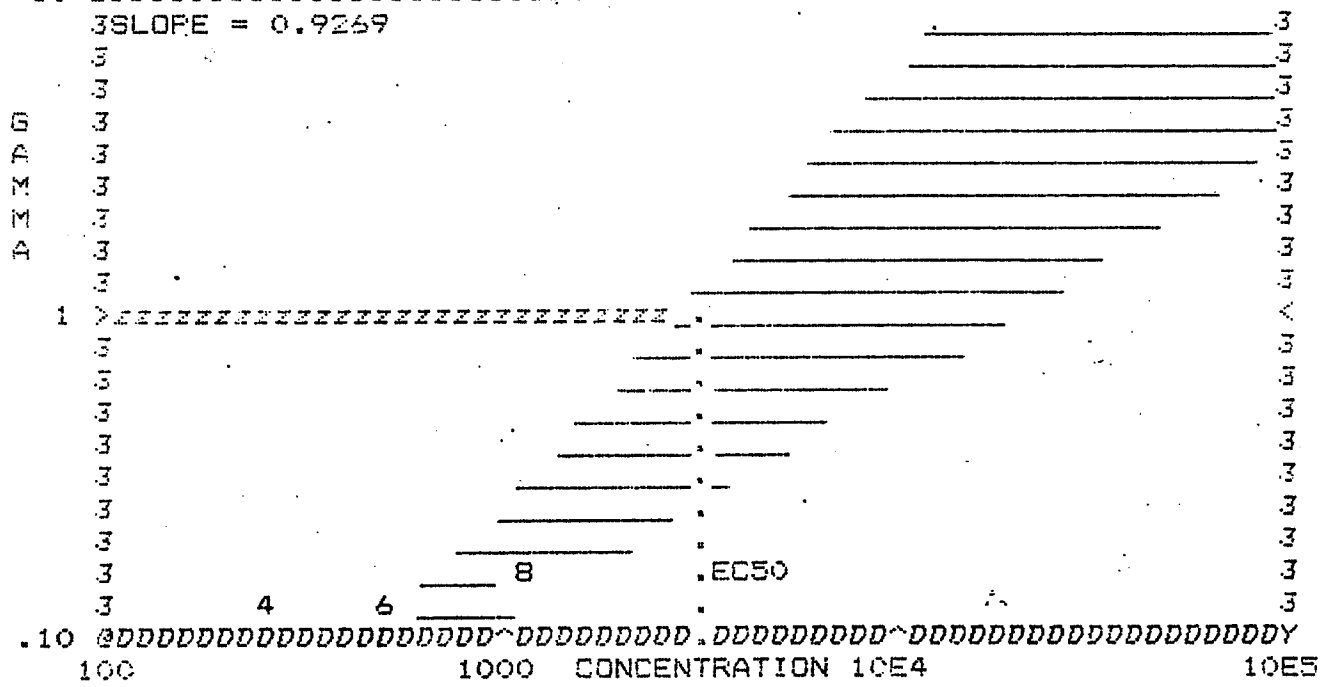
Sample Description: Microtox Testing of FC-94-X
Procedure: BASIC
Initial Concentration : 1000 mg/L
Test Time: 15 minutes

Osmotic Adjustment: NaCl
Dilution Factor : 2
Concentration Units: mg/L

NUMBER	IO/IT	CONC.	GAMMA
1	97.74/ 76.80	125.0000	0.06503
2	97.79/ 75.09	125.0000	0.08761
3	69.54/ 72.73	250.0000	0.02817#
4	96.83/ 74.38	250.0000	0.08722#
5	96.54/ 73.35	500.0000	0.09918#
6	90.53/ 69.03	500.0000	0.09526#
7	93.75/ 65.86	1000.0000	0.18881#
8	91.26/ 65.14	1000.0000	0.17002#
CONTROL IT/IO =	80.46/ 96.69	81.82/ 97.62**	
RATIOS =	0.8321	0.8381**	

CORRECTION FACTOR = 0.8351

Microtox Reagent: Lot # AMC25



EC50=3096.7422 (95% CONFIDENCE RANGE: 602.4584 TO %15917.8008)

Used for calculations

001549

15 min.

m1018

STATISTICAL REPORT FOR DATA FILE M1018.K15

ESTIMATING EQUATION: LOG C = 0.7754 x LOG b +3.4909

NUMBER OF DATA PAIRS USED: 6

RESIDUAL VARIANCE: 0.02548

95% CONFIDENCE FACTOR: 5.14018 FOR EC50

CORRELATION COEFFICIENT: R = 0.84780

COEFFICIENT OF DETERMINATION: R^2 = 0.71876

EFFECTIVE CONCENTRATIONS (95% CONFIDENCE RANGE):

EC50	=3096.7422 mg/L	(602.4584	TO %15917.8008)***
EC20	=1056.9373 mg/L	(488.4282	TO 2287.1658)***
EC10	= 563.5806 mg/L	(366.8522	TO 865.8067)
EC01	= 87.7866 mg/L	(18.3214	TO 420.6264)***

*** EXTRAPOLATED RESULTS

001550

15 min.

INITIAL DATA M1018.K15

NUMBER	CONCENTRATION	GAMMA	% EFFECT	
1	125.0000	0.065	6.11	
2	125.0000	0.082	8.06	7.08
3	250.0000	0.028	2.74	
4	250.0000	0.087	8.02	5.38
5	500.0000	0.099	9.02	
6	500.0000	0.095	8.70	8.86
7	1000.0000	0.189	15.88	
8	1000.0000	0.170	14.53	15.21

Touch SPACE BAR to continue....

MICROTOX DATA REPORT

FILE NAME: M1018.K5

TEST DATE: 2-7-94
TEST TIME: _____
Investigator: JBD
Approved by: _____
Samole Description: Microtox Testing of FC-94-X
Procedure: BASIC
Osmotic Adjustment: NaCl
Initial Concentration : 1000 mg/L
Dilution Factor : 2
Test Time: 5 minutes
Concentration Units: mg/L

NUMBER	IO/IT	CONC.	GAMMA
1	97.94/ 85.74	125.0000	-0.01908*
2	97.79/ 83.68	125.0000	0.00352*
3	89.54/ 80.52	250.0000	-0.04508*
4	96.63/ 82.60	250.0000	0.00667*
5	96.54/ 84.41	500.0000	-0.01767*
6	90.53/ 80.48	500.0000	-0.03404*
7	93.75/ 77.91	1000.0000	0.03332
8	91.26/ 78.10	1000.0000	0.00342*
CONTROL IT/IO =	82.95/ 96.69	83.91/ 97.62**	
RATIOS =	0.8579	0.8596**	

CORRECTION FACTOR = 0.8587

Microtox Reagent: Lot # AMC25

.....NO TOXICITY AT CONCENTRATIONS TESTED
* Invalic data or controls

5 min.

INITIAL DATA M1018.K5

NUMBER	CONCENTRATION	GAMMA	% EFFECT	
1	125.0000	-0.019 *	-1.95	
2	125.0000	0.004 *	0.35	-0.80
3	250.0000	-0.045 *	-4.72	
4	250.0000	0.007 *	0.66	-2.03
5	500.0000	-0.018 *	-1.82	
6	500.0000	-0.034 *	-3.52	-2.67
7	1000.0000	0.033	3.22	
8	1000.0000	0.003 *	0.34	1.78

* 7 INVALID DATA REMOVED FOR CALCULATION

Touch SPACE BAR to continue....