

AR 226 - 0708

MICROBICS MICROTOX® TOXICITY TEST

TEST SUBSTANCE

Identity: A mixture containing perfluorooctanesulfonate, which may also be referred to as PFOS, FC-95, or as a component of FC-201F-X. (1-Octanesulfonic acid) (CAS # 2795-39-3).

Remarks: The 3M production lot number was 1. The test sample is FC-201F-X (F-11129). Current information indicates it is a mixture 3% PFOS, 36% diethylene glycol butyl ether, 36.6% water, 8.25% acrylic foamer, 7% sodium octyl sulfate, 6% sulfonated alkyl ether salts, 3% triethanolamine, and 0.15% toluotriazole.

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: Microbics Microtox® Procedure

Test type: Acute static

GLP: No

Year Completed: 1992

Species: *Photobacterium phosphoreum*

Analytical monitoring: pH and osmotic condition.

Exposure period: 30-minutes

Statistical methods: EC50 values calculated by statistical linear regression program provided for Microtox®

Test organism source: Microbics' Reagent.

Test conditions:

Diluent: Millipore Milli-Q™ water

Test temperature: Not noted.

Stock and test solution preparation: A primary stock solution was prepared by adding 200 mg of test material to 100 mL Millipore Milli-Q™ water. The pH of the stock solution was 7.4. An osmotic adjustment was made using 200 mg NaCl dissolved in 10 mL stock solution. Appearance of test solutions was noted as "clear and colorless". All test solutions were made by proportional dilutions.

Exposure vessels: 4 mL cuvettes.

Number of replicates: two

Number of concentrations: Four plus a blank control

Element basis: Percent light loss

RESULTS

Nominal concentrations: Blank control, 125, 250, 500, and 1000 mg/L

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Element value: 5-minute EC₅₀ = 153 (130 – 180) mg/L
15-minute EC₅₀ = 135 (108 – 170) mg/L
30-minute EC₅₀ = 110 (84 – 145) 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 substance 30-minute EC₅₀ for *Photobacterium phosphoreum* was determined to be 110 mg/L with a 95% confidence interval of 84 to 145 mg/L.

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

DATA QUALITY

Reliability: Klimisch ranking 2. Testing meets all criteria for quality testing. However, sample purity was not properly characterized and the study 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 K1126-1, 1992.

OTHER

Last changed: 6/26/00.

Environmental Lab — Work Sheet

Sample Description

FC-201F-X F-11129 Lot 1
BROWN LIQUID

Lab Request No. K1126-1Page 1 of 10Date: 4/17/92Analyst: KSNMICROTOX

WEIGHED 200 mg of SAMPLE. ADDED TO FLASK WITH $\approx$ 50 ml Milli-Q WATER.

INITIAL pH = 7.4 - NOT ADJUSTED

ADDED Milli-Q WATER TO 100 ml.

OSMOTIC ADJUSTMENT: ADDED 200 mg NaCl TO 10 ml of sample

FINAL APPEARANCE OF TEST SOLUTION: CLEAR, COLORLESS LIQUID

K1126-1.K5

[illegible]

EC 50 = 152.6346 mg/L (95% CONFIDENCE RANGE: 129.7237 TO 179.5920)

11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1041 1042 1043 1044

MICROTOX DATA REPORT

FILE NAME: K1126-1.K5

TEST DATE: _____
TEST TIME: _____

Sample Description:

