## Biological Removal of Micropollutant from Chemically Pre-treated Sewage Treatment Plant Effluent – Laboratory tests and Reactor Development

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## Abstract

Over the past few decades, the increasing occurrence of micropollutants in the aquatic environment has been raised threats to the living aquatic organisms and human health. Although many technologies were studied to reduce the release of these compounds, most of these technologies showed its variable efficiency and often insufficient elimination, ranging from zero to significant part of some commonly reported micropollutants.

This study is a part of the project "Development of a method for the extensive elimination of refractory substances from municipal sewage treatment plant effluents" developed by the University of Stuttgart in cooperation with Stengenlun Umwelttechnik GmbH. The combination of an oxidative and a biological treatment for the removal of micropollutants was designed for the project and divided into two phases: laboratory tests and build-up and testing of a pilot. The present study evaluated the performance of three laboratory-scale moving bed bioreactors filled with three different carrier materials for the removal of micropollutants from chemically pre-treated sewage treatment plant effluent.

The MBBRs with the applied conditions showed the significant variations in the elimination of selected compounds, ranging from negavive removals to less than 90%. These fluctuation were observed among each individual compound as well as among different carrier materials used in each MBBR over the studied period. Among three carrierd used in this study, polyphenylene sulfide presented the best result in the physical and chemical resistance while the MBBR filled with polyurethane had the highest removal efficiency of micropollutants. Although, natural bath sponges displayed a strong abrasion and had to be re-filled during the investigation, this carrier is still a promising media for wastewater treatment due to its natural characteristic.