

NRP Endocrine Disruptors

Final Summary

Original project title Ecological Risk Assessment of UV filters
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UV filters in the aquatic ecosystem

By using a trace analytical method for environmental samples, we show that UV filters are present in water and biota of the aquatic food chain in Swiss rivers. Four compounds were identified at low levels. They pose a risk to aquatic biota only when regarded as compound mixtures.

Research questions

After development of a trace analytical method for nine hormonally active UV filters the contamination situation in Switzerland was evaluated by analysis of water and aquatic biota. Moreover, effects of two UV filters on *Daphnia magna* were assessed. Data on contamination and effects are used for an ecological risk assessment (ERA) of UV filters in the aquatic environment.

Results

A trace analytical technique based on GC-MS and LC-MS for nine hormonally active UV filters covering a large range of polarity was developed. Environmental samples were taken in Swiss rivers and wild fish and mussels were analysed for UV filter residues. Four UV filter compounds of different polarity were found in river water, although at very low concentrations. They occur in spring and summer. Effluents of wastewater treatment plants are a major source of UV filters in the river Glatt. In aquatic animals only one lipophilic UV filter was found to be present, the more polar UV filters did not bioaccumulate. Residues of UV filters were similar in fish, mussels and other river biota. The concentrations were in the range of up to over 200 ng/g lipids weight, and therefore rather low. These data allow an estimate of the "measured environmental concentrations (MEC)" that are used in the ERA.

The acute toxicity and long-term effects on *Daphnia magna* were assessed and data used to estimate the "predicted no effect concentration (PNEC)" in conjunction with additional data. The risk quotient MEC/PNEC is used for an ERA. The tentative ERA indicates no hazard and risks for those single UV filters, which are

actually found in the aquatic environment in Switzerland. However, there is a potential environmental risk when the mixture of occurring UV filters is regarded.

Perspectives

This project delivers important knowledge on the exposure situation in Switzerland. However, the existing data basis on contamination and effects should be extended for implementation in a comprehensive ERA.