

## Research Stays 2019

### Modelling of aerobic granular sludge for the treatment of industrial saline wastewater

August 1<sup>st</sup>, 2019 | October 31<sup>st</sup>, 2019

#### Objectives

The objective of the research stay was the development of a 1-D biofilm model to describe the operation of an aerobic granular sequencing batch reactor treating industrial saline wastewater.

#### Methodology

The operational conditions used as reference scenario to calibrate and validate the model corresponded to the operation of a laboratory-scale reactor treating industrial saline wastewater. The selected bioconversion model was the Activated Sludge Model no. 3 (ASM3). It was implemented in the biofilm modelling software AQUASIM.

#### Results

The experimental profile of COD consumption was well-described with the kinetic parameter values from ASM3. However, the kinetic parameters of autotrophic bacteria needed to be calibrated to fit the experimental data. The calibrated value of the maximum growth rate was low compared to other research works with the same model. This was due to the presence of salt and the high retention times of the sludge in the reactor. These conditions lead to the selection of slow-growing autotrophic bacteria, characterised by low values of the kinetic parameters (low maximum growth rate and half-saturation constant). The model was able to reproduce the performance of the system and the results agree with the experimental data.

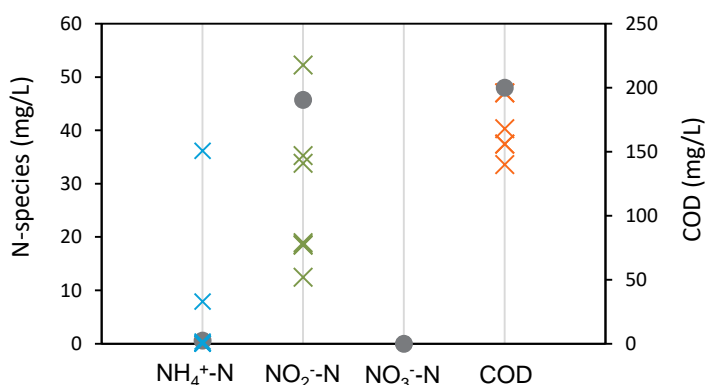


Figure 1: comparison of the effluent concentrations of the different compounds obtained with the model (●) and the experimental data (x)

#### Highlights

The combination of high salt concentrations and high sludge retention times lead to the selection of slow-growing autotrophic bacteria, which present lower values of the kinetic parameters. The high salinity has not a big impact in the heterotrophic activity.

#### Researcher

Paula Carrera Fernández



Group of Environmental Biotechnology (BioGroup)

University of Santiago de Compostela, Spain

Tutor: Anuska Mosquera Corral



#### Host Institution

Department of Green Chemistry and Technology

Ghent University

Tutor: Prof. Eveline Volcke



#### Contact Network details

##### Coordinator of CRETUS

Juan M. Lema  
Professor of Chemical Engineering  
Univ. Santiago de Compostela, Spain  
[juan.lema@usc.es](mailto:juan.lema@usc.es)

##### Research stays Coordinator

Carmen García Jares  
Assoc. Prof. in Analytical Chemistry  
Univ. Santiago de Compostela, Spain  
[carmen.garcia.jares@usc.es](mailto:carmen.garcia.jares@usc.es)