

ACUTE TOXICITY TO FISH

TEST SUBSTANCE

Identity: Perfluorooctanoic acid, ammonium salt; may also be referred to as PFOA ammonium salt, Ammonium perfluorooctanoate, FC-116, FC-126, FC-169, or FC-143. (Octanoic acid, pentadecafluoro-, ammonium salt, CAS # 3825-26-1)

Remarks: 3M production lot number 390. The test sample is FC-126, a white powdery solid. It's purity was not sufficiently characterized, though current information indicates it is a mixture of 78 - 93% test substance and 7 - 22% C₅, C₆, and C₇ perfluoro analogue compounds.

METHOD:

Method: Not stated

Type: Static acute

GLP: No

Year completed: 1987

Species: *Pimephales promelas*

Supplier: Dale Fattig of Brady, Nebraska.

Analytical monitoring: Temperature, pH and DO

Exposure period: 96-hours

Statistical methods: Probit analysis

Test fish age: Not noted.

Length and weight: Average length = 3.5 cm
Average weight = 0.30 g

Pretreatment: None.

Test conditions:

Dilution water: Carbon-filtered well water.

Dilution water chemistry (initial):

Temperature: 21°C

Dissolved Oxygen: 9.3 ppm

pH: 7.9

Stock and test solution preparation: Test solutions were created by direct weights addition.

Concentrations dosing rate: Once

Stability of the test chemical solutions: Not noted

Exposure vessels: 4 liter Pyrex® glass beakers containing 3 liters test solution.

Number of replicates: two

Number of fish per replicate: 6

Loading rate: 0.60 g/L

Number of concentrations: five plus a blank control

Water chemistry during the study:

Dissolved oxygen range (24 – 96 hours):

6.6 – 7.4 mg/L (control exposure)

5.6 – 6.6 mg/L (320 mg/L exposure)*

pH range (24 – 96 hours):

7.7 – 7.9 (control exposure)

7.7 – 8.0 (320 mg/L exposure)*

* 320 mg/L test group (third highest concentration) data given because total mortality occurred in the two higher test concentrations by 24 hours.

Test temperature (24 – 96 hours): 20°C

RESULTS

Nominal concentrations: Bk control, 100, 180, 320, 560, and 1000 mg/L
Element value: 96-hour LC₅₀ = 301 (244 – 370) mg/L

Element value based on nominal concentrations

CONCLUSIONS

The test sample 96-hour LC₅₀ for fathead minnow was determined to be 300 mg/L with a 95% Confidence Interval of 240 to 370 mg/L.

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

DATA QUALITY

Reliability: Klimisch ranking 2. Testing meets the criteria for quality testing. However, sample purity was not properly characterized and it lacks analytical confirmation of test substance concentrations.

REFERENCES

This study was conducted by the 3M Company, Environmental Laboratory, St. Paul, MN, Lab Request Number E1282-1, completed on May 1, 1987.

OTHER

Last changed: 5/24/00

ENVIRONMENTAL LABORATORY
FISH TOXICITY DATA SHEET
DEFINITIVE (FULL-SCALE TEST)

LR E1282-1

TYPE TEST 96HR Acute Static MATERIAL TESTED EC-1210 LOT 390
TEST ORGANISM Fathead minnow SOURCE Dale Fattig Brady, Neb. DATE REC'D 4/7/87 BATCH NO. 4-87
AVG. WT. 0.30 grams AVG. SIZE 3.5 cm NO. ORGANISMS PER DOSE 6 LOADING FACTOR 0.60 g/l
FISH DISEASE TREATMENT NONE
TEST SOLUTION VOLUME 5 LITERS/ALL-GLASS TANK TANK DIMENSIONS: 4 LITER PYREX® GLASS BEAKER
TIME STARTED 12:00 PM DATE STARTED 4-27-87 DATE COMPLETED 5-1-87
DILUTION WATER CARBON-FILTERED WELL WATER (TEMP 21 °C., D.O. 9.3 ppm, pH 7.9)
INVESTIGATOR [Signature] LC₅₀ (95% CONFIDENCE LIMITS) 290 (87-468) mg/L 96HR LC₅₀ combined 301 (244-370) mg/L Probit Analysis

