



Aalborg Universitet

AALBORG UNIVERSITY
DENMARK

Dechloromonas: to be or not to be a PAO? That is the question!

Petriglieri, Francesca; Singleton, Caitlin Margaret; Gomez, Miriam Peces; Petersen, Jette Fischer; Nierychlo, Marta Anna; Nielsen, Per Halkjær

Publication date:
2019

[Link to publication from Aalborg University](#)

Citation for published version (APA):

Petriglieri, F., Singleton, C. M., Gomez, M. P., Petersen, J. F., Nierychlo, M. A., & Nielsen, P. H. (2019). *Dechloromonas: to be or not to be a PAO? That is the question!*. Poster presented at 8th IWA Microbial Ecology and Water Engineering Specialist Conference, Hiroshima, Japan.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- ? Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- ? You may not further distribute the material or use it for any profit-making activity or commercial gain
- ? You may freely distribute the URL identifying the publication in the public portal ?

Take down policy

If you believe that this document breaches copyright please contact us at vbn@aub.aau.dk providing details, and we will remove access to the work immediately and investigate your claim.

Dechloromonas: to be or not to be a PAO?

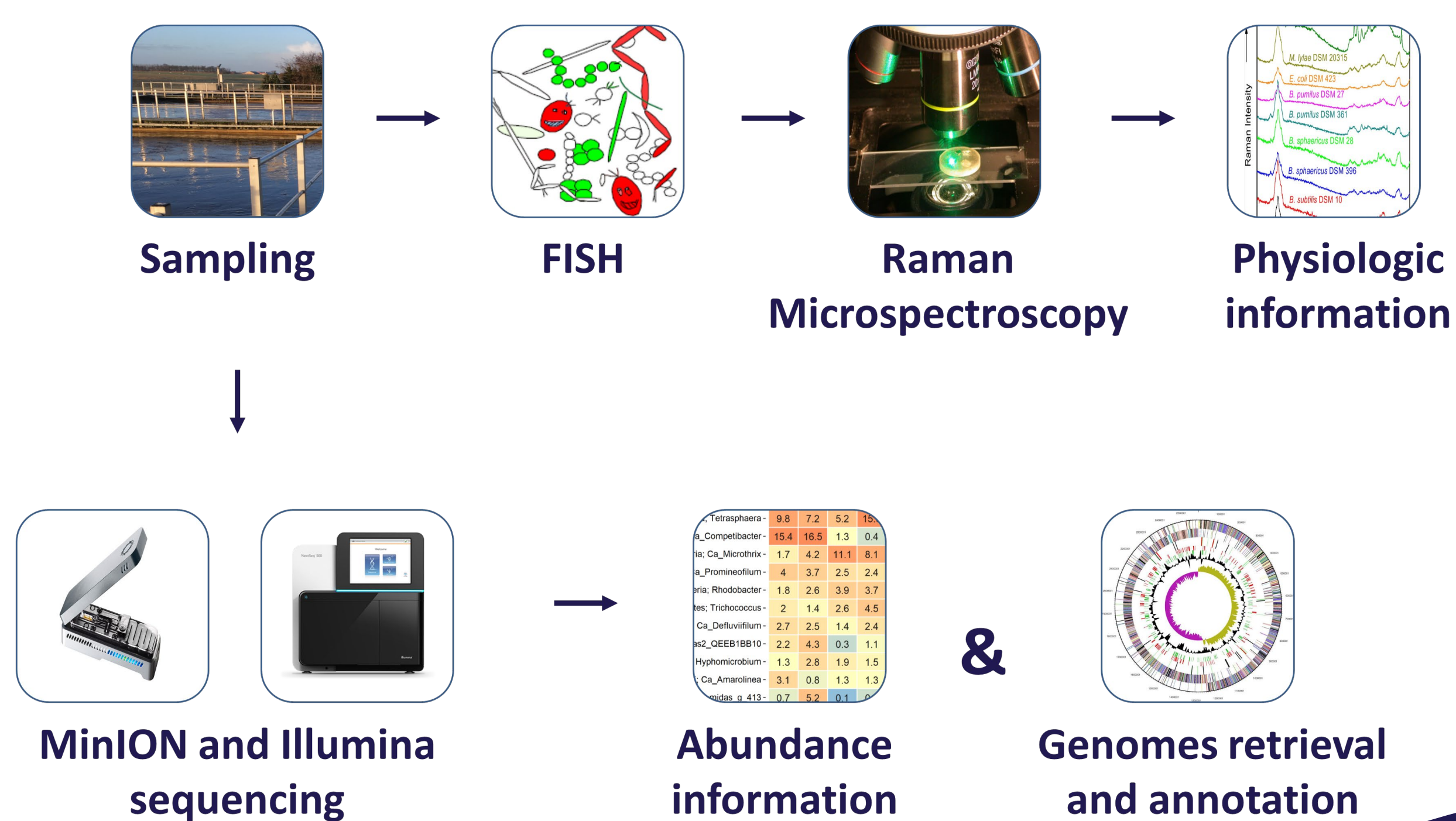
That is the question!

