

Sensitivität der Makrophyten *Ceratophyllum demersum*, *Elodea canadensis* und *Riccia fluitans* gegenüber Atrazin im Vergleich zum OECD-Standardtest mit *Lemna spec.*

Daniel Zeyher

Abstract

Although macrophytes together with algae play an important role in ecosystems as primary producers, they are underrepresented in the risk assessment of chemicals. So far only one standardised test with duckweed (*Lemna spec.*) is existing. Generally it is questionable if the Lemna-Standard-Test (OECD 221) is sufficient for testing the effects of herbicides or other pesticides. So it is difficult to estimate the effects of chemicals which are situated in deeper water stratum or bound to the sediment under the usage of *Lemna spec.* An additional problem is that several herbicides used in agriculture have a specific toxic effect on dicotyle plants and do no harm monocotyle plants like *Lemna spec.* The aim of this study is to contribute to the project "Development of new methods for the risk assessment of environmental chemicals with macrophytes". Therefore the herbicide atrazine, a synthetic photosynthesis inhibitor was chosen as model substance to test effects on the macrophytes *Ceratophyllum demersum*, *Elodea canadensis* and *Riccia fluitans*. For comparability of the results the Lemna-Standard-Test was performed under parallel conditions. As test parameters were used physical parameters (pH-value, electrical conductance, oxygen content) and growth parameters like shootlength and fresh weight. The analysis of the gained growth parameters showed no measurable negative effect of the test substance atrazine on the three macrophytes used, although higher atrazine concentrations caused negative morphological effects on the two macrophytes *C. demersum* and *E. canadensis*. Furthermore higher atrazine concentrations caused measurable decrease of pH-value and oxygen content in the media of the macrophytes, which is an indication for the photosynthesis inhibiting effect of atrazine, although these parameters were influenced by the used solvent EtOH. Beside this, *C. demersum* reacted on rising atrazine concentrations with an increased growth rate, which could be measured by fresh weight and shoot length. Such effects did not appear under the use of the same testmedia by the Lemna-Standard-Test. Here higher concentrations of atrazine lead to significant inhibiting growth effects with a complete inhibition at the highest concentration. In summary the results based on growth parameters showed two different tendencies. In case of the Lemna-Standard-Test rising atrazine concentrations lead to a decreasing growth rate, while they had no or an increasing effect on the growth rate of the three macrophytes. These results lead to the question if growth rates always can be used as ideal effect-parameters or if additional endpoints like physical or physiological parameters should be used to gain a more differentiated insight into the effects of chemicals.