

# REGATA

## Rede Galega de Tratamento de Augas

### Research Stays 2015

## Environmental benefits of nutrient removal via nitrite from sludge reject water in a full scale WWTP

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### Objectives

The present study aims to quantify the environmental benefits resulting from the application of nitrification/denitrification and enhanced biological phosphorus removal via nitrite for the separate treatment of sludge reject water before it is recirculated back to the inlet of the WWTP

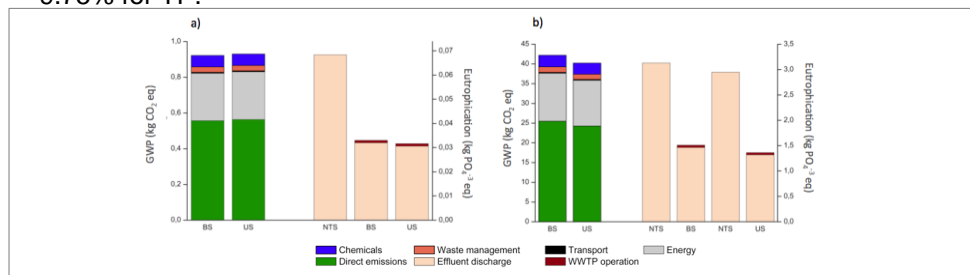
### Methodology

A Greek WWTP serving 117,000 p.e was selected as case study. The baseline scenario (BS) was defined as the current operation of the plant. The upgraded scenario (US) consisted of the implementation of a SBR for the treatment of reject water by nitrification/denitrification.

- Life cycle assessment approach was used to conduct the environmental evaluation of the proposed scenarios. Global warming potential and Eutrophication were considered the main environmental hotspots for the WWTP.
- Two functional units (FU) were used for the environmental evaluation: 1 m<sup>3</sup> and 1 kg of PO<sub>4</sub><sup>-3</sup> eq removed.

### Results

In the BS the sludge reject water (5.6 % of the total wastewater flow) recirculated to the biological reactor means an increase of the nutrient load of 20.91% for TN and 9.75% for TP.



Regarding the US the reject water recirculation only caused an increase of 6.9% and 5.6% for the TN and TP loads. In terms of GWP, no drawbacks were observed in the US, and when 1 kg of PO<sub>4</sub><sup>-3</sup> eq removed was considered as FU, the plant shows better performance.

### Highlights

The better performance of the US increased the removal rates of TN and TP from 80% to 85% and from 20% to 22% respectively. In addition, the US was demonstrated to be more environmentally friendly in terms of GWP and EP when a function related FU was used. A 9.7% reduction in terms of EP was achieved with the novel configuration.

### Researcher

Yago Lorenzo Toja



Group of Environmental Engineering and Bioprocesses (Biogroup)

University of Santiago de Compostela

Responsible: Prof. Juan M. Lema

### Host Institution

Department of Mechanical, Aerospace and Civil Engineering

University of Brunel

Responsible: Prof. Evina Katsou



### Contact Network details

Chair of the Network REGATA

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

Research stays Coordinator

M<sup>a</sup>. Ángeles Sanroman Braga  
Professor of Chemical Engineering.  
University of Vigo, Spain.  
[sanroman@uvigo.es](mailto:sanroman@uvigo.es)

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