FC - 201F-X F11129 LOT 1 BROWN LIQUID TEST DATE 4/17/92

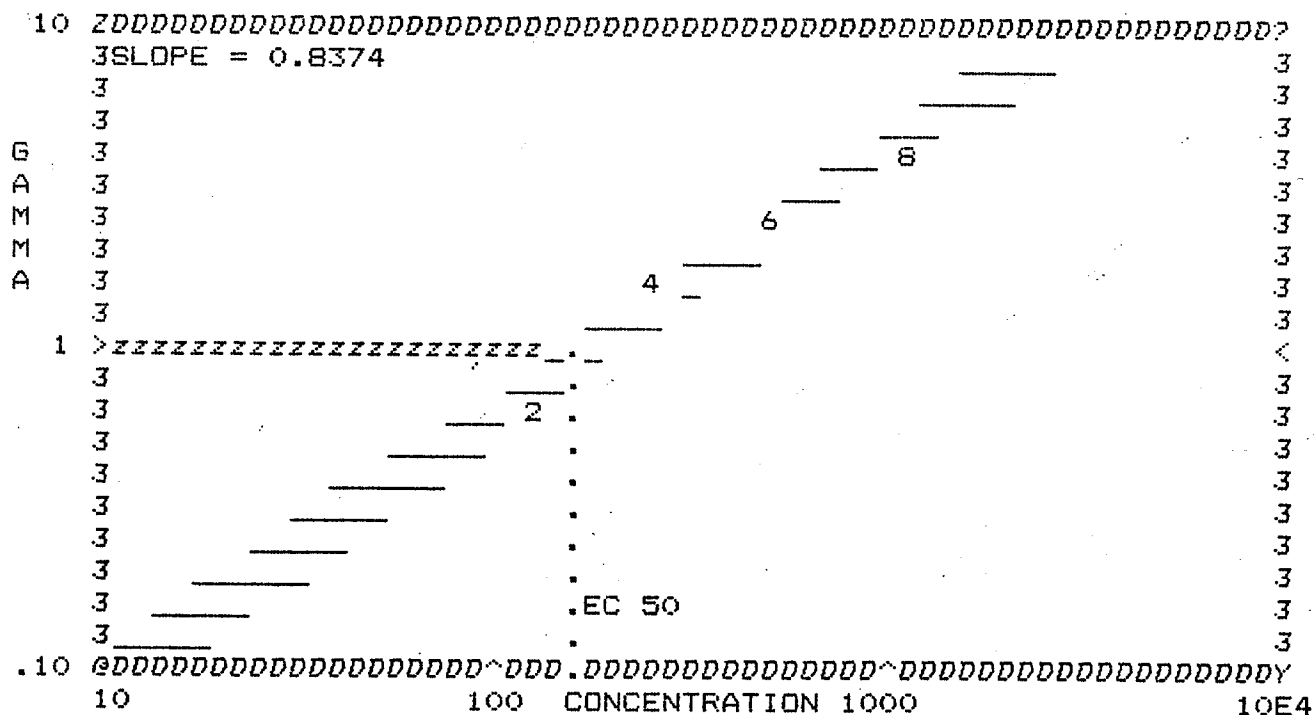
Procedure: BASIC
Initial Concentration : 1000 mg/L
Test Time: 5 minutes

Osmotic Adjustment: NaCl
Dilution Factor : 2
Concentration Units: mg/L

NUMBER	IO/IT	CONC.	GAMMA
1	86/ 42	125.0000	0.77000#
2	87/ 42	125.0000	0.79059#
3	84/ 27	250.0000	1.68931#
4	88/ 28	250.0000	1.71675#
5	88/ 19	500.0000	3.00363#
6	86/ 19	500.0000	2.91264#
7	91/ 14	1000.0000	4.61873#
8	87/ 14	1000.0000	4.37176#

CONTROL IT/IO = 80/ 94

BLANK RATIO = 0.8644



EC 50 = 152.6346 (95% CONFIDENCE RANGE: 129.7237 TO 179.5920)

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# Used for calculations
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000392

STATISTICAL REPORT FOR DATA FILE K1126-1.K5

ESTIMATING EQUATION: $\text{LOG } C = 1.1702 \times \text{LOG } b + 2.1837$

NUMBER OF DATA PAIRS USED: 8

RESIDUAL VARIANCE: 0.00303

95% CONFIDENCE FACTOR: 1.17661 FOR EC50

CORRELATION COEFFICIENT: $R = 0.98991$

EFFECTIVE CONCENTRATIONS (95% CONFIDENCE RANGE):

EC 50 =	152.6346 mg/L	(	129.7237 TO	179.5920)
EC 20 =	30.1391 mg/L	(	20.8449 TO	43.5773)***
EC 10 =	11.6684 mg/L	(	7.0781 TO	19.2355)***
EC 1 =	0.7053 mg/L	(	0.2880 TO	1.7272)***

*** EXTRAPOLATED RESULTS

K1126-1.K15

RI1120-1.R119

NUMBER	CONC.	GAMMA	GAMMA EST.	% EFFECT
1	125.0000	0.8951	0.9604	47.231
2	125.0000	0.8212	0.9604	45.092
3	250.0000	1.9307	1.7212	65.879
4	250.0000	1.9475	1.7212	66.073
5	500.0000	3.3345	3.0847	76.929
6	500.0000	3.5008	3.0847	77.782
7	1000.0000	5.3499	5.5281	84.252
8	1000.0000	4.6038	5.5281	82.155

EC 50 = 135.4463 mg/L (95% CONFIDENCE RANGE: 108.2013 TO 169.5515)

