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Sulfonylurea herbicides – methodological challenges in setting aquatic limit values

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Lemna spp. have been shown to be up to 1000 times more sensitive to some sulfonylurea herbicides (SUs) than the green alga (e.g., *P. subcapitata*) which is commonly used as a representative organism for aquatic primary producers in environmental risk assessments. When the compounds are evaluated according to the EU Water Framework Directive, the resulting Water Quality Standards (WQSs) are below the analytical quantification limit, making it difficult to verify compliance with the limit values. However, several methodological concerns may be raised in relation to the very low effect concentrations reported for SUs in duckweed tests in the literature. Therefore, we decided to further investigate the effects of four SUs on *Lemna gibba* by studying how different test parameters affected the toxicity of the SUs. The SUs used were metsulfuron methyl, thifensulfuron methyl, flupyrsulfuron methyl and rimsulfuron. The following parameters were varied during testing: pH, exposure duration, temperature and light/dark cycle. Preliminary results show that a decrease in pH causes an increase in toxicity for all compounds. Exposure to a high concentration for 24 hours caused a reduction in growth rate, from which the plants recovered within 5 days. Difficulties in maintaining the concentration of the test substances were encountered due to a rapid hydrolysis of certain SUs in aqueous solution. These preliminary results raise the question whether the presently used standard *Lemna* tests are suitable for setting limit values for SUs or if more detailed information should be gained by taking methodological considerations into account.

Topic

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