Student projects

Mixture toxicity of pharmaceuticals and pesticides
Contaminants such as chemicals, pesticides or pharmaceuticals in the environment do not act alone on the organisms living there, but always in combination. Assessing and evaluating the risk and effects of these mixtures is one of the important subfields of ecotoxicology. Biotests that can react more specifically to neurotoxic substances (daphnia, fish embryos), for example, will be used to investigate this mixture toxicity.

Miniaturization of classical ecotoxicological tests for use in environmental monitoring
Environmental monitoring to control the pollution of e.g. water bodies usually takes place only by means of chemical analysis. An evaluation of ecotoxicity is only possible indirectly. The direct analysis by means of biotests is at the moment still costly in terms of sample quantity, test duration or also informative value and thus a reason for the hesitant use of biotests for monitoring. The aim of the work is to optimize some bioassays to such an extent that a general use by authorities is feasible and reasonable.

How great is the sorption of chemicals on plastic test vessels and does this reduce the significance of ecotoxicological test results?
For practical reasons it is thought that ecotoxicological bioassays should be performed more often with plastic microtiter plates (e.g. to save volume and chemicals). A risk of misinterpretation of biotest results is based on the possible sorption of tested chemicals to the plastic of the titer plates - and thus a possible reduction of the observed toxic effects. Whether this sorption plays a significant role in the evaluation of environmental samples will be explored.

Development of a test for movement analysis of fish embryos after exposure to neurotoxins
The effects of neurotoxins maybe based, among other things, on the inhibition of nerves, which can, for example, interfere with normal muscle function and thus normal movement of, for example, fish. For the monitoring and identification of such modes of action, a test is to be further refined that records and analyzes the movement of fish embryos and also includes influences of complex mixtures.

How fast do fish embryos take up pesticides from the environment ?
After heavy rain events, leaching of pesticide mixtures into water bodies occurs under certain conditions in agriculturally used areas. Whether these acute loads are "registered" at all by organisms within a period of a few hours is to be investigated. This will be analysed with tests on the toxicokinetics of pesticides in fish embryos. Here the uptake and elimination of substances in the fish embryo will be observed using chemical-analytical methods in combination with physiological test endpoints.