

MICROBIAL INHIBITION (DEHYDROGENASE ACTIVITY)

TEST SUBSTANCE

Identity: A mixture containing perfluorooctanesulfonate, which may also be referred to as PFOS, FC-95, or as a component of FC-206A. (1-Octanesulfonic acid) (CAS # 2795-39-3).

Remarks: The 3M production lot number was cc 785-22. The test sample is FC-206A. Current information indicates it is a mixture of 0.92% PFOS, 18.75% diethylene glycol butyl ether, 75.44% water, 1.83% Hydroxy foamer, 1.75% sodium octyl sulfate, 1.2% poloxyethylene monooctylphenyl ether, 0.06% sodium lauryl sulfate, and 0.05% 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: TTC.

GLP: No

Year completed: 1979

Analytical monitoring: Amount of formazan formed (as determined with a spectrophotometer measuring % transmittance).

Statistical methods: Graphed the measured % transmittance.

Test organism source: Activated sludge mixed liquor from the Metropolitan Wastewater Treatment Plant (Pig's Eye Plant), St. Paul, MN.

Test condition:

Dilution water: Deionized water

Synthetic sewage: Nutrient broth (0.1 g/100 mL mixed liquor) added approximately 1-hour prior to start of test. The mixed liquor was kept aerated prior to the test.

Stock and test solution preparation: A primary stock solution was prepared by dissolving 22 g of test material to 100 mL with deionized water. The stock solution was then diluted (1 mL of stock solution to 100 mL deionized water) to prepare Dilution #1. Dilution #2 was prepared by adding 1 mL of Dilution #1 to 100 mL deionized water. These solutions were used to prepare the test concentrations.

Test vessels: Not given.

Number of concentrations: five plus 2 blank controls

Incubation Temperature: 37 ± 1 °C

Total suspended solids on day of testing: 10.6 g/L (TSS).

Element Basis: Microbial dehydrogenase activity by formation of formazan.

Incubation time: 15-minutes.

RESULTS

Nominal concentrations: Blank control, 10, 100, 1,000, 10,000, and 100,000 mg/L.

Element values: Not given.

CONCLUSIONS

No conclusions given. No triphenylformazan (TF) standard curve was prepared in order to determine μ moles of TF produced in the test solutions, therefore, a plot of percent inhibition vs. log concentrations was not constructed to determine the EC50 value based on dehydrogenase activity..

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 is 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 solutions.

REFERENCES

The studies were conducted by the 3M Company, Environmental Laboratory, Lab Request Number 4970S, 1979.

OTHER

Last changed: 6/26/00

File: ^{CR} Page No. 49705

ENVIRONMENTAL ENGR. LAB - WORK SHEET

SAMPLE DESCRIPTION

FC-206A
CC-785-22Date: 11-29-79
Analyst: W. G. Schind
Hrs.: _____

TTC

Preparation of Sample Dilutions:STOCK SOLUTION: 22.0 g FC-206 diluted to 100 ml
with D.I. water (1 ml = 220 mg)DILUTION #1: 1.00 ml stock solution diluted to 100 ml
with D.I. water.DILUTION #2: 1.00 ml dilution #1 diluted to 100 ml
with D.I. water.Preparation of Test Solutions

Description	Test Material (ml)	BOD H ₂ O (ml)	Mixed Solution (ml)	TTC (ml)	Final volume (ml)
Blank #1	^{none (was)} 5.0 ml dilution #2	5.0	5.0	1.0	11
10 mg/l	5.0 ml dilution #2	0	5.0	1.0	11
100	0.50 ml dilution #1	4.5	5.0	1.0	11
1000	5.0 ml dilution #1	0	5.0	1.0	11
10,000	0.50 ml stock soln.	4.5	5.0	1.0	11
100,000	5.0 ml stock soln.	0	5.0	1.0	11
Blank #2	none	5.0	5.0	1.0	11

The dilutions were incubated at $37 \pm 1^\circ\text{C}$ for approx. 15 min.

Reviewed by: _____

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ENVIRONMENTAL ENGR. LAB - WORK SHEET

SAMPLE DESCRIPTION

FC-206 A

Date: 11-29-79
Analyst: W. Q. Schind
Hrs.: _____

TTC

Note: 0.1 g nutrient broth per 100 ml of mixed liquor was added ~1 hr. before the start of the TTC test. The mixed liquor was kept aerated until just prior to the test.

Reviewed by: _____

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ENVIRONMENTAL ENGR. LAB - WORK SHEET

SAMPLE DESCRIPTION

FC-206A
CC 785-22Date: 11-29-79Analyst: W. A. Schil

Hrs.: _____

TTC

Mixed liquor from Pigs Eye - Metro Sewage Plant was obtained and concentrated by allowing the sludge to settle and decanting some of the supernatant. Final MLSS = 10,600 mg/l and where ~75% volatile.

