

Reduce greenhouse gas emissions from Swedish wastewater and sewage sludge management

Minska utsläppen av växthusgaser från svensk hanteringen av avloppsvatten och avloppsslam



Collaboration partners

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Summary

Greenhouse gas emissions are an increased concern within all sectors of society. Treating wastewater is essentially positive for the environment but it has also an impact on the environment due to the resource demand and emissions along the process chain.

In this project we study the greenhouse gas emissions from three defined steps, reject water treatment and storage, and spreading of sludge, in the wastewater and sludge management chain. The greenhouse gases considered are nitrous oxide (N_2O) and methane (CH_4), which has a greenhouse warming potentials 298 and 25 times stronger than carbon dioxide (CO_2), respectively. The aim is to provide new knowledge on the greenhouse gas emissions from wastewater and sludge processes, and to provide good decision support on suitable combinations and operation for these processes as part of the wastewater management.

Description

Nitrous oxide (N₂O) and methane (CH₄) emissions will be measured at/during:

- A. The Anammox technology, a new resource efficient technology for removing nitrogen from reject water. The influence of process parameters will be studied and the process compared with Sequenced Batch Reactor process.
- B. Storage of sludge for one year, which probably will be a minimum hygienisation requirement before spreading it on arable land. Measurements have shown that sludge storage can give large N₂O emissions. Influence of covering/not covering the storage and sanitizing/not sanitizing the sludge will be studied.
- C. Different spreading strategies on GHG emissions for two types of sludge will be studied.

In addition to the direct gaseous emissions, the Wastewater Treatment System (WWTS) also causes other environmental impact from e.g. energy and material use, and naturally from water emissions. To provide a good decision support for suitable process operation and combinations, the GHG emissions measured will be integrated with existing data on emissions and resource use in a system analysis over the whole WWTS.

Goal

The objectives of the project are:

- 1) to provide new knowledge on the greenhouse gas (GHG) emissions from wastewater and sludge processes, and
- 2) to provide good decision support on suitable combinations and operation for such processes to minimize GHG emissions.

Expected benefit

Decreased greenhouse gas emissions from the treatment of wastewater, and especially from the treatment of reject water and the handling of the sewage sludge.

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