TEST DATE: _____
TEST TIME: _____

FC - 201F-X F11129 LOT 1 BROWN LIQUID TEST DATE 4/17/92

Osmotic Adjustment: NaCl

Dilution Factor : 2

Concentration Units: mg/L

NUMBER	IO/IT	CONC.	GAMMA
1	86/ 38	125.0000	0.89506#
2	87/ 40	125.0000	0.82124#
3	84/ 24	250.0000	1.93073#
4	88/ 25	250.0000	1.94748#
5	88/ 17	500.0000	3.33453#
6	86/ 16	500.0000	3.50077#
7	91/ 12	1000.0000	5.34992#
8	87/ 13	1000.0000	4.60382#

BLANK RATIO = 0.8374

$$3SLOPE = 0.8417$$

The figure is a log-log plot showing the relationship between Gamma (Y-axis) and Concentration (X-axis). The Y-axis ranges from 0.1 to 3, and the X-axis ranges from 10 to 1000. A series of horizontal bars are plotted at various concentration levels, labeled 1 through 8. A vertical line is drawn at concentration 50, labeled 'EC 50'. The plot is titled 'GAMMA' on the Y-axis and 'CONCENTRATION' on the X-axis.

Label	Concentration	Gamma
1	10	0.1
2	100	0.2
3	100	0.3
4	200	0.4
5	300	0.5
6	400	0.6
7	500	0.7
8	600	0.8

EC 50 = 135.4463 (95% CONFIDENCE RANGE: 108.2013 TO 169.5515)

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# Used for calculation
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STATISTICAL REPORT FOR DATA FILE K1126-1.K15

ESTIMATING EQUATION: $\text{LOG } C = 1.1494 \times \text{LOG } b + 2.1318$

NUMBER OF DATA PAIRS USED: 8

RESIDUAL VARIANCE: 0.00492

95% CONFIDENCE FACTOR: 1.25180 FOR EC50

CORRELATION COEFFICIENT: $R = 0.98358$

EFFECTIVE CONCENTRATIONS (95% CONFIDENCE RANGE):

EC 50 =	135.4463 mg/L	(	108.2013 TO	169.5515)
EC 20 =	27.5266 mg/L	(	16.8924 TO	44.8552)***
EC 10 =	10.8380 mg/L	(	5.6365 TO	20.8398)***
EC 1 =	0.6886 mg/L	(	0.2175 TO	2.1798)***

*** EXTRAPOLATED RESULTS

K1126-1, K30

NUMBER	CONC.	GAMMA	GAMMA EST.	% EFFECT
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1	125.0000	1.0258	1.1536	50.636
2	125.0000	0.9939	1.1536	49.848
3	250.0000	2.3920	2.0627	70.519
4	250.0000	2.3920	2.0627	70.519
5	500.0000	3.9749	3.6883	79.899
6	500.0000	4.2091	3.6883	80.803
7	1000.0000	6.0152	6.5950	85.745
8	1000.0000	5.7068	6.5950	85.090

EC 50 = 110.3339 mg/L (95% CONFIDENCE RANGE: 83.8096 TO 145.2529)

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17. 1 2 3

TEST DATE: _____
TEST TIME: _____

TEST TIME: _____

FC - 201F-X F11129 LOT 1 BROWN LIQUID TEST DATE 4/17/92

Osmotic Adjustment: NaCl

Dilution Factor : 2

Concentration Units: mg/L

NUMBER	IO/IT	CONC.	GAMMA
1	86/ 36	125.0000	1.02576#
2	87/ 37	125.0000	0.99392#
3	84/ 21	250.0000	2.39196#
4	88/ 22	250.0000	2.39196#
5	88/ 15	500.0000	3.97488#
6	86/ 14	500.0000	4.20908#
7	91/ 11	1000.0000	6.01519#
8	87/ 11	1000.0000	5.70683#

BLANK RATIO = 0.8480

[illegible]

3SLOPE = 0.8384

G
A
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EC 50 = 110.3339 (95% CONFIDENCE RANGE: 83.8096 TO 145.2529)

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# Used for calculations
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000398

STATISTICAL REPORT FOR DATA FILE K1126-1.K30

ESTIMATING EQUATION: $\text{LOG } C = 1.1478 \times \text{LOG } b + 2.0427$

NUMBER OF DATA PAIRS USED: 8

RESIDUAL VARIANCE: 0.00569

95% CONFIDENCE FACTOR: 1.31648 FOR EC50

CORRELATION COEFFICIENT: $R = 0.98097$

EFFECTIVE CONCENTRATIONS (95% CONFIDENCE RANGE):

EC 50 =	110.3339 mg/L	(	83.8096 TO	145.2529)***
EC 20 =	22.4741 mg/L	(	12.7709 TO	-39.5497)***
EC 10 =	8.8605 mg/L	(	4.2097 TO	18.6493)***
EC 1 =	0.5652 mg/L	(	0.1568 TO	2.0365)***

*** EXTRAPOLATED RESULTS