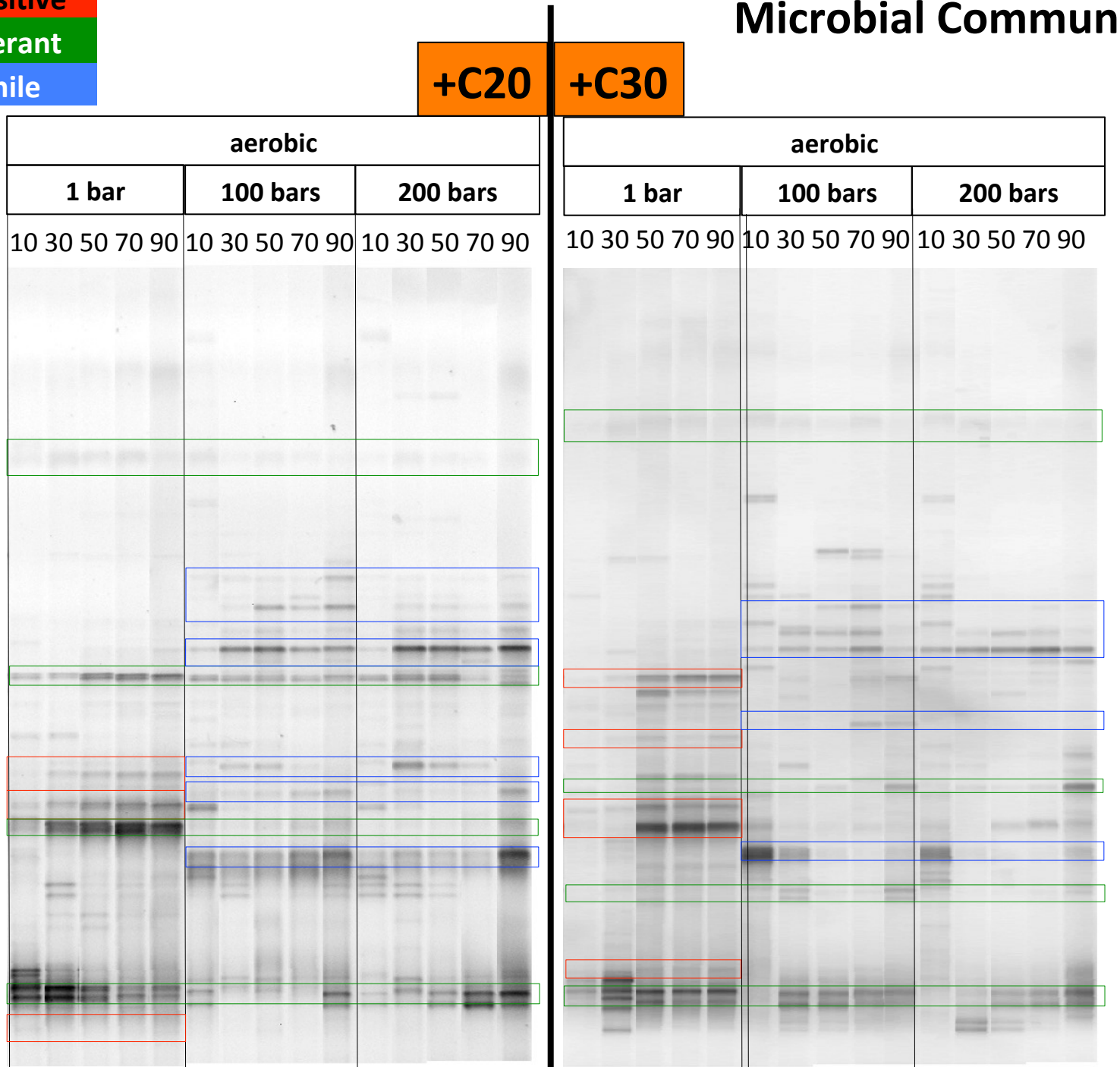
