

ACTIVATED SLUDGE RESPIRATION INHIBITION TEST

TEST SUBSTANCE

Identity: A mixture containing perfluorooctanesulfonate, which may also be referred to as PFOS, FC-95, or as a component of FX-3104. (1-Octanesulfonic acid) (CAS # 2795-39-3).

Remarks: The 3M production lot number was not noted. The test sample is FX-3104, 6%. Current information indicates it is a mixture of 0.48% PFOS, 14.09% diethylene glycol butyl ether, 59% water, 17.6% ethylene glycol, 1.44% sodium octyl sulfate, 4% inhibitor, 2.0% polyoxyethylene monooctylphenyl ether, 1.25% propane sultone foamer, 0.03% sodium lauryl sulfate, and 0.1% benzotriazole.

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 209

Test type: Static acute

GLP: No

Year Completed: 1985

Analytical monitoring: Dissolved oxygen concentrations

Statistical methods: Results were determined by calculation of the % inhibition in respiration rate.

Test organism source: Activated sludge mixed liquor collected from the Metro Waste Treatment Plant, St. Paul, MN.

Test condition:

Dilution water: Not given.

Synthetic sewage: per OECD method

Reference and test solution preparation: Not given.

Test vessels: Not given.

Number of concentrations: five plus blank control

Temperature: Not given.

Total suspended solids and pH on day of testing: Not given.

Element Basis: Respiration inhibition as determined by oxygen consumption.

RESULTS

Nominal concentrations: 2 Blank controls, 100, 180, 320, 560, and 1000 mg/L

Element values: 30-minute EC50 = >1000 mg/L

3-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 test substance 3-hour EC₅₀ for activated sludge respiration inhibition was determined to be >1000 mg/L.

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

DATA QUALITY

Reliability: Klimisch ranking 3. Study lacks description and records of the method followed. The inoculum was not properly characterized. There is no characterization of the test substance purity, 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 C1111-2, 1985.

OTHER

Last changed: 6/26/00

LH 21111-2
DATE: 2/20/85
ANALYST: 2/20/85

ENVIRONMENTAL LABORATORY
MICROBIAL TOXICITY
ACTIVATED SLUDGE RESPIRATION INHIBITION TEST-OECD 209

TEST SUBSTANCE: FX3104 6% Light Water

TEST SYSTEM: SOURCE OF ACTIVATED SLUDGE MIXED LIQUOR:
METRO WASTE TREATMENT PLANT, FRO'S EYE, ST PAUL, MN
DATE RECEIVED: 2/20/85 DATE USED: 2/20/85

30 MINUTE DISSOLVED OXYGEN READINGS

TIME MINUTES	CONTROL II	TEST SUBSTANCE CONCENTRATIONS					CONTROL III
		100mg/l	180mg/l	320mg/l	560mg/l	1000mg/l	
0.5	2.8	0.9	0.8	0.6	0.8	0.5	2.9
1	2.3	0.6	55sec/0.5	40sec/0.5	43sec/0.5		2.4
2	1.6	1:05/0.5					1.7
3	0.7						1.0
4	3:05/0.5						3:30/0.5
5							
6							
7							
8							
9							
10							

3 HOUR DISSOLVED OXYGEN READINGS

TIME MINUTES	CONTROL II	TEST SUBSTANCE CONCENTRATIONS					CONTROL III
		100mg/l	180mg/l	320mg/l	560mg/l	1000mg/l	
0.5	3.2	3.2	3.9	3.6	5.0	4.4	3.5
1	2.9	2.8	3.4	3.2	4.8	4.2	3.2
2	2.2	2.2	2.7	2.5	4.2	3.8	2.9
3	1.6	1.5	2.1	1.9	3.7	3.4	2.3
4	1.1	1.0	1.5	1.4	3.2	3.0	1.4
5	0.5	4:40/0.5	0.9	0.8	2.7	2.5	0.8/1.1
6			5:45/0.5	5:15/0.5	2.2	2.1	0.5
7					1.8	1.7	
8					1.3	1.2	
9					0.9	0.8	
10					9:45/0.5	9:45/0.5	

ENVIRONMENTAL LABORATORY
MICROBIAL TOXICITY

DATE 12/20/85
ANALYST RR/S

ACTIVATED SLUDGE RESPIRATION INHIBITION TEST CALCULATIONS-OECD209

$$\% \text{ INHIBITION} = \frac{\left(\frac{RC_1 + RC_2}{2} \right) - R_s}{\frac{RC_1 + RC_2}{2}} \times 100$$

R = OXYGEN CONSUMPTION RATE (mg O₂/l and min.)

S = TEST SUBSTANCE

C₁ = CONTROL I

C₂ = CONTROL II

30 MINUTE DISSOLVED OXYGEN CALCULATIONS

TEST SUBSTANCE CONCENTRATIONS	OXYGEN CONSUMPTION RATE R (mg O ₂ /l and min.)	% INHIBITION
CONTROL II	.8494	
100 mg/l		
180 mg/l		
320 mg/l		
560 mg/l		
1000 mg/l		
CONTROL III	.7458	

30 MINUTE EC₅₀ (95% CONFIDENCE LIMITS) >1000 mg/l

3 HOUR DISSOLVED OXYGEN CALCULATIONS

TEST SUBSTANCE CONCENTRATIONS	OXYGEN CONSUMPTION RATE R (mg O ₂ /l and min.)	% INHIBITION
CONTROL II	.6329	—
100 mg/l	.6202	0
180 mg/l	.6081	1.4
320 mg/l	.6045	1.5
560 mg/l	.4824	22
1000 mg/l	.4277	31
CONTROL III	.6000	—

3 HOUR EC₅₀ (95% CONFIDENCE LIMITS) >1000 mg/l

ACCEPTABILITY OF TEST (IN CONTROLS)*:

$$\% \text{ DIFFERENCE} = \frac{|RC_1 - RC_2|}{\frac{RC_1 + RC_2}{2}} \times 100$$

30 MINUTE CONTROLS = 1.3

3 HOUR CONTROLS = 5.3

*PER CENT DIFFERENCE NOT TO EXCEED 15%.