

ACUTE TOXICITY TO FISH (FATHEAD MINNOW)

TEST SUBSTANCE

Identity: Mixture containing perfluorooctanesulfonate which may also be referred to as PFOS, FC-95, or as a component of FC-201F.
(1-Octanesulfonic acid, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluoro-, potassium salt, CAS # 2795-39-3)

Remarks: The 3M production lot number was 1. The test sample is FC-201F (F-11129). Current information indicates that FC-201F is a mixture of 3.0% PFOS, 36.0% diethylene glycol butyl ether, 36.6% water, 8.25% acrylic foamer, 7.0% sodium octyl sulfate, 6.0% sulfonated alkyl ether sodium salts, 3.0% triethanolamine, and 0.15% tolyl triazole.

The following summary applies to a mixture with incompletely characterized concentration of impurities. Data may not accurately reflect toxicity of the fluorochemical component of the test sample.

METHOD:

Method: OECD Guideline 203.

Test type: Acute static

GLP: No

Year Completed: 1992

Species: *Pimephales promelas*

Supplier: ETC, Superior, WI, maintained at ASci-DETD, Duluth, MN

Analytical monitoring: Dissolved oxygen, Temperature, pH, conductivity

Exposure period: 96-hours

Statistical methods: Not noted

Test fish age: Juveniles (45 days)

Average Length and weight:

1 L Beakers:

Length: 1.42 cm
Weight: 0.034 g

Aquarium:

Length: 1.5 cm
Weight: 0.041 g

Loading:

Beakers: 0.57 g/L
0.34 g/L
0.17 g/L

Aquaria: 0.21 g/L
0.12 g/L
0.06 g/L

Pretreatment: Not noted.

Test conditions:

Dilution water: Shallow well water, Two Harbors, MN.

Dilution water chemistry:**Hardness:** 178 mg/L (as CaCO₃)**Alkalinity:** 147 mg/L (as CaCO₃)**Lighting:** Not noted**Stock and test solution preparation:** Not noted.**Concentrations dosing rate:** Once**Stability of the test chemical solution:** Not noted.**Exposure vessels:** 1 L beakers having a surface area of 87 cm² and aquarium having a surface area of 300 cm². Testing was conducted at several different volumes in each vessel type to study the relationship between the surface area of the exposure chamber to the volume of the dilution water / test solution.**Number of replicates:** two**Number of fish per replicate:** 5.**Number of concentrations:** 1 plus a blank control for each vessel type**Water chemistry during the study:****Conductivity range (0-96 hours):**

322 – 391 µmhos/cm (controls)

359 – 400 µmhos/cm (1.0 L exposure in Beakers)

361 – 373 µmhos/cm (3.4 L exposure in Aquariums)

pH range (0-96 hours):

8.22 – 8.63 (controls)

8.44 – 8.50 (1.0 L exposure in Beakers)

8.37 – 8.51 (3.4 L exposure in Aquariums)

Temperature range (0-96 hours):

20.8 – 21°C (all test vessels)

Dissolved oxygen range (0-96 hours):

7.9 – 8.6 mg/L (controls)

8.3 – 8.4 mg/L (1.0 L exposure in Beakers)

8.0 – 8.6 mg/L (3.4 L exposure in Aquariums)

RESULTS

Description of test system					% Mortality					
Type of exposure chamber	Surface area (cm ²)	Volume (L) of dilution water used.	Volume (µL) of test substance added	Surface area/volume of dilution water used	3 h	6 h	24 h	48 h	72 h	96 h
1-L Beaker	87	1	0 (control)	87	0	0	0	0	0	0
1-L Beaker	87	0.3	273	290	0	0	0	0	0	0
1-L Beaker	87	0.5	454	174	0	0	0	0	0	0
1-L Beaker	87	1	909	87	50	70	70	70	70	70
Aquarium	300	1	0 (control)	300	0	0	0	0	0	0
Aquarium	300	1	909	300	0	0	0	0	0	0
Aquarium	300	1.3	1,545	177	0	20	20	20	20	20
Aquarium	300	3.4	3,091	88	60	70	70	70	70	70

Element values based on nominal concentrations.

Remarks: Testing was conducted on the mixture as described in the Test Substance Remarks field. The value reported applies to that mixture and not the fluorochemical proportion alone.

CONCLUSIONS

No reliable conclusions can be made based on this study. However, the data indicates that the acute toxicity of the test sample may be dependent upon the ratio of the surface area of the exposure vessel to the volume of the test solution. The test sample appeared to be acutely toxic only when the surface area to volume ratio was about 87-88 cm²/L.

