



MICROPLASTICS IN WASTEWATER STREAM

Gdansk Water Utilities

Microplastics in the wastewater treatment plant effluent
Wastewater is one of the main inputs of microplastics (MPs) to the aquatic environment and conventional wastewater treatment plants (WWTPs) play an important role in releasing MPs to water bodies. Even though they are said to remove micropollutants to a certain extent, given the large volumes discharged constantly, they represent a significant source of MPs in terms of load. Therefore the potential microplastics-targeted tertiary treatment technologies at the WWTPs are essential to develop. Recent years have brought interest in more nature-based solutions, such as constructed wetland technology.

WHAT ARE CONSTRUCTED WETLAND SYSTEMS?

Constructed wetlands (CWs) are ecologically-engineered systems that utilize natural physical, chemical and biological treatment processes involving wetland vegetation, soils, and associated microbial assemblages to remove pollutants and improve water quality. CWs are nowadays a well-known technology for wastewater treatment.



About the pilot study

A pilot-scale constructed wetland installation was investigated to assess its ability to remove microplastics from the final effluent of the Wschód WWTP in Gdansk, Poland. The pilot plant was designed as a two-stage hybrid system and consisted of two types of wetland beds that differ in their operating conditions and characteristics: horizontal flow (HFCW) and vertical flow constructed wetland (VFCW). Both beds were planted with the most popular wetland vegetation which is common reed (*Phragmites australis*). To determine MPs removal efficiency, wastewater samples were taken from the influent and effluent of the existing WWTP as well as from the pilot constructed wetland system.

Conclusion

Critical knowledge gaps remain in sources and fate of microplastic pollution in wetland treatment systems. Constructed wetland technology was chosen and tested as a novel method to track and analyse the possible removal and retention of microplastics under the impacts of processes occurring in the wetland matrix. Initial promising results of solids, organic matter and nutrients removal offer the prospect of new satisfactory final results also for microplastics, after the adaptation and development of the tested pilot station.

ABOUT THE REPORT

Subject areas: microplastics removal, constructed wetland, wastewater

Authors: Katarzyna Cur

Publisher: Gdansk Water Utilities

Release year: 2021

Link: <https://www.giwk.pl/badania-i-ekologia/projekt-fanplesstic-sea/>

FANPLESSTIC-SEA

This fact sheet has been produced within FanPLESStic-sea, a project working with preventing and decreasing the pollution of microplastics in the water and the Baltic Sea.

Project period: Jan 2019 - Dec 2021

Total project budget: 3 m. euro

Partners: SALT, GIWK, ECAT, Gdanskie Wody, Aalborg University, Luke, Helcom, Latvijas hidroekologijas institūts, Siauliai CCIC, Luleå tekniska universitet, Sweden Water Research

Read more: www.fanplessticsea.com



EUROPEAN
REGIONAL
DEVELOPMENT
FUND