

Accepted Manuscript

Performance and microbial community structure of a Polar Arctic Circle aerobic granular sludge system operating at low temperature

Alejandro Gonzalez-Martinez, Barbara Muñoz-Palazon, Paula Maza-Márquez, Alejandro Rodriguez-Sanchez, Jesus Gonzalez-Lopez, Riku Vahala

PII: S0960-8524(18)30169-X
DOI: <https://doi.org/10.1016/j.biortech.2018.01.147>
Reference: BITE 19504

To appear in: *Bioresource Technology*

Received Date: 21 December 2017
Revised Date: 30 January 2018
Accepted Date: 31 January 2018

Please cite this article as: Gonzalez-Martinez, A., Muñoz-Palazon, B., Maza-Márquez, P., Rodriguez-Sanchez, A., Gonzalez-Lopez, J., Vahala, R., Performance and microbial community structure of a Polar Arctic Circle aerobic granular sludge system operating at low temperature, *Bioresource Technology* (2018), doi: <https://doi.org/10.1016/j.biortech.2018.01.147>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Performance and microbial community structure of a Polar Arctic Circle aerobic granular sludge system operating at low temperature

Alejandro Gonzalez-Martinez^{a*}, Barbara Muñoz-Palazon^b, Paula Maza-Márquez^b, Alejandro Rodriguez-Sanchez^b, Jesus Gonzalez-Lopez^b, Riku Vahala^a,

^a: Department of Built Environment, School of Engineering, Aalto University, P.O. Box 15200, Aalto, FI-00076 Espoo, Finland.

^b: Institute of Water Research, University of Granada, Ramón y Cajal, 4, 18071 Granada, Spain.

* Corresponding author: Alejandro Gonzalez-Martinez, Department of Built Environment, Aalto University, P.O. Box 15200, Aalto, FI-00076 Espoo, Finland; E-mail: alejandro.gonzalezmartinez@aalto.fi

Highlights

- Granular sludge bioreactor was acclimated from 7 °C to 3 °C.
- The system at 5°C achieved high nitrogen, phosphate and Carbon removal performance
- Granular biomass were washed out at 3 °C of operation.
- Dominant bacterial phylotypes were related to *Zoogloea*, *Arcobacter* and *Acinetobacter*.
- SM1K20 and *Trichosporon domesticum* were firstly reported in aerobic granules.

Abstract

The aim of this work was to study the performance and microbial community structure of a Polar Arctic Circle aerobic granular sludge (AGS) system operating at low temperature. Thus, an AGS bioreactor was operated at 7, 5 and 3°C of temperature using a cold-adapted sludge from Lapland. At 5°C, it yielded acceptable conversion rates, in terms of nitrogen, phosphorous, and organic matter. However, under 3°C a negligible nitrogen and phosphorous removal performance was observed. Below 5°C, scanning electron microscopy studies showed a wispy, non-dense and irregular granular structure with a strong outgrowth of filamentous. Moreover, Illumina next-generation sequencing showed a heterogeneous microbial population where SM1K20 (*Archaea*), *Trichosporon domesticum* (*Fungus*), and *Zoogloea*, *Arcobacter* and *Acinetobacter* (*Bacteria*) were the dominant phylotypes. Our study suggests that AGS

Download English Version:

<https://daneshyari.com/en/article/7067802>

Download Persian Version:

<https://daneshyari.com/article/7067802>

[Daneshyari.com](https://daneshyari.com)