

**ECOTOXICITY ELEMENTS  
TOXICITY TO TERRESTRIAL ORGANISMS**


**Plants: *Brassica rapa*, *Amaranthus retroflexus*, *Chenopodium album*, *Galinsoga parviflora*, *Solanum nigrum*, *Malva pusilla*, *Nigella arvensis***

**PAPER REVIEWED**

Marschner, A.1992. Phytotoxizitätsuntersuchungen mit zwei anionischen Detergentien (TPBS, LAS) und einem Herbizid (Atrazin). Schriftenreihe des Vereins für Wasser-, Boden-, und Lufthygiene, 89, 459-483.

**TEST SUBSTANCE**

- Commercially available LAS (Marlon A, CAS-nr. 68411-30-3, supplier not mentioned).

 Remarks: The neat material was 50 % (w/w) active LAS in water, sodium salt solution, average molecular weight not specified, distribution of the linear alkyl chains: C11.4-11.8. All data expressed in mg LAS (active substance) / kg d.w. soil.  
Paper in German.


**METHOD**

- Laboratory Not mentioned.
- Objectives To determine the effects of LAS on the growth of 6 wild plant species and 1 cultivated plant.  
Additional objectives not reviewed in this summary:
  - to evaluate the toxicity of atrazin and tetrapropylenebenzoesulphonate;
  - to compare the toxicity of the test substances;
  - to compare the sensitivity of different plant species.
- Method/guideline followed The German national guideline (BBA 1984) for plant tests was followed with the following deviations. Seven instead of 5 plants were used per pot, humidity was 70 % of the water holding capacity instead of 60 %, 9 instead of 4 concentrations were used.  
Important deviations from OECD guideline 208 (OECD 1984) are the following: % particles < 20 µm not given, pH not measured, emerged seedlings instead of seeds were used, weight and viability of seeds not mentioned, volume and not weight of soil in the test containers is given, method of chemical incorporation not given, growth conditions not mentioned.
- Test substrate/application A sandy agricultural soil was used for the experiments

(collection site not mentioned). Only limited information about the soil is available (organic carbon content, texture).

The 50 % LAS solution in water (Marlon A) was added to the soil, but no details are given.

- GLP Likely not.
- Year (study performed) ≤ 1992.
- Species/strain/supplier  
*Brassica rapa* (turnip), *Amaranthus retroflexus* (common amaranth), *Chenopodium album* (fat hen), *Galinsoga parviflora* (gallant soldier) and *Solanum nigrum* (black nightshade) seeds were obtained from the Insitut für Unkrautforschung der Biologischen Bundesanstalt für Land- und Forstwirtschaft (Braunschweig).  
*Malva pusilla* (round-leaved mallow) seeds were obtained from the Botanischen Gärten (Dresden, Karlsruhe and Berlin).  
*Nigella arvensis* (wild fennel) seeds were obtained from Botanischen Gärten (Halle and Karlsruhe).
- Analytical monitoring Nominal LAS concentrations were not measured.
- Exposure period 14 days.
- Endpoints (Fresh) weight.
- Statistical methods The EC50 values were calculated with probit analysis according to Finney (1971). NOEC calculations not detailed.

 Remarks: It is not clear whether seeds from one species, obtained from different suppliers were mixed and randomized or not before the experiments were performed. Important deviations from OECD guideline 208 (OECD 1984) were noted (see ‘Method/guideline followed’). It was not clear how NOECs were derived.

## RESULTS

- Nominal concentrations  
*N. arvensis*, *S. nigrum*: 0, 5, 10, 20, 50, 80, 100, 125, 225 mg LAS / kg d.w.  
*B. rapa*: 0, 10, 20, 50, 80, 100, 125, 200 mg LAS / kg d.w.  
These data were derived from graphs in the reviewed paper, since they were not literally mentioned in the text.  
Nominal concentrations could not be derived for the

other species.

- Measured concentrations Not available.
- EC50, EC10 See Table 1 (EC10 derived from graphs in the reviewed paper, since they were not literally mentioned in the text).

Table 1: NOEC, EC10 and EC50 values (mg LAS / kg d.w.) for growth of the different tested plant species (14 days).

Species	NOEC	EC10	EC50
<i>B. rapa</i>	N.A.	75	135
<i>A. retroflexus</i>	N.A.	105	143
<i>C. album</i>	N.A.	120	164
<i>G. parviflora</i>	20	55	90
<i>M. pusilla</i>	80	105	204
<i>N. arvensis</i>	N.A.	45	133
<i>S. nigrum</i>	N.A.	120	196

N.A. Data not given in reviewed paper and not sufficient raw data to calculate NOECs.

📌 Remarks: EC10 values were derived from graphs since they were not literally mentioned in the reviewed paper.

## CONCLUSIONS

*N. arvensis* was the most sensitive plant with an EC10 of 45 mg LAS / kg d.w. Wild species were not more sensitive nor reacted in another way to LAS than the cultured species *B. rapa*.

## RELIABILITY

Klimisch score (Klimisch *et al.* 1997) **3b (documentation insufficient for assessment): not enough raw data documented in the reviewed paper, no measured concentrations; test-substrate not fully described, nominal concentrations not measured.**

## REFERENCES

- BBA, Biologische Bundesanstalt für Land- und Forstwirtschaft Berlin-Dahlem. 1984. Richtlinien für die Prüfung und Bewertung von Stoffen im Rahmen des Gesetzes zum Schutz vor gefährlichen Stoffen (Chemikaliengesetz): Verfahrensvorschlag 'Phytotoxizitätstest an einer monokotylen Pflanzenart (*Avena sativa*) und einer dikotylen Pflanzenart (*Brassica rapa* (DC.) METZG.)'. (EC 50, 14 Tage). Berlin, Germany.
- Finney, D.J. 1971. Probit analysis, 3<sup>d</sup> edition. Cambridge, UK.
- OECD. 1984. OECD guideline for testing chemicals nr. 208:Terrestrial plants, growth test.