Francesca Petriglieri, Caitlin Singleton, Miriam Gomez, Jette. F. Petersen, Marta Nierychlo, Per. H. Nielsen
Center for Microbial Communities, Aalborg University, Denmark



Background and Methods

EBPR (Enhanced Biological Phosphorus Removal) is a biotechnological process that relies on the ability of certain microorganisms, called **PAO** (polyphosphate accumulating organisms), to store phosphate intracellularly. Members of the genus *Dechloromonas* are often abundant in EBPR plants worldwide and have long been considered putative PAOs, as **intracellular poly-P** has been identified with traditional staining methods. The **aim of this study** was to determine its metabolic potential, to verify it and define the levels and dynamics of important storage polymers using **metagenomics** and **FISH-Raman** microspectroscopy.

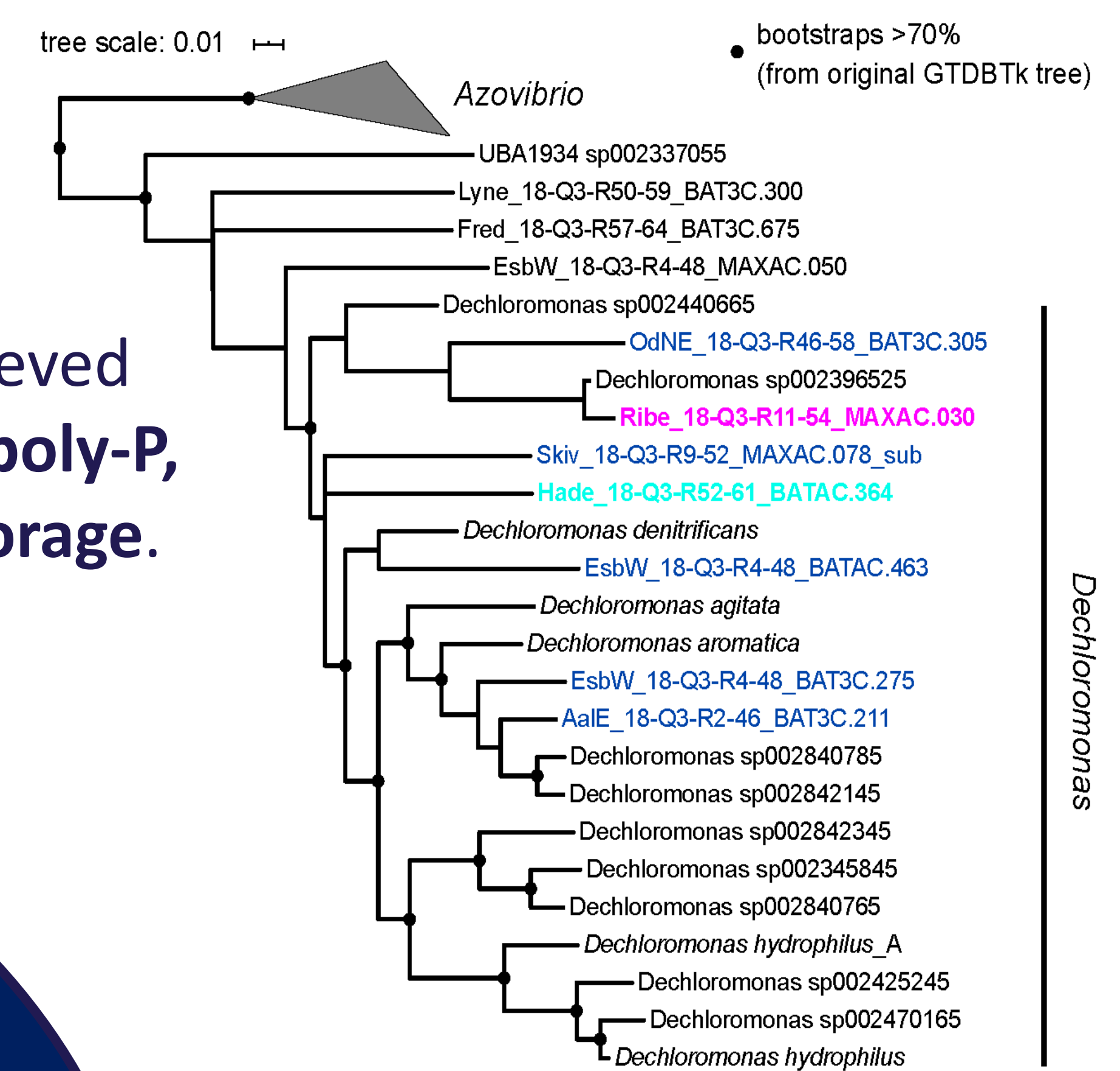


Abundance and metabolic potential

	Avedøre	Bjergmarken	Bjerringbro	Boeslum	CP Kelco	Damhusåen	Egå	Ejby Mølle	Esbjerg E	Esbjerg W	Fonæs	Fredericia	Haderslev	Hirtshals	Hjørring	Horsens	Kalundborg	Kerteminde	Kolding	