

PLASTRAT – Reducing Input of Microplastics into Inland Waters

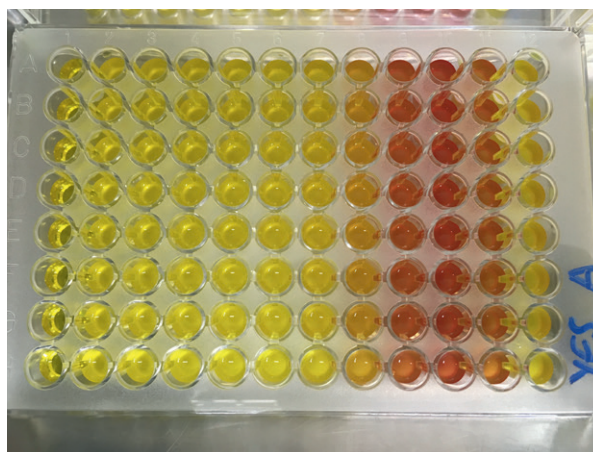
Plastics in the Environment – Sources · Sinks · Solutions

While plastic waste and microplastics in the oceans have been investigated for some time now, little is known about their effects in inland waters. How do plastic particles enter rivers and lakes? What is their impact on people and the environment? How can the released plastic particles be safely, effectively and efficiently eliminated from water? The joint research project PLASTRAT will provide answers to these questions and develop solutions to reduce the entry of plastic into limnic systems.

Entry Points and Consumer Behavior

The primary entry routes for plastic particles into surface waters stem from urban water management: discharges from rainwater and mixed water sewers as well as wastewater treatment plants. Furthermore, the particles are washed out of agriculturally-used sewage sludge, compost and digestate. It is unclear how significant each of the individual sources is and what options exist, such as through technical procedures, for avoiding these emissions. Therefore, the PLASTRAT project focuses on the pathways of plastic particles. For example, the researchers consider tire abrasion as an emission source and examine sewage sludge as a possible microplastic sink. They are also working on suitable methods for sampling, processing and analyzing microplastics in various media such as water, sediment and sludge.

Consumer behavior also plays a major role when examining microplastic sources. In addition to hygiene articles such as wet wipes or tampon packaging, this includes clothing (e.g. fleece jackets) and dog excrement bags. Plastic particles are released into the environment from these sources during washing or improper disposal. The demands of both manufacturers and consumers of plastic products, especially regarding their properties, are being considered in detail. Researchers continue to investigate how consumers perceive environmental risks associated with plastic and what impact this has on usage and disposal practices. Additionally, they are identifying the potential for replacement materials, such as bio-based or biodegradable plastics. In doing so, they take into account factors such as altered product quality, price and risk acceptance.



Ecotoxicological testing of samples for hormonal activity

Impact of Plastic Degradation

The joint research project also sheds light on the possible effects of plastic particles on people and the environment. To this purpose, researchers are analyzing the environmental changes in various types of plastics: how are plastic residues broken down in freshwater and sewage sludge? What happens to potentially dangerous additives such as plasticizers and can these have hormonal effects or other harmful impacts on living organisms? Changes in the plastic surface can also be significant for the absorption and desorption of pollutants from microplastic particles. The project partners want to determine what exactly happens using experiments at wastewater treatment plants.

Practical Solutions

In parallel with investigations about pathways and environmentally induced changes of plastic particles, the project partners are exploring methods of removing microplastics from wastewater. Researchers are analyzing whether advanced wastewater treatment, such as ozonization and sand-activated carbon filtration or ultrafiltration membranes, enables the elimination of microplastics.

The joint research project also aims to present solutions that go beyond microplastic research. The interdisciplinary research teams plan to develop a joint evaluation system for the environmental compatibility of different types of plastics and, building on this, to establish criteria for a quality seal for practical use. This could serve as a guide for consumers and decision-makers for more environmentally sound handling of plastic products. Information on the harmful effects, distribution or elimination possibilities of plastics or products would allow for evaluation and thus selection between several alternatives.



The Holzkirchen wastewater treatment plant is used for sampling in the project.

Research Focus

Plastics in the Environment – Sources • Sinks • Solutions

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Solution Strategies to Reduce Entries of Urban Plastic into Limnic Systems (PLASTRAT)

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