

Duckweed growth inhibition tests and standardization

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The duckweed growth inhibition test is standardized in a number of states like France (AFNOR 1996), Sweden (SIS 1995, USA (ASTM 1991, EPA 1996, APHA 1992) and Canada (Environment Canada 1998). On the level of OECD a guideline was completed as draft in June 1998 (OECD 1998). 37 participants successfully finished an international ring test in December 1998. A revised draft document (10/2000) is available. The process of ISO standardization started in summer 2000. The separations of standards for testing chemicals and environmental samples successively vanishes. The OECD-guideline will offer the opportunity to test not only chemicals but even environmental samples but there are some concerns about the test medium used for *L. minor*. On the other hand DIN and ISO standards classically made for water samples are more and more opened for soil elutriates and all substances dissolved in water. This includes even pure chemicals. All standards are in so far compatible to measurements made by image-analysis as image-analysis includes the observation parameter frondnumber. OECD and the DIN/ISO standard will contain total frond area as a second observation parameter at least equal or more sensitive than frond number. Even special requirements can be achieved by image-analysis. For example the ASTM standard points out that only fronds with less than 50 percent chlorosis should be counted as living. Switching to new fields of growing importance the duckweed growth inhibition test is an integrated part of standards for soil quality (ISO/CD 15799 1999) and difficult substances (OECD 1999). In these fields the duckweed test shows its power in being able to cope with suspensions and turbid or coloured test material.

Standards and guidelines:

- AFNOR 1996 Determination of the inhibitory effect on the growth of *Lemna minor* XP T 90-337
- APHA 1992 Toxicity Part 8000 8-32-8-39 in: Standard methods for the examination of water and wastewater 18th ed., APHA, AWWA, WEF, Washington
- ASTM, 1991. Conducting static toxicity tests with *Lemna gibba*. Guide E 1415-91. Annual book of ASTM standards. Section 11 Water and environmental technology. Vol. 11.04. ASTM, Philadelphia, U.S.
- Environment Canada 1998 Biological test method: test for measuring the inhibition of growth using the freshwater macrophyte *lemna minor* Report EPS 1/RM/37
- EPA 1996 Ecological effects test Guidelines OPPTS 850.4400 Aquatic plant toxicity test using *lemna* ssp., Tiers I and II , EPA 712-C-96-156
- ISO/CD 15799 1999 Soil quality - Guidance on the ecotoxicological characterizations of soil and soil materials
- OECD 1998 Draft OECD test guideline - *Lemna* growth inhibition test
- OECD 1999 Draft Difficult substances
- SIS 1995 Swedish Institute of Standards, Water quality - determination of growth inhibition (7-d) *Lemna minor* , duckweed SS 02 82 13

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