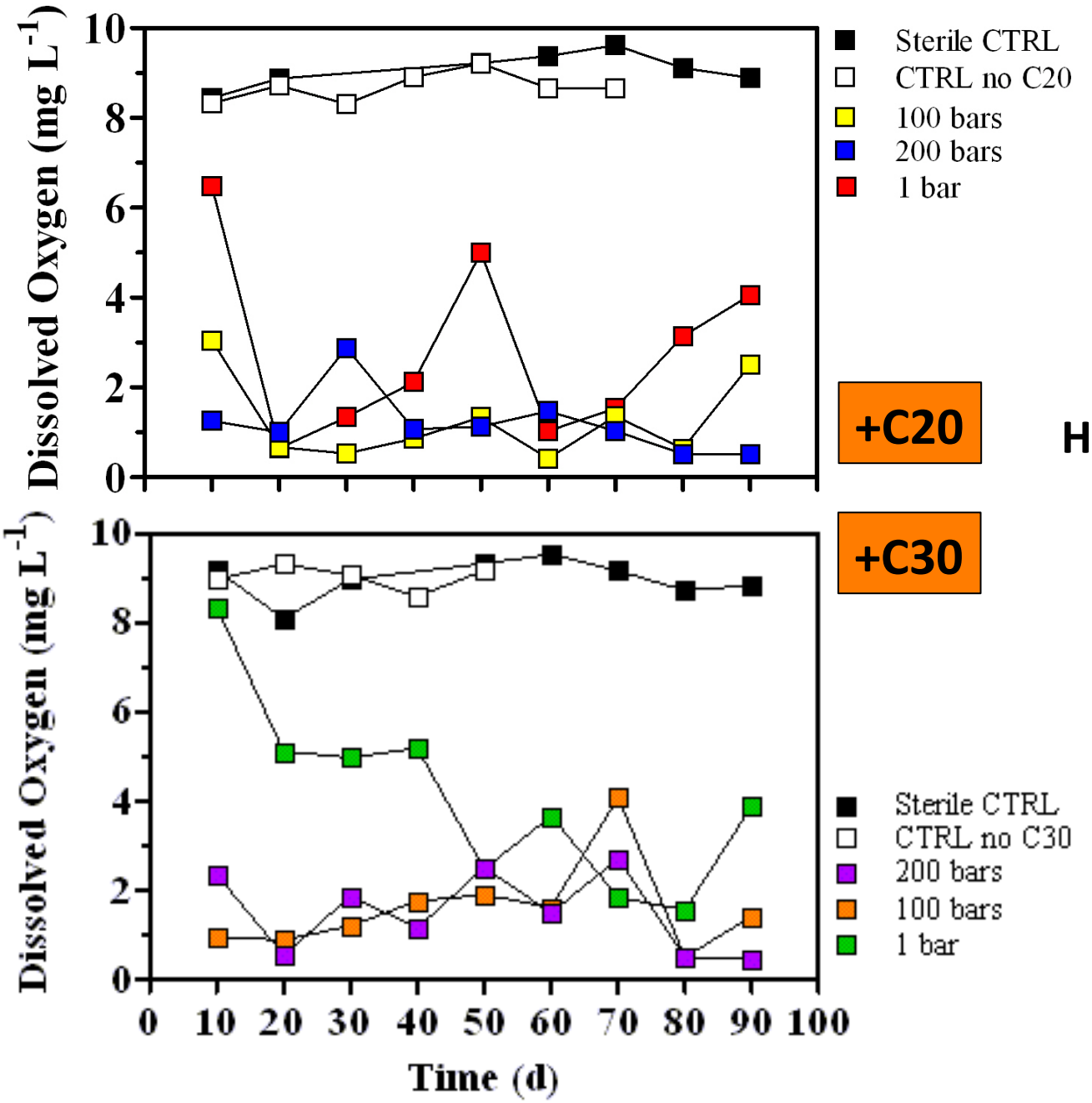