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

DATA QUALITY

Reliability: Klimisch ranking 2. This study meets the criteria for quality testing. However, the sample purity was not properly characterized and the study lacks analytical confirmation of the amount of fluorochemical proportion in solution.

REFERENCES

This study was conducted by AScl Corporation, Duluth Environmental Testing Division, Duluth, MN at the request of the 3M Company, Lab Request number K1792, 1992.

OTHER

Last changed: 6/26/00

STUDY TITLE

FURTHER INVESTIGATION ON THE ACUTE TOXICITY OF
FC-201F TO FATHEAD MINNOW (*PIMEPHALES PROMELAS*)

DATA STANDARD

OECD GUIDELINE 203

STUDY COMPLETED

October 5, 1992

TESTING FACILITY

ASCI Corporation
ASCI-Duluth Environmental Testing Division
112 East Second Street
Duluth, MN 55805

Tel. No. (218) 722-4040

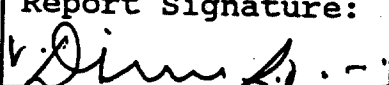
STUDY IDENTIFICATION NUMBERS

ASCI Study ID# 5030-015-03

3M Company Lab Request# K1792

Notes: This report is a continuation of the ASCI Report ID#
015-FHA.R3M for ASCI Study ID# 5030-015-03. The original
study was completed on August 24, 1992.

1.0 GENERAL INFORMATION

Study Title	Further Investigation on the Acute Toxicity of FC-201F to Fathead Minnow (<i>Pimephales promelas</i>)	
Data Standard	OECD Guideline 203.	
Sponsor	3M Environmental Laboratory, Building 2-3E-09, 935 Bush Avenue, St. Paul, MN 55106.	
Sponsor's Representative	Susan A. Beach, 3M Environmental Laboratory, Building 2-3E-09, 935 Bush Avenue, St. Paul, MN 55106; Tel No. (612) 778-7452.	
Sponsor's Lab Request#	K1792.	
Testing Facility	ASCI Corporation/ASCI-Duluth Environmental Testing Division, 112 East Second Street, Duluth, MN 55805; Tel. No. (218) 722-4040.	
Principal Investigator	Jo A. Thompson	
Project Director	Dinesh Vaishnav	
Testing Facility Director	Donald Mount	
Test Dates	August 28-September 1, 1992.	
Data Validation and Report Review	Dinesh Vaishnav 10/5/92	Report Signature: 
Retention of Raw Data and Final Report	Two years from the date study is completed.	
Location of Raw Data and Final Report	ASCI Corporation/ASCI-Duluth Environmental Testing Division, 112 East Second Street, Duluth, MN 55805; Tel. No. (218) 722-4040.	

2.0 OBJECTIVE(S) AND RESULTS

To determine the effect of the surface area to volume ratio on the acute toxicity of the test substance, FC-201F, to fathead minnow (*Pimephales promelas*) under static test conditions.

This study was conducted according to the ASCI study plan retained by the Sponsor, OECD Guideline 203 (OECD 1984), and the previous report submitted for this particular test substance.

Results from this study are described in Table 1.

3.0 CONCLUSIONS

1. The test substance acute toxicity appears to be dependent upon the ratio of the surface area of the exposure chamber to the volume of the dilution water, but not on the type of the exposure chamber.
2. The test substance was acutely toxic only when the above ratio was about 87-88 cm-square L⁻¹.

4.0 REFERENCE

Organization for Economic Cooperation and Development (OECD). 1981/1984. OECD Guidelines for Testing of Chemicals. OECD Publication Information Center, Washington, D.C.

Table 1. Acute toxicity of 1,000 mg/L FC-201F (test substance) to fathead minnows (*P. promelas*) in various test systems

Description of test system					% Mortality					
Type of exposure chamber	Surface area (cm-square)	Volume (L) of dilution water used	Volume (μl) of test substance added	Surface area/volume of dilution water used	3 h	6 h	24 h	48 h	72 h	96 h
1-L Beaker	87	1	0 (control)	87	0	0	0	0	0	0
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1-L Beaker	87	0.5	454	174	0	0	0	0	0	0
1-L Beaker	87	1	909	87	50	70	70	70	70	70
Aquarium	300	1	0 (control)	300	0	0	0	0	0	0
Aquarium	300	1	909	300	0	0	0	0	0	0
Aquarium	300	1.3	1,545	177	0	20	20	20	20	20
Aquarium	300	3.4	3,091	88	60	70	70	70	70	70

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1.19
.91
All conc
~ 1000
ppm