

Telomer Research Program



Report Title: 1-Decanol, 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-heptadecafluoro-
Terrestrial Plants Toxicity, Seedling Emergence

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Study Objective: The determination of toxic effects of soil incorporated 1-Decanol, 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-heptadecafluoro- on the emergence of seedlings and the early stages of growth of three terrestrial plant species according to OECD 208 (Draft, July 2000).

Materials and Methods: Three plant species of different families were tested: the monocot *Avena sativa* (oats) and the dicots *Glycine max* (soybean) and *Brassica napus* (rape). The test substance, 1-Decanol, 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-heptadecafluoro-, heated to 50 °C, was weighed, dissolved in *tert.*-butyl-methyl-ether and mixed with quartz sand. After the solvent had volatilized, the test substance was incorporated into the soil, in which the seeds were sown, at soil test concentration ranges of: 1000-10 mg/kgs soil dry weight for oats and soybean and 100-6.25 mg/kg soil dry weight for rape. Temperature (16-26 °C), relative humidity (68-100%) and fluorescent illumination 3400-5300 (lx) were recorded. There were 8 replicates (5 seeds per replicate) per dose level. A solvent control and negative control were used for testing. Emerged seedlings were counted every 7 days and observations made for any phytotoxic symptoms. Plants were harvested after 21 days and measurements made of shoot height and shoot fresh weight.

Findings: No statistically significant differences were found between the negative control and the solvent control. Therefore, the data for the negative control and solvent control were pooled for subsequent statistical analyses. Plants were observed on day 7, 14 and 21 for visual phytotoxic effects, number of dead plants and emerged seedlings. Shoot height was determined on day 21. Biomass was determined as fresh weight on day 21. Statistically significant inhibition of shoot height was found for rape at 100 mg/kg DW. No statistically significant inhibition of shoot height was determined in the tested concentration range 10-1000 mg/kg DW for oats and soybean. Statistically significant inhibition of fresh weight was found at test substance concentrations ≥ 50 mg/kg DW for rape and 1000 mg/kg DW for soybean. No statistically significant inhibition of fresh weight was determined in the tested concentration range 10-1000 mg/kg DW for oats. For emerged seedlings, no statistically significant decrease in emergence was found for oats and soybean at the concentration range 10-1000 mg/kg DW and for rape at the concentration range 6.25-100 mg/kg DW.

The EC₂₅ and EC₅₀ values with confidence range for shoot height, fresh weight and emerged seedlings were calculated based on percentage inhibition. NOEC values were calculated using One Way Analysis of Variance (ANOVA) and Dunnett's test. Results are shown in Tables 1-3.

Table 1: Shoot Height: NOEC, EC₂₅ and EC₅₀ values with Confidence Range (p)

Species	NOEC* [mg/kg DW]	EC ₂₅ [mg/kg DW]	p=95% [mg/kg DW]	EC ₅₀ [mg/kg DW]	p=95% [mg/kg DW]
Oats	1000	>10000	-	>1000	-
Rape	50.0	80.2	65.6-97.9	>100	-
soybean	1000	>1000	-	1000	-

Table 2: Fresh Weight: NOEC, EC₂₅ and EC₅₀ values with Confidence Range (p)

Species	NOEC* [mg/kg DW]	EC ₂₅ [mg/kg DW]	p=95% [mg/kg DW]	EC ₅₀ [mg/kg DW]	p=95% [mg/kg DW]
oats	1000	>1000	-	>1000	-
rape	25.0	51.7	44.0-60.8	73.7	62.6-86.7
soybean	320	>1000	-	>1000	-

Table 3: Number of Emerged Seedlings: NOEC, EC₂₅ and EC₅₀ values with Confidence Range (p)

Species	NOEC* [mg/kg DW]	EC ₂₅ [mg/kg DW]	p=95% [mg/kg DW]	EC ₅₀ [mg/kg DW]	p=95% [mg/kg DW]
oats	1000	>1000	-	>1000	-
rape	100	>100	-	>100	-
soybean	1000	>1000	-	>1000	-

- not determinable

* The highest tested concentration of the test substance at which no statistically significant effect was observed relative to control

Conclusion: After 21 days no test substance related phytotoxic effects were observed for oats and soybean at the tested concentration range 10-1000 mg/kg. For rape, decrease in shoot height was observed at the concentration 100 mg/kg. The EC₅₀ values for shoot height were > 100 mg/kg DW for rape and > 1000 mg/kg for oats and soybean.(Table 1).

The EC₅₀ values for fresh weight was determined to be 73.7 mg/kg DW for rape and > 1000 mg/kg for oats and soybean (Table 2). Significant differences in comparison to the control were determined at 50 and 100 mg/kg for rape and at 1000 mg/kg for soybean. The EC₅₀ values for seedling emergence were > 100 mg/kg DW for rape and > 1000 mg/kg DW for oats and soybeans respectively (Table 3).