Lundtofte	Lynetten	Marngårdfjord	Marselisborg	Middelfart	Merke	Odense NE	Odense NW	Randers	Ribe	Ringkøbing	Skejve	Søholt	Viborg	Viby	Aabenraa	Aby	Aalborg E	Aalborg W	Aars
Tetrasphaera	6.6	9.5	5.2	4.4	0.2	3.9	9.4	15	8	12.8	7.4	9.6	3.7	14.8	12.7	21.8	0.1	2.2	9.8	10.1	4.3	5.1	14.8	3.6	7.7	5.7	1.8	7.3	6.9	13.6	8.3	3.9	6.3	5.3	9.5	15.5	4.4	6.1	22.8
Dechloromonas	2.7	2.3	1.8	1.8	0.1	1.7	2.7	2.0	1.3	2.5	0.8	0.6	0.9	1.3	7.3	1.1	0.2	0.3	1.6	3.3	1.9	0.6	0.3	0.6	0.9	1	2.1	2.6	1.7	2.2	0.5	4.2	0.8	2.8	0.5	2	3.4	0.2	
Ca_Accumulibacter	0.5	1.2	0.4	1	0	0.9	1.1	0.8	0.6	0.9	0.4	0.8	0.6	0.6	1	0.1	0.3	0.5	0.4	0.3	0.4	1.6	0.3	0.5	0.2	1.5	1	0.3	1.4	0.9	1.1	0.4	0.7	0.4	1.1	0.6	1.1	0.5	0.1
Tessaracoccus	0.1	0.3	0.3	0.5	0	0.4	0.5	0.2	0.1	0.5	0.8	2.3	0.5	0.2	0.2	0.3	0.3	0.1	0.7	0.6	0.3	0.1	0.2	2.6	0.7	0.6	0.4	0.6	0.4	0.2	0.2	0.3	0.8	0.2	0.5	0.5	0.5	0.7	0.1
Ca_Obscuribacter	0.1	0.1	0	0.1	0	0.2	0.1	0.1	0.1	0.1	0	0.1	0.1	0.1	0.1	0	0	0	0	0.3	0.2	0	0	0	0.1	0.1	0.1	0.1	0.2	0	0.1	0.1	0.1	0	0.1	0.1	0.1		

Dechloromonas is the **second** most abundant PAO in Danish plants, reaching up to **40%** of the biomass.