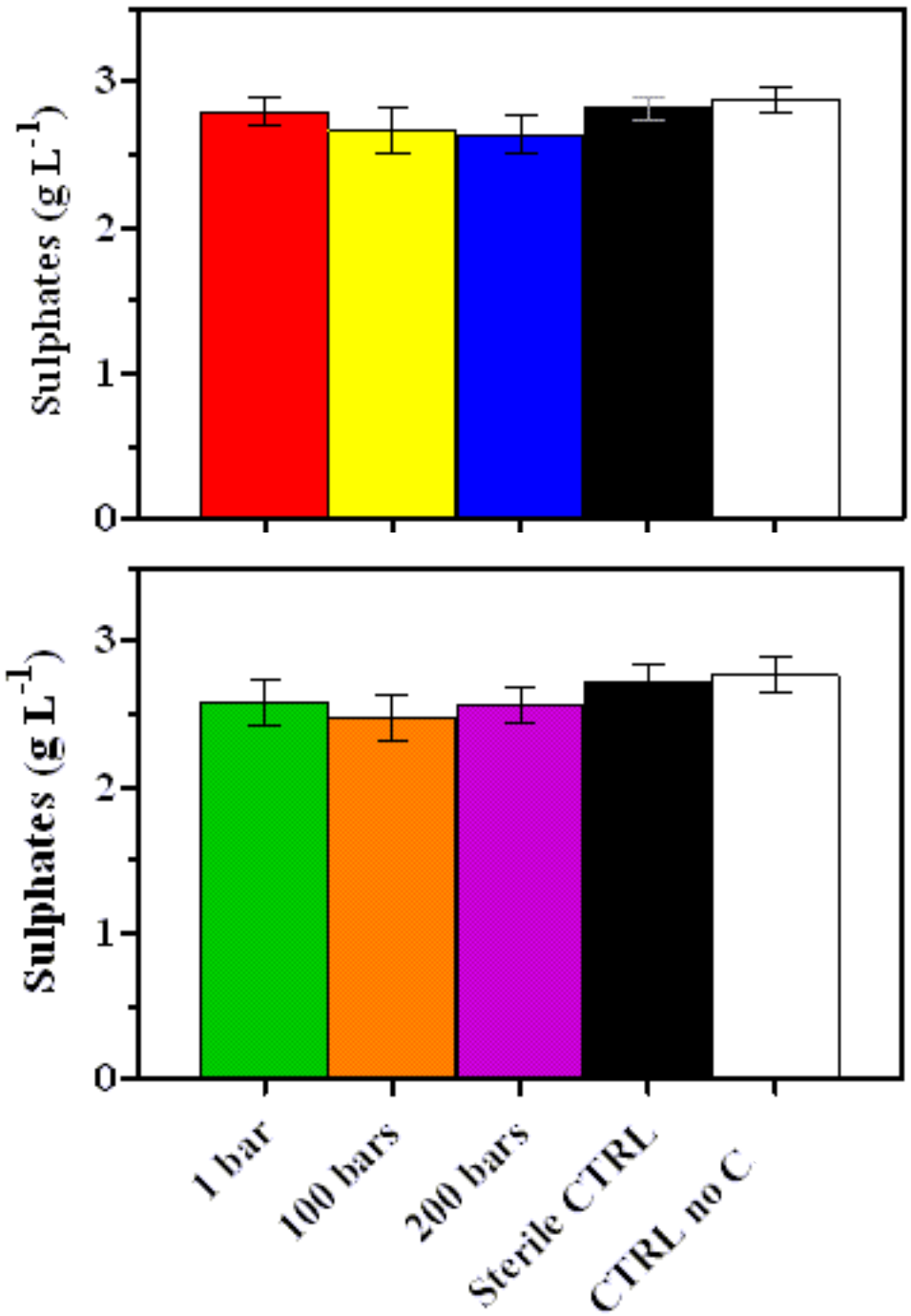
Microbial Community Shift