Tank No.	Initial Conc. mg/l	Total Amount Added	24 Hours			48 Hours			72 Hours			96 Hours		
			Total No. Dead	pH	D.O. ppm	Total No. Dead	pH	D.O. ppm	Total No. Dead	pH	D.O. ppm	Total No. Dead	pH	D.O. ppm
I	CONTROL	* mg	0	7.9	7.4	0	7.8	7.2	0	7.7	6.8	0	7.7	6.7
1-1	100	300	0	7.9	7.1	0	7.8	6.8	0	7.7	6.8	0	7.7	6.6
1-2	180	540	0	7.9	6.8	0	7.8	6.2	0	7.7	6.2	0	7.7	6.0
1-3	320	960	4	8.0	6.6	4	7.8	6.0	4	7.7	6.0	4	7.7	5.8
1-4	5100	15300	6	8.0	5.6	6	—	—	6	—	—	6	—	—
1-5	10000	30000	6	8.0	4.2	6	—	—	6	—	—	6	—	—
Test Temp. °C			20			20			20			20		
Initials & Date			3 4-28-87			3 4-29-87			3 4-30-87			3 5-1-87		

COMMENTS: * Direct weights. Initial pH of highest concentration tested 10000 mg/L 7.9. Test material white powder. Appears soluble in water at ambient conditions.

SECONDARY EFFECTS (OTHER THAN MORTALITY)

EC₅₀

Tank No.	Symptoms or Reactions	Total Number Affected			
		24-Hr.	48-Hr.	72-Hr.	96-Hr.
CONTROL I					
1-1		NONE	NONE	NONE	NONE
1-2	SURFACING	NONE	NONE	2	1
1-3	SURFACING	NONE	NONE	2	1
1-4		—	—	—	—
1-5		—	—	—	—

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ENVIRONMENTAL LABORATORY
FISH TOXICITY DATA SHEET
DEFINITIVE (FULL-SCALE TEST)

LR E1282-1

TYPE TEST 96 HR ACUTE STATIC MATERIAL TESTED MC-1210 LOT 390
TEST ORGANISM Fathead minnow SOURCE Brady, Neb DATE REC'D 4/7/87 BATCH NO. 487
AVG. WT. 0.30 grams AVG. SIZE 3.5 cm NO. ORGANISMS PER DOSE 6 LOADING FACTOR 0.60 g/l
FISH DISEASE TREATMENT NONE

TEST SOLUTION VOLUME 3 LITERS/ALL-GLASS TANK TANK DIMENSIONS: 4 LITER PYREX® GLASS BEAKER

TIME STARTED 12:00 PM DATE STARTED 4-27-87 DATE COMPLETED 5-1-87

DILUTION WATER CARBON-FILTERED WELL WATER (TEMP 21 °C., D.O. 9.3 ppm, pH 7.9)

INVESTIGATOR [Signature] 96 HR LC₅₀ (95% CONFIDENCE LIMITS) 312 (213-419) mg/L Probi
96 HR LC₅₀ combined 301 (214-370) mg/L Anal

Tank No.	Initial Conc. mg/l	Total Amount Added	24 Hours			48 Hours			72 Hours			96 Hours		
			Total No. Dead	pH	D.O. ppm	Total No. Dead	pH	D.O. ppm	Total No. Dead	pH	D.O. ppm	Total No. Dead	pH	D.O. ppm
II	CONTROL	*mg	0	7.9	7.2	0	7.8	7.0	0	7.7	6.6	0	7.7	6.6
2-1	100	300	0	7.9	7.2	0	7.8	6.7	0	7.7	6.7	0	7.7	6.2
2-2	180	540	0	7.9	6.5	1	7.9	6.4	1	7.7	6.2	1	7.7	6.0
2-3	320	960	2	7.9	6.3	2	7.8	5.8	2	7.7	5.6	2	7.7	5.6
2-4	560	1680	6	7.9	4.5	6	—	—	6	—	—	6	—	—
2-5	1000	3000	6	7.9	4.0	6	—	—	6	—	—	6	—	—
Test Temp. °C			20			20			20			20		
Initials & Date			34-28-87			34-29-87			34-30-87			35-1-87		

COMMENTS: *Direct weights. Initial pH of highest concentration tested, 1000 mg/l 7.9. Test material white powder. Appears soluble in water at ambient conditions.

SECONDARY EFFECTS (OTHER THAN MORTALITY)

EC₅₀

Tank No.	Symptoms or Reactions	Total Number Affected			
		24-Hr.	48-Hr.	72-Hr.	96-Hr.
CONTROL II					
2-1		NONE	NONE	NONE	NONE
2-2	SURFACING			2	1
2-3	SURFACING			2	1
2-4		—	—	—	—
2-5		—	—	—	—

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