

ACUTE TOXICITY TO FISH (FATHEAD MINNOW)

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 sultane 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: Not given.

Type: Acute static-renewal range-finder

GLP: No

Year completed: 1985

Species: *Pimephales promelas*

Supplier: Commerical Supplier, Brady, NE.

Analytical monitoring: Temperature, pH, and dissolved oxygen.

Exposure period: 96-hours

Statistical methods: LC₅₀ values were calculated using logistic regression methods (probit analysis).

Test fish age: Juveniles

Length and weight: Average length = 41 mm
Average weight = 0.50 g (wet)

Loading: 0.67 g/L

Pretreatment: 25 mg/L Tetracycline HCl

Test conditions:

Dilution water: Carbon-filtered well water

Dilution water chemistry: Not given.

Lighting: Not given.

Stock and test solution preparation: The test material was added directly to the dilution water on a weight/volume basis.

Concentrations dosing rate: Solution renewal during the study.

Stability of the test chemical solutions: Not noted.

Exposure vessels: 4 L glass beakers containing 3 L test solution.

Number of replicates: 1 for exposure concentrations, 2 for blank control.

Number of fish per replicate: 4.

Number of concentrations: five plus a blank control

Water chemistry during the study:

pH range (0-96 hours):

7.6 – 7.8 (control exposure)

7.6 – 7.7 (1000 mg/L exposure)

Temperature range (0-96 hours): 19 – 20 °C

Dissolved oxygen range (0-96 hours):

7.0 – 9.3 mg/L (control exposure)

4.2 – 9.3 mg/L (1000 mg/L exposure)

RESULTS

Nominal concentrations: Blank control, 1, 10, 100, 500, and 1000 mg/L

Element values: 96-hour LC₅₀ = >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 sample 96-hour LC₅₀ for fathead minnow 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. The study was a range-finder with limited number of organisms exposed at each concentration. There is a lack of characterization of the test sample. Test solutions lack 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

Type Test RENEWAL Material Tested EX-3104 6% Lot
 Test Organism Fathead minnow Source Brady, Neb Date Rec'd 8/22/84 Batch # 2-85/68
 Avg. Wt. 0.50 grams Avg. Size 4.1 cm No. Organisms per dose 4 Loading Factor 0.67 g/l
 Fish Disease Treatment: 25 mg/l Tetracycline NPL 8/22/84
 Test Solution Volume 3 Liters/All-Glass Tank Tank Dimensions: 4 liter Pyrex^R glass beaker
 Time Started 2:00pm Date Started 2/4/85 Date Completed 2/8/85
 Dilution Water Carbon-filtered well water (Temp. 19 °C., D.O. 9.3 ppm, pH 7.7)
 Investigator [Signature] LC₅₀ (95% Confidence Limits) >1000 mg/l
 Full Signature(s) [Signature]

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	7.6	7.5	0	7.7	7.2	0	7.7	7.3	0	7.7	7.4
II	Control	—	0	7.7	7.6	0	7.8	7.0	0	7.8	7.1	0	7.8	7.3
2-1	1	3	0	7.6	7.0	0	7.7	6.8	0	7.7	6.8	0	7.7	7.1
2-2	10	30	0	7.6	7.0	0	7.7	6.6	0	7.7	6.6	0	7.7	6.8
2-3	100	300	0	7.6	6.1	0	7.7	5.9	0	7.7	6.0	0	7.7	6.2
2-4	500	1500	0	7.6	6.1	0	7.7	5.8	0	7.7	5.8	0	7.7	5.8
2-5	1000	3000	0	7.6	4.5	0	7.6	4.2	0	7.6	4.3	0	7.6	4.2

Test Temp. °C

Initials & Date

Comments: *INDIVIDUAL WEIGHTS. Light amber frothy liquid. Soluble in water
 at ambient room temperature.

Secondary Effects (other than Mortality):

EC₅₀

BEST COPY AVAILABLE

Tank No.	Symptoms or Reactions	Total Number Affected			
		24-Hr.	48-Hr.	72-Hr.	96-Hr.
Control	I & II				
2-1					
2-2					
2-3					
2-4					
2-5					

002987

ENVIRONMENTAL LABORATORY

TABLE I. SUMMARY OF ACUTE TOXICITY OF EX-3104 6% (Light Water)
TO FATHEAD MINNOW UNDER STATIC RENEWAL EXPOSURE CONDITIONS⁽¹⁾

CHEMICAL CONCENTRATION (mg/l)	PERCENT MORTALITY			
	24-HR.	48-HR.	72-HR.	96-HR.
CONTROL	0	0	0	0
<u>1</u>	0	0	0	0
<u>10</u>	0	0	0	0
<u>100</u>	0	0	0	0
<u>500</u>	0	0	0	0
<u>1000</u>	0	0	0	0
<u> </u>				
LC ₅₀ (95% CONFIDENCE LIMITS) ⁽²⁾ mg/l	>1000	>1000	>1000	>1000

(1) Data were averages of two replications for each concentration with ten (10) fish per replicate. A total of twenty fish were used per concentration.

(2) LC₅₀ values were calculated using logistic regression methods (Probit Analysis).

002988