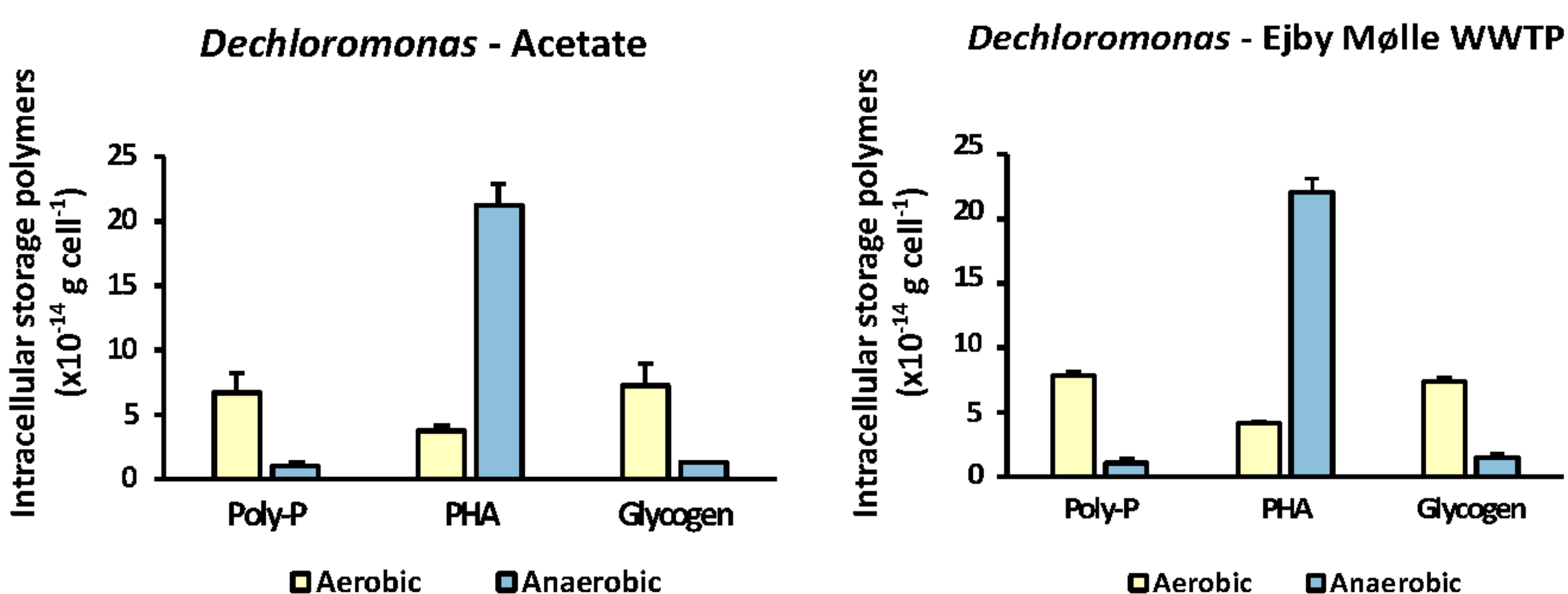
The 7 genomes retrieved showed potential for **poly-P**, **PHA** and **glycogen** storage.



