

TOXICITY TO AQUATIC PLANTS

TEST SUBSTANCE

Identity: A mixture containing perfluorooctanesulfonate, which may also be referred to as PFOS, FC-95, or as a component of FX-3103. (1-Octanesulfonic acid) (CAS # 2795-39-3).

Remarks: The 3M production lot number was not noted. The test sample is FX-3103, 3%. Current information indicates it is a mixture of 0.96% PFOS, 20% diethylene glycol butyl ether, 50.56% water, 15% ethylene glycol, 4.32% sodium octyl sulfate, 6.0% polyoxyethylene monooctylphenyl ether, 2.5% propane sultone foamer, 0.5% sodium nitrate, 0.06% 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

GLP: No

Year study performed: 1985

Species: *Selenastrum capricornutum*

Source: Not given.

Element basis: Algal cell counts (cells/mL).

Exposure period: 96 hours

Statistical Methods: IC₅₀ values calculated using probit analysis or other regression models.

Analytical monitoring: Not given.

Test Conditions:

Algal Nutrient Medium: Not given.

Stock and test solution preparation: Not given.

Exposure vessels: Not given.

Agitation: Not given.

Number of replicates: 2

Initial cell loading: 2.05×10^4 cells/mL

Number of concentrations: five plus a blank control

Lighting: Not given.

Water Chemistry: Not given.

RESULTS

Nominal concentrations: Blank control, 100, 180, 320, 560, and 1000 mg/L

96-Hour Algal Growth Response

Nominal Conc. (mg/L)	Mean Cell-Count (cells/mL)	Percent Inhibition
Control	1,790,000	---
100	1,770,000	1
180	1,080,000	40
320	720,000	60
560	310,000	83
1000	200,000	89

Element values: 96-hour IC_{50} = 236 (193 – 273) mg/L

Element values are based on nominal concentrations.

Reversibility of Growth Inhibition: Not given.

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 exhibits a 96-hour IC_{50} of 236 mg/L with a 95% confidence interval of 193 to 273 mg/L.

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. There is no characterization of the test substance purity, and 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 C1111-1, 1985.

OTHER

Last changed: 6/26/00.

ENVIRONMENTAL LABORATORY
FRESHWATER ALGAE GROWTH INHIBITION TEST
ALGAL CELL COUNT, no./ml
HEMOCYTOMETER METHOD*

LR 0111-1

TEST DAY 4-ANY TEST TYPE AA:BT DATE 2/23/85

MATERIAL TESTED: EX.3103 3%

ALGAL SPECIES: Green Algae, Selenastrum capricornutum

ANALYST: [Signature]

TREATMENT	TOTAL OF 25 FIELDS COUNTED	no./ml	MEAN + SD
CONTROL			
I	180	1,800,000	1,790,000
II	178	1,780,000	
100mg/l			
1-1	178	1,780,000	1,770,000
2-1	176	1,760,000	
180mg/l			
1-2	110	1,100,000	1,080,000
2-2	106	1,060,000	
320mg/l			
1-3	72	720,000	720,000
2-3	72	720,000	
560mg/l			
1-4	32	320,000	310,000
2-4	30	300,000	
1000mg/l			
1-5	20	200,000	200,000
2-5	20	200,000	

* 0.1 mm deep Hemocytometer; area of field 1 x 1 and 0.1 mm deep.

ENVIRONMENTAL LABORATORY
 TABLE 1. SUMMARY OF ACUTE TOXICITY
 OF FX3103 3% TO FRESHWATER ALGAE
 (SELENASTRUM CAPRICORNUTUM)⁽¹⁾

Chemical Concentration (mg/l)	Percent Inhibition in Standing Crop ⁽²⁾		
	48-Hr. Based on Cell-Count	96-Hr. Based on Cell-Count	Based on Cell Dry Wt.
Control		—	
<u>100</u>		1	
<u>180</u>		40	
<u>320</u>		60	
<u>560</u>		83	
<u>1000</u>		89	
—			
IC ₅₀ (95% Confidence Limits) mg/l ⁽³⁾ <u>236 (193-273)</u>			

Acceptability of Test

The Selenastrum capricornutum control cultures have met the following quality criteria:

- Exhibited log phase growth within 48* hours (max. 48 hr.)
- Attained a 96-hr. standing crop of 1.79×10^6 cells/ml (min. 10^5 cells/ml)
- + Log phase growth at 48-hrs. 445,000 cells/ml.
 Initial loading 20,500 cells/ml.

- (1) Data were averages of two replications for each test concentration.
- (2) Based on cell-count (no./ml) and/or cell-dry weight (mg/l).
- (3) IC₅₀ values were calculated using Probit Analysis or other regression models of experimental data.