Piezosensitive
Piezotolerant
Piezophile



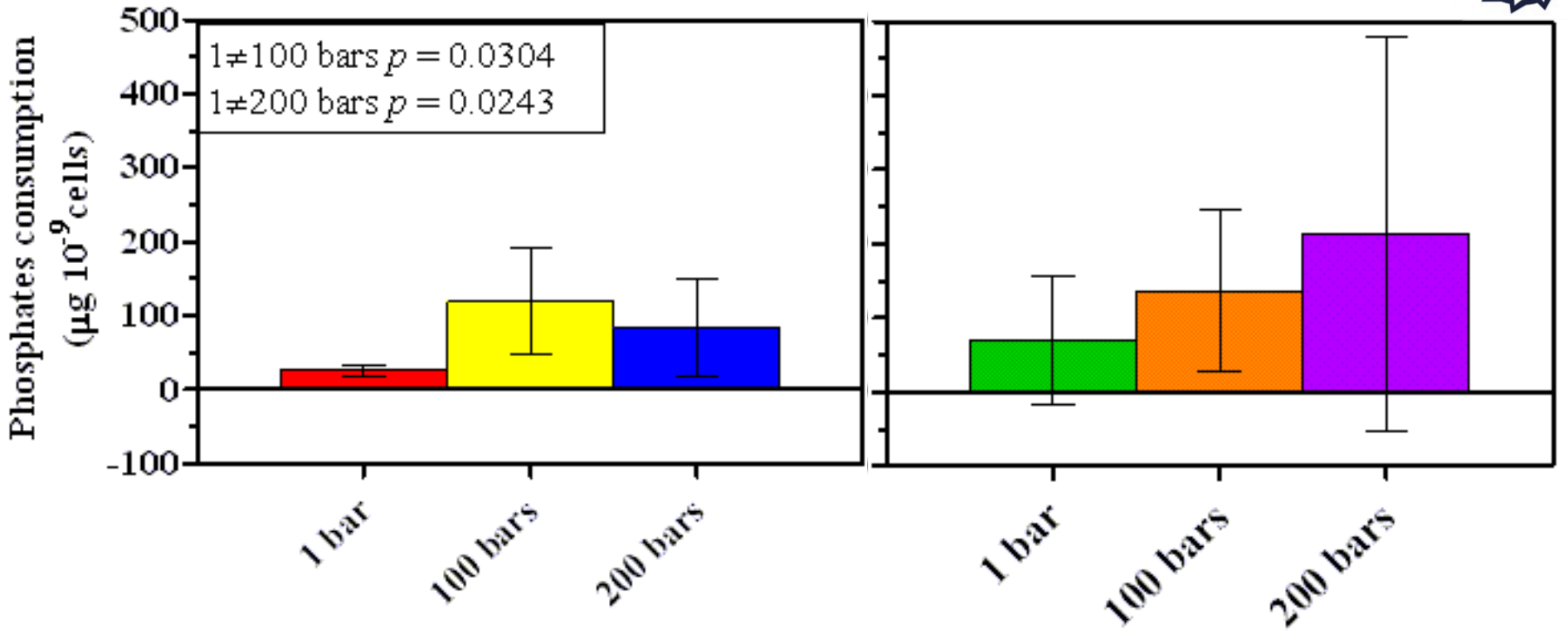


High respiration rate in all conditions



SO_4^{2-} consumption is not statistically significant

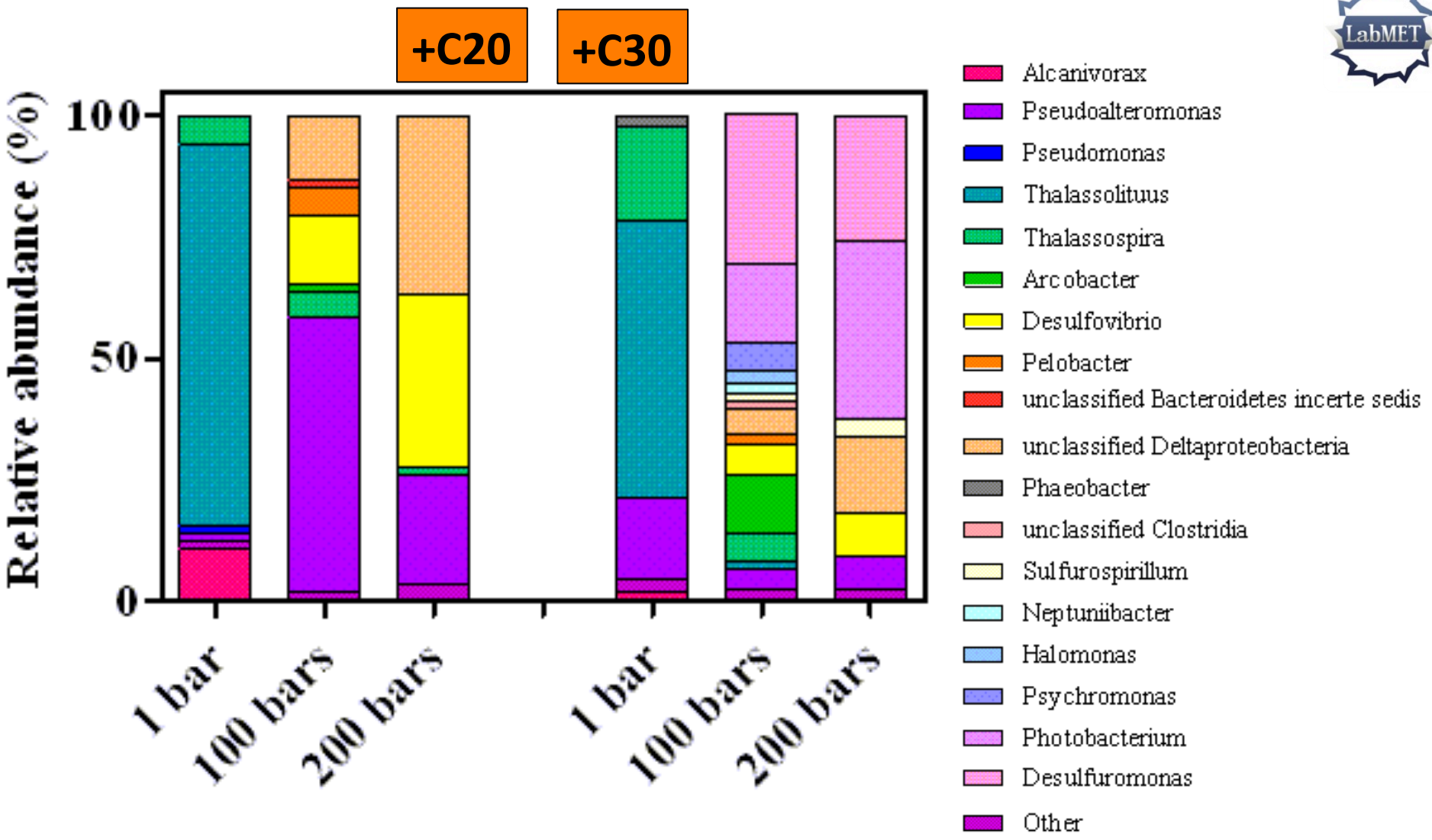
+C20 +C30



