

Title	Biologically Activated Filtration with Activated Carbon at the Paderborn Wastewater Treatment Plant (BAC Paderborn)
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Project partner	Paderborn municipal drainage company DAHLEM Consulting Engineers GmbH & Co. KG
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<p>In recent years, more and more investigations on the occurrence of organic trace substances in municipal wastewater and on its behaviour in the process of biological wastewater treatment have been carried out at national and international level. As advanced treatment steps in municipal wastewater treatment plants, ozonation and activated carbon adsorption were investigated.</p> <p>Biologically activated filtration with activated carbon (BAC) is a novel process approach in municipal wastewater treatment. Ozonation and filtration by means of granulated activated carbon (GAC) are connected in series. An essential feature of this process is the previous oxidative decomposition of large molecules and thus the prevention of the surface adsorption of large molecules as well as the establishment of a biofilm in the GAC-fill. The biofilm allows the biological degradation of adsorptively bound substances. The biological activation takes place through the pre-ozonation of the waste water. First results on a semi-technical scale show that an improvement of the adsorption process and thus a significant extension of the service life of the activated carbon filter can be achieved by pre-ozonation.</p> <p>The project's objective is therefore to test the BAC process on an industrial scale at the Paderborn wastewater treatment plant. For this purpose, an existing waste water filtration will be converted to BAC filtration by pre-treating the incoming wastewater using ozonation and then filtering it via an activated carbon bed. In order to be able to evaluate the various processes for the elimination of trace substances, pure ozonation and GAC filtration will also be investigated separately. The primary objective of the investigation and funding scope is a comprehensive comparison of the ozonation and GAC filtration processes already investigated with the BAC filtration described above and the determination of the</p>	

preferred variant in the event of large-scale implementation at the Paderborn wastewater treatment plant.

The research project is divided into two project phases. The first phase includes the identification of the lead substances and the relevant indirect dischargers as well as the basic determination and planning of the pilot plant. The substance and parameter selection requires a wastewater treatment plant screening with identification of the relevant substances. Project-specific lead substances are defined from this substance pool. The large-scale pilot plants are then dimensioned and built.

The second phase of the project comprises the experimental implementation of the three process technologies (ozonation, GAC filtration, BAC filtration) and the operation of the large-scale plants. Energy and operational aspects as well as the cost structure will be considered. After completion of the project, the three processes will be evaluated with regard to their effectiveness, practicability and economic efficiency