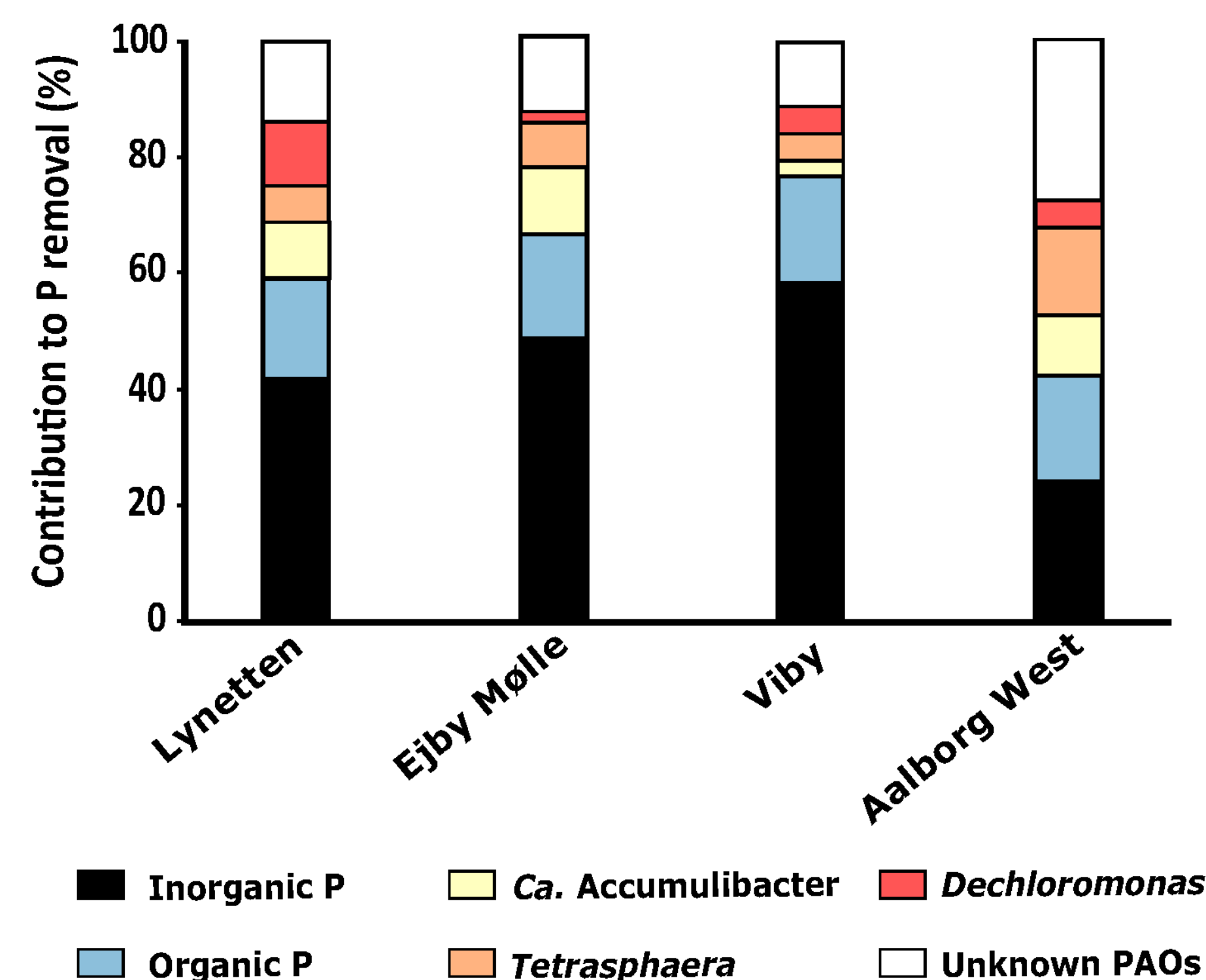
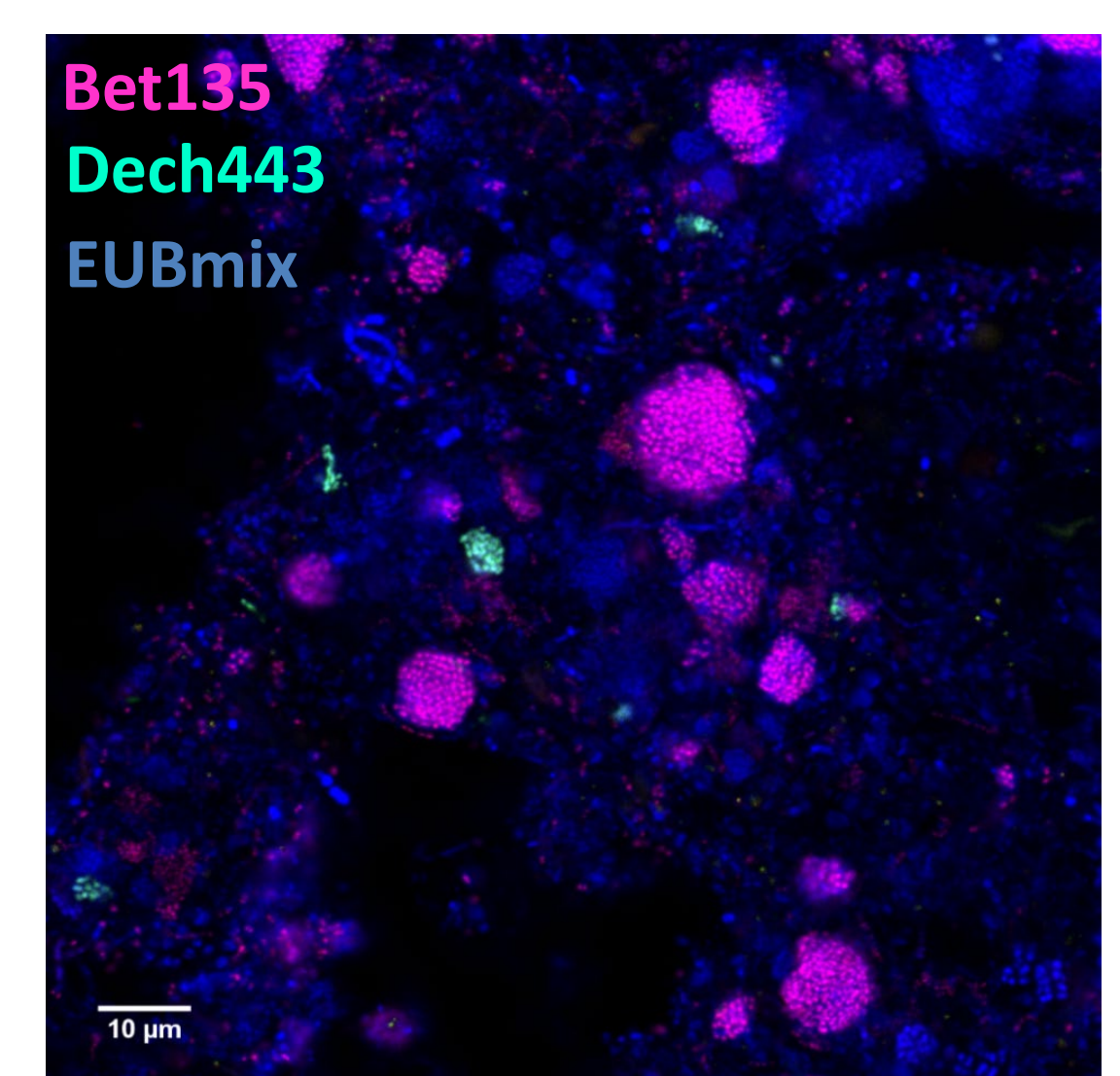
NOW WE KNOW IT!
Dechloromonas is an important PAO in full-scale EBPR WWTPs.

Dechloromonas in lab-scale P release experiments

The presence and dynamic behaviour of intracellular storage polymers was confirmed by **FISH-Raman** in *Dechloromonas* cells during P-release experiments, with mixed biomass from lab-enrichment and full-scale sludge.



Dechloromonas in full-scale WWTPs



The genus *Dechloromonas* plays an **important** role in P removal in full-scale EBPR plants.