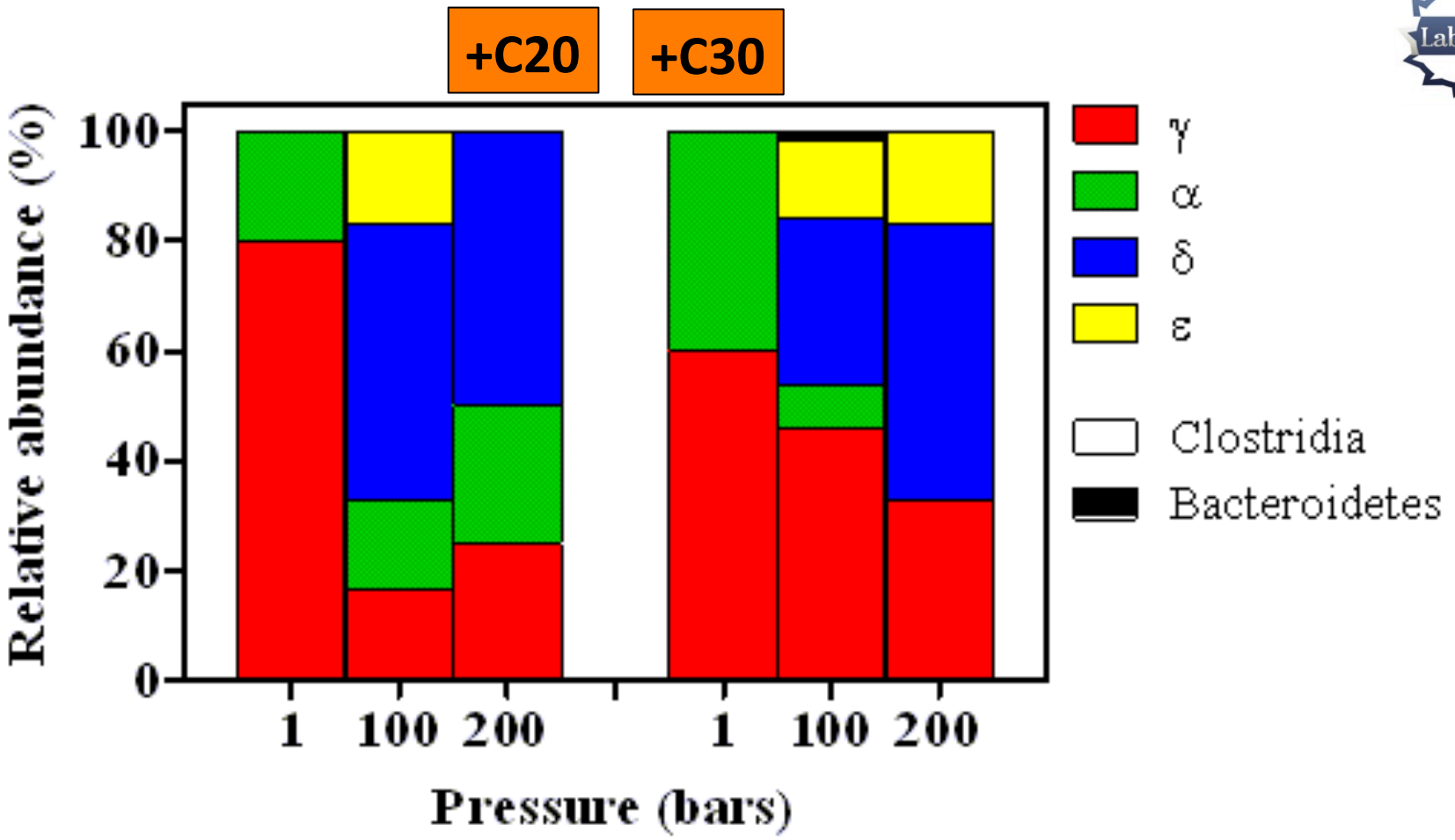
PO_4^{3-} consumption C30 > C20

PO_4^{3-} consumption with C20 100/200 bars > 1 bar

Inoculum	Depth	Sediment Layer	pH	Cl^-	NO_2^-	NO_3^-	PO_4^{3-}	SO_4^{2-}
	meters	cm		g L^{-1}		mg L^{-1}		
inoculum C20	955	0-2	7.73	16.2	n.d.	5	n.d.	1.19
inoculum C30	960	0-2	7.94	16.0	n.d.	5	n.d.	1.16



Microbial community structures differ but the main genera involved are common



γ- and α Proteobacteria dominate at 1 bar
δ- and ε Proteobacteria grow under high pressure

