

Understanding the role of *Tetrasphaera* in enhanced biological phosphorus removal

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 \blacktriangleright To gain knowledge on the new PAO genus *Tetrasphaera* by obtaining an enriched culture at lab-scale

>Two reactor configurations:

Sequencing batch reactor



>Continuous pilot plant system with A²/O configuration











Results: Batch experiments with the SBR sludge

PHA & Glycogen quantification





Results: Batch experiment with the A^2/O sludge

PHA & Glycogen quantification



Results: Comparison between configurations

Anaerobic PHA and glycogen production

mmol C/g VSS	SBR	A ² /O
COD consumed	3.436	8.87
PHA	0.692	0.621
Glycogen	0.476	0.066
Total=PHA + Glycogen	1.168	0.687
Carbon recovery ratio	0.34	0.08

Results: Literature comparison

Study		P _{rel} /C _{upt} (mol P/mol C)	PHA _{prod} /C _{upt} (mol C/mol C)	Glyc _{prod} /C _{upt} (mol C/mol C)
Enriched PAO	Kapagiannidis et al. (2013)	0.64	1.10	Consumption (-0.41)
	Tayà et al. (2013)	0.34	1.47	Consumption (-0.49)
This study	SBR	0.27	0.20	0.14
	A ² /O	0.21	0.07	0.01

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Bresults: Bacterial community assessment

	PAOMix	GAOMix	Tetrasphaera
SBR	36 ± 1%	21 ± 1%	43 ± 9%
A²/O plant	26 ± 4%	1 ± 1%	66 ± 5%

Why do we detect the presence of PAO and GAO if we fed the reactor with glutamate for more than 400 days?

We are still operating the A²/O pilot plant with glutamate

We are working with this enriched-*tetrasphaera* culture in order to better understanding this new PAO genus

We will perform batch assays with different carbon sources and different electron acceptors

We are waiting for the pyrosequencing results

- Successful enrichment of sludge in *Tetrasphaera* using glutamate as sole carbon source was obtained for the first time.
- Better results and more stability was achieved with continuous pilot plant with respect to SBR.
- Fermentation products of glutamate did not allow to obtain a highly *Tetrasphaera*-enriched culture.
- The increase of PHA and glycogen during the anaerobic phase only accounted a small percentage of the carbon source consumed.
- Other storage routes should be studied to identify the fate of the carbon source stored under anaerobic conditions.

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