Results (see graph)

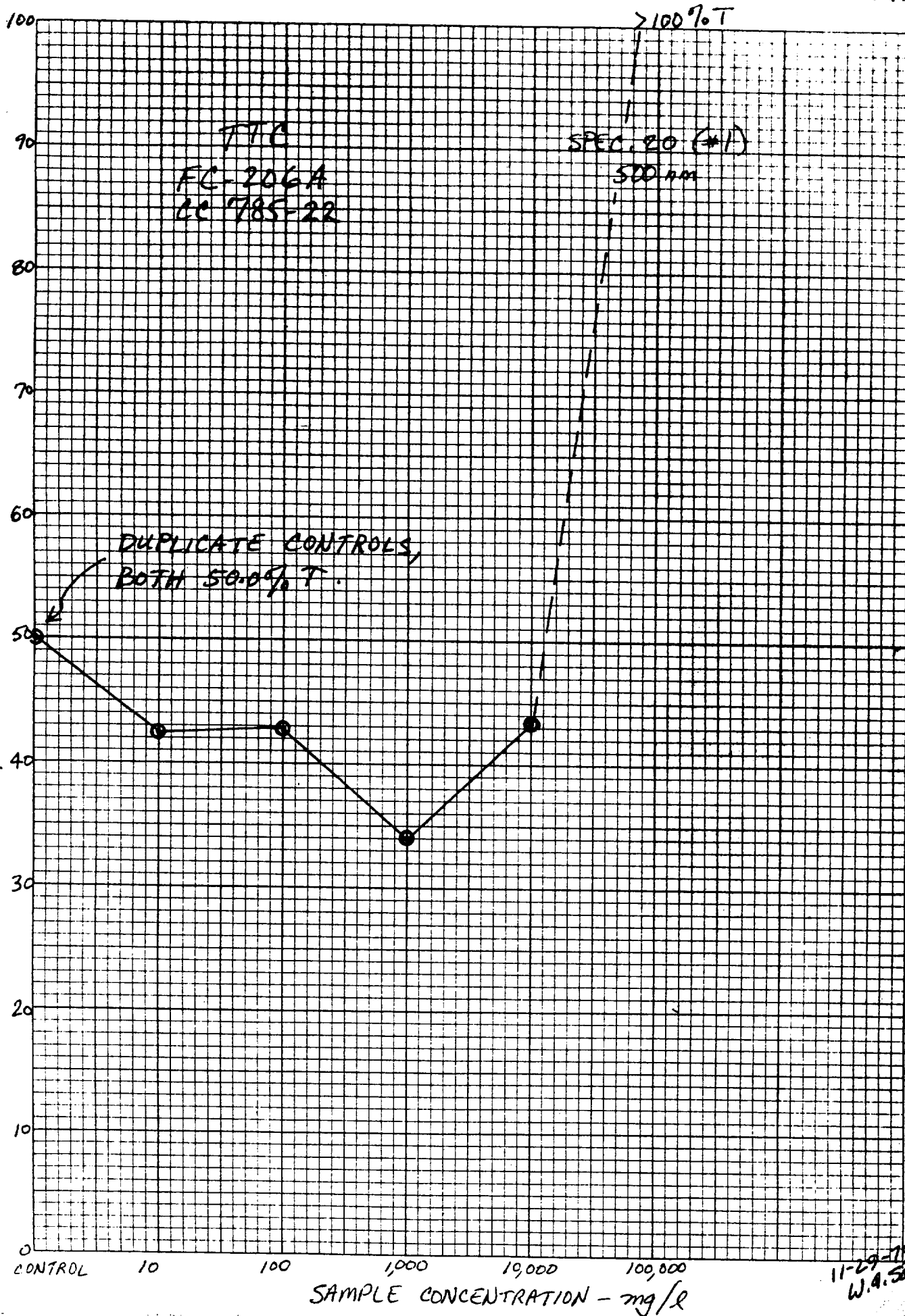
Concentration of Sample (mg/l)	% Transmittance
Blank #1 (control)	50.0% *
10	42.5
100	42.8
1000	34.0
10,000	44.3
100,000	>100
Blank #2 (control)	50.0

Initially,

* The spectrophotometer was set @ 100% T using an absolute ethanol (ethyl alcohol) blank. The reading of Blank #1 at this setting was ~7% T. The meter was readjusted to read 50% T using Blank #1 by turning the %T control. This control does not effect the wave length setting. All other readings were made at this setting.

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% TRANSMITTANCE



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Environmental Lab
Data

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SOLIDS

Analyst W. B. Schil

Std. Methods: (14th ed.) pp. 89-98, sec. 208 - Solids
pp. 518-519, sec. 502 C. - Grease & Oil

Calculation: $\text{mg/l Residue} = \frac{\text{mg residue} \times 1000}{\text{ml sample}}$

Date analyzed 11-29-79

Pipe Eye Metro Sewage Plant - mixed liquor *

Sample Description Type of Solids ml Sample	TSS 2.0	TSS 0.70			
Gross Weight (g)	23.1982	22.0270			
Crucible Weight (g)	23.1776	22.0194			
Residue Weight (g)	0.0206	0.0076			
Residue mg/l	10400	10800			
Sample Description Type of Solids ml Sample	AVE. = 10,600 mg/l				
Gross Weight (g)					
Crucible Weight (g)					
Residue Weight (g)					
Residue mg/l					

* The mixed liquor was allowed to settle and some of the supernatant was decanted before use in the TTC test.

** According to Jim Wyzkowski, the MLSS on the day of collection was 7500 mg/l. W. B. Schil 12-04-79