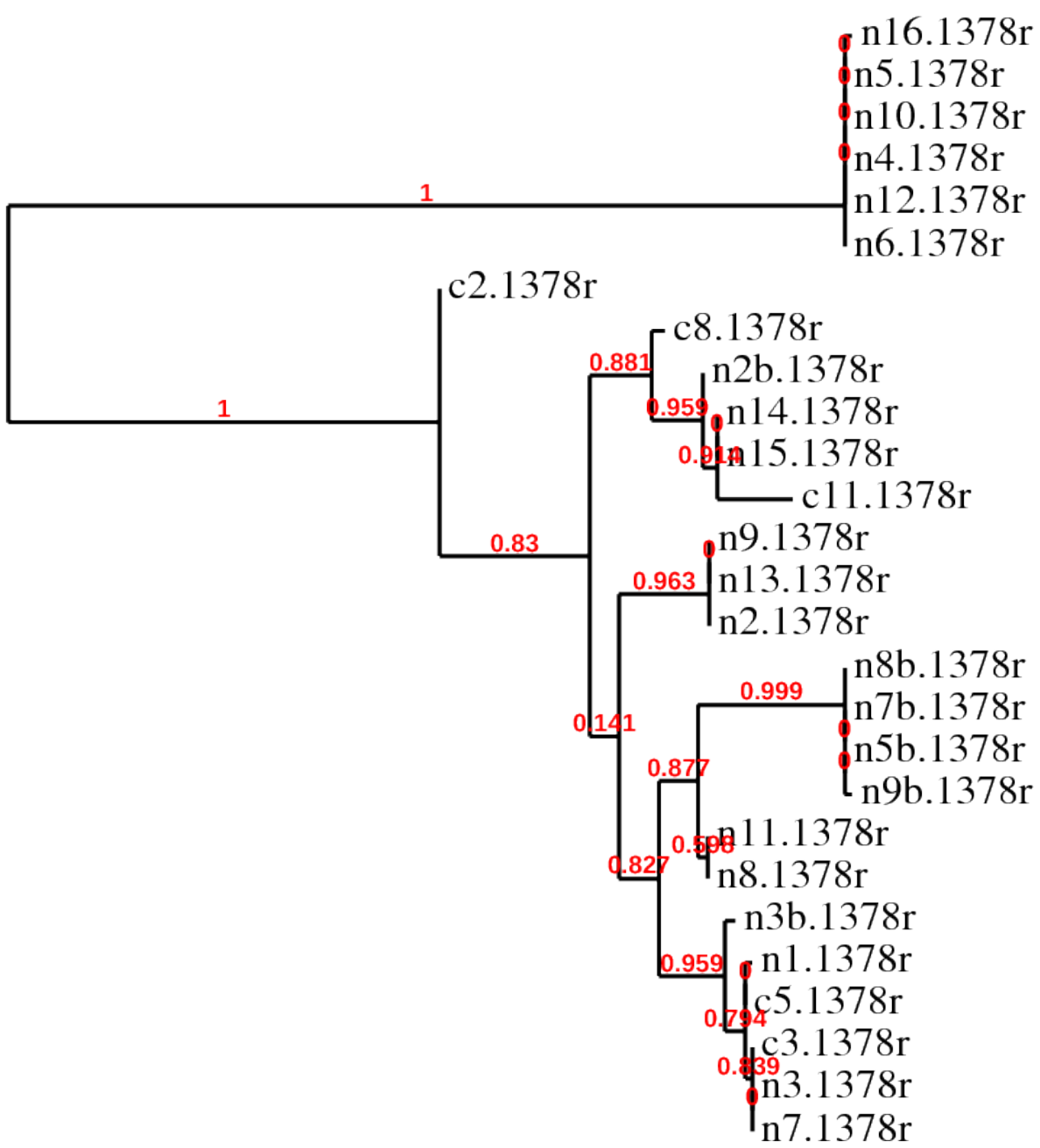
C20	%	Pressure	C30	%
Thalassolituus	78.6	1 bar	*Thalassolituus*	56.8
Alcanivorax	10.5		*Thalassospira*	19.7
Thalassospira	6.1		*Pseudoalteromonas*	16.7
Pseudoalteromonas	1.6		*Phaeobacter*	2.2
Pseudomonas	1.3		*Alcanivorax*	2.0
Other	1.9		Other	2.6
Pseudoalteromonas	56.1	100 bars	*Desulfuromonas*	30.8
Desulfovibrio	14.0		*Photobacterium*	16.1
unclassified *Deltaproteobacteria*	13.4		*Arcobacter*	11.9
Pelobacter	5.8		*Desulfovibrio*	6.3
Thalassospira	5.5		*Thalassospira*	6.1
Arcobacter	1.8		*Psychromonas*	6.0
unclassified *Bacteroidetes incertae sedis*	1.3		unclassified *Deltaproteobacteria*	5.6
Other	2.1		*Pseudoalteromonas*	4.4
			Halomonas	2.6
			Pelobacter	2.0
			Neptuniibacter	1.9
			Sulfurospirillum	1.8
			Thalassolituus	1.3
			unclassified *Clostridia*	1.3
			Other	2.2
unclassified *Deltaproteobacteria*	36.5	200 bars	*Photobacterium*	36.7
Desulfovibrio	35.9		*Desulfuromonas*	26.0
Pseudoalteromonas	22.9		unclassified *Deltaproteobacteria*	15.8
Thalassospira	1.4		*Desulfovibrio*	9.2
Other	3.2		*Pseudoalteromonas*	6.4
			Sulfurospirillum	3.3
			Other	2.6

