

In-depth investigation of organic compounds in the effluent of the Rya Wastewater Treatment Plant

Removal of organic compounds from wastewater is one of the key objectives of wastewater treatment. The effluent limits for organic matter (measured as BOD) are regulated and treatment plants have to pay fines if the effluent concentrations are too high. The Rya wastewater treatment plant (WWTP) in Gothenburg is facing problem meeting the requirements for BOD concentration in the effluent, especially during the winter season. However, the requirement for the discharge limit on a yearly basis is fulfilled at the Rya WWTP but during the colder winter months the discharge limits are exceeded and improved BOD reduction is needed. The goal of this project is, therefore, to characterize the organic compounds in the effluent and try to identify where they come from and how the treatment efficiency of the plant can be improved. Increased BOD levels can be due to poor biological degradation of organic matter, due to compounds present in the influent that is not degraded or due to release of compounds from the floc matrix. Since the Rya WWTP is rather complex with different recycling streams and filtration of the effluent by disc filtration, the water quality at different points of the treatment plant will be assessed, namely: inflow to the activated sludge; effluent from the secondary settlers; effluent from the post-denitrification and effluent from the disc filters. The investigation should start in January/February when the water temperatures are low.

We will use a suite of analytical methods to characterize the organic compounds. This includes measurements of BOD and total organic carbon, as well as more advanced analytical techniques such as high-performance liquid chromatography and fluorometry. The thesis student will learn these techniques together with senior researchers at Chalmers.

The project will be carried out in collaboration with Gryaab AB, the company running the Rya WWTP. Sampling will be done at the treatment plant; however, most of the analytical work will be carried out in the Environmental Chemistry Lab at the department of Civil and Environmental Engineering, Chalmers. The student will also analyse the process performance at the plant by assessing process data, hence getting an opportunity to learn how a large wastewater treatment plant works.

This project can be done by one or two students working together.

If you are interested in this master thesis topic, contact Britt-Marie Wilén or Oskar Modin.

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