

1-Decanol, 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-heptadecafluoro-
Daphnia magna Reproduction Test (21 d), Limit Test
 according to OECD Guideline 211

Project-No. 020719CK
 Study-No. DRE84111

Robust Summary

Test Item	1-Decanol, 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-heptadecafluoro-
Batch Number	P00/001
CAS RN	678-39-7
Purity	C8-perfluoroalkylethanol: 99.3 % (a/a), sum perfluoroalkylethanol 99.9 % (a/a)
Testing Facility	DR.U.NOACK-LABORATORIUM FÜR ANGEWANDTE BIOLOGIE Käthe-Paulus-Str. 1, D-31157 Sarstedt Tel. +49(0)5066 70670, email: info@noack-lab.de
Method	
Method/Guideline followed	OECD-Guideline No. 211
Type	Semi-static
GLP	Yes [X] No []
Year performed	2003
Test Conditions	
Species	
Test organism	<i>Daphnia magna</i> STRAUS (Clone 5)
Culture	In 2-3 L glass vessels with approximatively 1.8 L culture medium, at 21 °C (temperatures of 20 - 25 °C are tolerated), in an incubator, 16 h illumination, illumination strength max. 20 $\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$.
Culture medium	Elendt M4, according to Elendt (1990), modified to a total hardness of 160 to 180 mg CaCO_3/L .
Feeding of the Culture	At least 5x weekly ad libitum with a mix of <i>Desmodesmus subspicatus</i> and <i>Chlorella vulgaris</i> , with an algae cell density of $> 10^6$ cells/mL.
Age of test organisms	2 - 24 h old Daphnids were used for the test.
Stock solution	A stock solution of 1.3 g test item/L was prepared in methanol. The stock solution was not longer used than 21 d.
Dispersion treatment	Agitation
Vehicle	Methanol, the concentration in the test replicates and the solvent control replicates was 0.1 mL/L.
Limit concentration	0.13 mg 1-Decanol, 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-heptadecafluoro-/L dissolved in 0.1 mL methanol/L (0.1 mL of the stock solution were mixed with dilution water to give a final volume of 1 L).
Dilution water	Elendt M4, according to ELENDET (1990), modified to a total hardness of 160 to 180 mg CaCO_3/L .

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Illumination	Max. 15 - 20 $\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$
Photoperiod	16 / 8 hours light / dark cycle
Temperature range	18 - 22 °C, ± 2 °C constant
pH	The pH-value should be in the range of 6 - 9. Normally deviations of initial and final pH values should be < 1.5 units.
Hardness	> 140 mg/L CaCO_3
O ₂	The oxygen concentration should be > 3 mg/L at the beginning and during the test.
Exposure period	21 d
Exposure vessel type	Glass beakers (5 (ID) x 8 (H) cm), 100 mL volume will be used.
Number of study organisms	10 animals, individually held
Number of replicates	10 per concentration, solvent control and control
Endpoints assessed parental	Number of juveniles, immobile juveniles, aborted eggs, immobile occurrence of males and winter eggs.
Measurements	Dissolved oxygen concentration, pH-values, total hardness and water temperature were measured once a week, in fresh and old media, in one replicate of the control, the solvent control and the test item concentration.
Analytical monitoring	The test item concentration of the fresh and old media were analytically verified by gas chromatography with mass spectrometric detection ($m/z = 463$ and 395). The limit of detection (LOD) and limit of quantification (LOQ), calculated using the blind value method (according to DIN 32645) were determined to be 0.009 mg/L and 0.027 mg/L (threefold the LOD), respectively.
Measured concentration remarks	The test item concentration of the fresh and old media were analytically verified three times within the study period after 0, 6, 12, 24 and 48 h. Test item concentrations were analysed in triplicates. The control, solvent control and stock solution were analysed after 0 and 48 h in one replicate. All results are based on the geometric mean exposure concentration.

Results

Water parameter were determined to be within the acceptable limits.

Table 1: **Water Parameters During Test Exposure**

G.M.E.C. [µg a.i./L]	Dissolved oxygen range [mg/L]	pH-value range	Temperature range [°C]	Total hardness range [mg/L]
45.3	7.63 – 9.31	6.92 – 8.04	20.4 – 21.9	163 – 179
Solvent control	7.88 – 9.44	6.97 – 8.12	20.5 – 21.9	163 – 179
Control	7.94 – 9.57	7.33 – 8.62	20.1 – 22.0	160 - 177

Water quality criteria of pH-value: Deviations < 1.5 units between the initial and final pH-values are regarded to be not significant.

The dissolved oxygen concentration should be above 3 mg/L.

The total hardness should be more than 140 mg/L as CaCO₃.

The temperature should be within the range 18-22 °C.

G.M.E.C. = Geometric mean exposure concentration

Endpoints assessed:

Table 2: **Test Item Related Effects**

Effects	Control	Solvent Control	Geometric Mean Exposure Concentration 45.3 µg a.i./L
Number of Juveniles (Reproduction Rate)	no	yes	no
Coefficient of Variation (CV) ¹⁾	no	no	no
Immobile Juveniles	no	yes	yes
Aborted Eggs	no	yes	yes
Immobilisation of the Parental ²⁾	no	no	no
Occurrence of Males, Winter Eggs	no	no	no

no = no significant effect

¹⁾ = CV > 25 %

yes = significant effect

²⁾ = ≥ 20 % after 21 days

Validity criteria

Mortality in the control and solvent control group did not exceed 20 % at the end of the test.

The mean number of living offspring produced per parent animal surviving at the end of the test was > 60 in the control group.

The coefficient of variation around the mean number of living offspring produced per parent in the control groups was < 25 %.

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Conclusions

Measured concentrations

Using the analytically verified concentrations the geometric mean exposure concentration was calculated to be 45.3 µg a.i./L.
Alternatively, the time weighed mean measured concentration was calculated to be 64.3 µg a.i./L.

Evaluation

The no observed effect concentration (NOEC) was determined to be the geometric mean exposure concentration 45.3 µg a.i./L.