


ECOTOXICITY ELEMENTS
TOXICITY TO TERRESTRIAL ORGANISMS
Soil invertebrates: *Lumbricus terrestris*

PAPER REVIEWED

Swigert J.P. 1990. Acute toxicity of linear alkylbenzene sulfonate to earthworms (*Lumbricus terrestris*). ABC Laboratory study report 38317. ABC Laboratories, Columbia, Missouri, USA.

TEST SUBSTANCE


- LAS (Monsanto Company).

 Remarks: The neat material was 35.1 % (w/w) active LAS in an aqueous solution. No further details were given. All data expressed in mg LAS (active substance) / kg d.w. soil (nominal values).

METHOD

- Laboratory Analytical Bio-Chemistry Laboratories Inc. Aquatic Toxicology Division. 7200 East ABC Lane, Columbia, Missouri, USA.
- Objectives To determine the toxicity of LAS towards the earthworm *Lumbricus terrestris* on the basis of mortality, growth and cocoon production after 7 to 14 days exposure.
- Method/guideline followed US Food and Drug Administration technical guide no. 4.12 (US FDA 1987).
- Test substrate/application Artificial soil as described by OECD (1984).
- Spiking method Appropriate weights of the LAS solution (35.1 % LAS in water) were mixed with 1.16 L of deionized water and added to 2.44 kg of artificial soil, resulting in 5 LAS spiked soils (5 concentrations) with a water content of 35%.
- GLP Yes.
- Year (study performed) 1989.
- Species/strain/supplier Earthworms were obtained from Carolina Biological Supply Company, Burlington, North Carolina, USA.

- Analytical monitoring Nominal concentrations in the test (day 0, 7 and 14) were measured by Monsanto Company.
- Exposure period 14 days.
- Endpoints Mortality, burrowing time, fresh weight, growth, general health (not quantitative), behaviour (not quantitative) and cocoon production (not quantitative).
- Statistical methods Anova analysis, followed by linear contrasts was performed for the weight data.

 Remarks: Weight and growth were assessed as mean weight / growth per replicate (mean of 10 worms).

RESULTS

- Nominal concentrations 0, 84, 167, 333, 667, 1333 mg LAS / kg d.w.
- Measured concentrations Although more analyses were performed, only the data from the 667 mg LAS / kg d.w. were presented in the reviewed paper.
- NOEC, LOEC, ECx, LCx. The NOECweight (7 and 14 days) was 667 mg LAS / kg d.w., the LOECweight (7 and 14 days) was 1333 mg LAS / kg d.w. The data were not sufficient to calculate an LC10 or LC50: only 22.5 % mortality occurred after 14 days. ECx values were not given in the reviewed manuscript. We calculated ECx values for weight, growth and burrowing based on Vanewijk and Hoekstra (1993, Table 1).

 Remarks: /

CONCLUSIONS

The lowest EC10 value was found for growth (7 days), 636 mg LAS / kg d.w. (Table 1).

RELIABILITY

- Klimisch score 1c (test procedures according to national standards): performed under GLP according to guideline (US FDA 1987), but only limited measured concentrations available; tested compound not fully described.

REFERENCES

- OECD 1984. OECD guideline for testing chemicals nr. 207. Earthworm, acute toxicity tests.
- US FDA. 1987. US Food and Drug Administration: earthworm subacute toxicity. FDA Environmental Assessment Technical Guide no. 4.12.
- Vanewijk, P.H., Hoekstra, J.A. 1993. Calculation of the EC50 and its confidence interval when subtoxic stimulus is present. *Ecotoxicology and Environmental Safety*, 25, 25-32.

ECx calculations performed by the reviewers

Table 1 represents the results of our ECx calculations based on the raw data of the experiments.

Table 1: Calculated ECx values and confidence intervals (mg LAS / kg d.w.) (mg LAS / kg d.w.) performed according to Vanewijk and Hoekstra (1993) for *Lumbricus terrestris*, exposed to LAS.

Endpoint	Exposure time	EC10	EC50	Hormesis
Weight	7 days	846 (290-2465)	3136 (518-18960)	No
	14 days	668 (244-1828)	1157 (765-1751)	No
Growth	7 days	636 (242-1675)	1160 (815-1652)	No
	14 days	N.A.	N.A.	N.A.
Burrowing	7 days	1242 ^a	1319 ^a	No

N.A. = data insufficient for ECx calculations.

^a = data insufficient to calculate confidence intervals.