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 FC-201F-X. (1-Octanesulfonic acid) (CAS # 2795-39-3).

Remarks: The 3M production lot number was 1. The test sample is FC-201F-X (F-11129). Current information indicates it is a mixture 3% PFOS, 36% diethylene glycol butyl ether, 36.6% water, 8.25% acrylic foamer, 7% sodium octyl sulfate, 6% sulfonated alkyl ether salts, 3% triethanolamine, and 0.15% toluoltriazole.

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 Guideline 209
GLP: No
Year Completed: 1992
Analytical monitoring: Dissolved oxygen concentrations, temperature.
Statistical methods: Not applicable.
Test organism source: Activated sludge mixed liquor collected from the Metro Wastewater Treatment Plant, St. Paul, MN
Test condition:

Dilution water: Millipore Milli-Q™ water
Synthetic sewage: per OECD method
Reference and test solution preparation: A 500 mg/L stock solution of the reference substance, 3,5-dichlorophenol, was prepared. The pH of the reference solution was measured to be 7.8. Test substance was added directly to the test vessels.
Test vessels: Not given
Number of concentrations: one plus blank controls, all in duplicate
Temperature: 17.7 – 19.0 °C
Total suspended solids and pH on day of testing: 3.4 g/L (TSS in final: 1.36 g/L. Initial pH 7.5 and final pH 7.5.
Element Basis: Respiration inhibition as determined by oxygen consumption.
Remarks: Uptake rates corrected to 20°C for calculations.

RESULTS

Nominal concentrations: Blank controls and 1000 mg/L, all in duplicate
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 EC_{50} 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. Several pages are missing from this study. Sample purity was not properly characterized 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 K1126-1, 1992.

OTHER

Last changed: 6/26/00

LR K1126-1
Date 3/23/92
Analyst KSN
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ENVIRONMENTAL LABORATORY

ACTIVATED SLUDGE MIXED LIQUOR

Type Test OECD Activated Sludge Respiration Inhibition Test #209

ACTIVATED SLUDGE MIXED LIQUOR

Date Obtained 3/23/92 Date Used 3/23/92

Mixed Liquor Suspended Solids (MLSS) 3.9 g/L Adjusted to — g/L

MLSS in final test solution 1.36 g/L

Initial pH 7.5 (1st test soln. prepared) Final pH 7.5 (last soln. prepared)

Comments

TEST SUBSTANCE

Sample Description FC-201 F-X F-11129 Lot 1

Initial pH of highest conc. tested (1000 mg/L) = 7.7 Adjusted to pH —

Comments Brown Liquid

REFERENCE SUBSTANCE

Sample Description 3,5-Dichlorophenol

Initial pH of stock solution (500 mg/L) = 7.8 Adjusted to pH —

Comments

EXPOSURE CONDITIONS

Test Duration 3 Hours

Test Temperature Range: 17.7-19.0 °C

Comments

LR K1126-1

ENVIRONMENTAL LABORATORY

OECD ACTIVATED SLUDGE RESPIRATION INHIBITION TEST #209
TEST SOLUTIONS PREPARATION

Test Substance: FC-201F-X F-11129 LOT 1

Sample Description: BROWN LIQUID

Analyst: KSN

Date: 3/23/92

Test Conc. mg/L	mg added per 500 mL	mL MQ(1) water per 500 mL	mL syn. sewage feed per 500 mL	mL microbial inoculum per 500 mL	Total Volume mL
BK-CONTROL	—	284	16	200	500
1000-A	500	284	16	200	500
1000-B	500	284	16	200	500

INITIAL pH VALUES:
1000-A : 7.7
1000-B : 7.7

(1) Millipore Milli-Q^{R} high purity water

Lr: K1126-1
Date: 2/23/92

ENVIRONMENTAL LABORATORY
OECD ACTIVATED SLUDGE RESPIRATION INHIBITION TEST #209
CALCULATION OF RESULTS

Test Substance: FC - 201F-X

Analyst: KSN

30-Minute Exposure Dissolved Oxygen Concentrations, mg/L

mg/L	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	Temp, °C	R (1)	Ra (2)	% Inh. (3)
BK1	8.7	8.5	8.1	7.8	7.5	7.2	6.9	6.6	6.2	5.9	5.5	17.7	0.6473	0.7595	-
1000.00	2.7	2.4	1.9	1.4	0.9	0.4	-	-	-	-	-	18.5	1.0000	1.1099	0
1000.00	4.1	3.6	3.3	2.8	2.4	1.8	1.4	0.9	0.5	-	-	18.6	0.9000	0.9920	0
BK2	8.3	7.9	7.7	7.4	7.0	6.7	6.4	6.1	5.7	5.3	5.0	17.9	0.6594	0.7631	-

% diff in controls (4): 0.5 **EC50 (95% CI): ≥1000 mg/L** RaCm (5): 0.7613

3-Hour Exposure Dissolved Oxygen Concentrations, mg/L

mg/L	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	Temp, °C	R (1)	Ra (2)	% Inh. (3)
BK1	7.9	7.7	7.4	7.1	6.8	6.4	6.1	5.7	5.4	5.1	4.8	18.1	0.6582	0.7511	-
1000.00	8.3	8.0	7.6	7.3	6.8	6.3	5.9	5.4	5.1	4.7	4.3	19.0	0.8388	0.8992	0
1000.00	8.8	8.5	8.1	7.9	7.5	7.2	6.9	6.5	6.1	5.7	5.4	18.1	0.6909	0.7885	0
BK2	8.6	8.4	8.1	7.7	7.4	7.1	6.7	6.5	6.1	5.8	5.3	18.2	0.6679	0.7569	-

% diff in controls (4): 0.8 **EC 50 (95% CI): ≥1000 mg/L** RaCm (5): 0.7540

(1) R= Oxygen uptake rate (mg O2/L-min)

(2) Ra= R adjusted to 20°C= [R/ϑ.Ex]

(3) % Inhibition= [(RaCm)-RaS/(RaCm)]100

(4) % difference in controls: [|RaBk1-RaBk2|/RaCm]100 (Two controls must be within 15% of each other.)

(5) Mean adjusted R, controls= [RaBk1+RaBk2]/2

ϑ= 1.072
RaCm= mean adjusted R, controls
Bk= blank control, S= sample
Tobs= sample temp
x= Tobs-20°C