Conclusions

Culture	Strains/Genus	Pressure (bars)	Hydrocarbon	Reference
Mixed	*Aeromonas* *Pseudomonas* *Vibrio spp.*	~500	C16	Schwarz *et al.*, 1974; 1975
Axenic	*Marinobacter hydrocarbonoclasticus*	~350	C16	Grossi *et al.*, 2010
Axenic	*Rhodococcus qingshengii* TUHH-1	up to 120	C16, naphthalene	Schedler *et al.*, 2014
Axenic	*Sphingobium yanoikuyae B1*	up to 120		

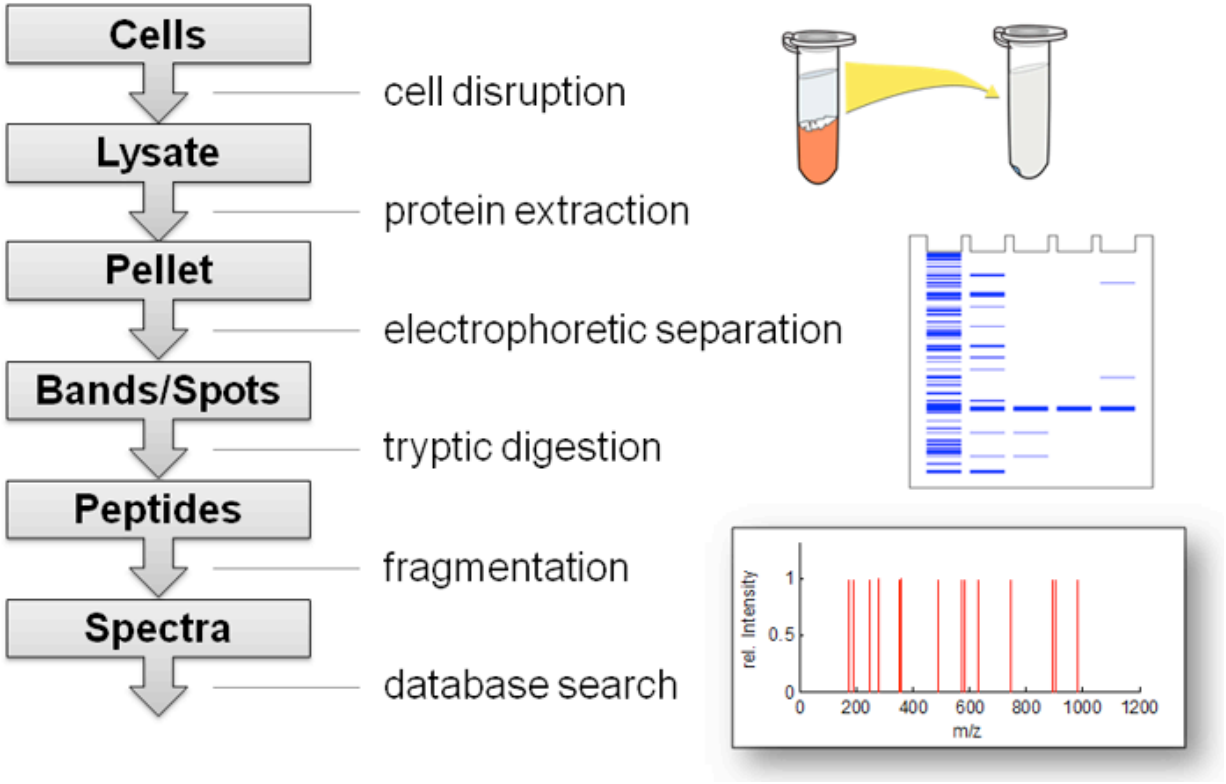
- **Which are the dominant bacteria?**

Desulfovibrio, Desulfuromonas, Photobacterium,
unclassified *Deltaproteobactierium, Sulforospirillum*



Work in progress… (1)
Isolation

Work in progress… (2)
Metaproteomics



OTTO VON GUERICKE UNIVERSITÄT MAGDEBURG

Bioprocess Engineering
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Prof. Benndorf



Dr. Heyer

Deep-sea microbial community shifts in high pressure reactors supplied with solid alkanes (C20 or C30)

Scoma Alberto, Rifai Ridwan, Pini Emma, Hernandez-Sanabria Emma, Kerckhof Frederiek – Maarten and Boon Nico



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