

Electronic Supplementary Information

Decarburization, denitrification characteristics and microbial community analysis of full-scale two-stage anoxic-oxic process for treating refractory coking wastewater

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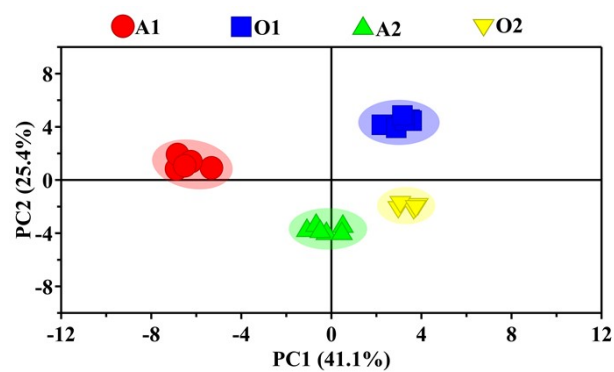


Fig. S1 PCA score plot constructed from the relative abundance of microorganisms in different biological reaction tanks of two-stage A/O process.

Table S1 The relative parameters of main structures in the full-scale two-stage A/O process for treating coking wastewater.

Main structures	Effective volume (m ³)	Hydraulic retention time (h)
Regulation tank	7200	48
Anoxic tank 1 (A1)	4800	32
Oxic tank 1 (O1)	9000	60
Sedimentation tank 1 (S1)	2400	16
Anoxic tank 2 (A2)	1950	13
Oxic tank 2 (O2)	2100	14
Sedimentation tank 2 (S2)	900	6

Table S2 Determination of differential microorganisms by pairwise comparisons of microbial communities in biological reaction tanks of A1 and O1.

Differential microorganisms with higher relative abundance in A1		Differential microorganisms with higher relative abundance in O1	
Microorganisms	VIP values of microorganisms compared in A1 and O1	Microorganisms	VIP values of microorganisms compared in A1 and O1
<i>Azoarcus</i>	1.43388	<i>Halomonas</i>	1.4703
<i>Thauera</i>	1.41815	<i>Acinetobacter</i>	1.41147
<i>Alcaligenes</i>	1.40553	<i>Nitrospira</i>	1.39612
<i>Legionella</i>	1.32431	<i>Burkholderia</i>	1.38949
<i>Thioalkalispira</i>	1.31396	<i>Mycobacterium</i>	1.33741
<i>Hyphomonas</i>	1.24466	<i>Nitrosomonas</i>	1.32428
<i>Pedomicrobium</i>	1.18542	<i>Pseudorhodobacter</i>	1.29997
<i>Pusillimonas</i>	1.14538	<i>Mesorhizobium</i>	1.29303
<i>Thiobacillus</i>	1.02985	<i>Pseudomonas</i>	1.25307

Table S3 Determination of differential microorganisms by pairwise comparisons of microbial communities in biological reaction tanks of A1 and A2.

Differential microorganisms with higher relative abundance in A1		Differential microorganisms with higher relative abundance in A2	
Microorganisms	VIP values of microorganisms compared in A1 and A2	Microorganisms	VIP values of microorganisms compared in A1 and A2
<i>Pedomicrobium</i>	1.57222	<i>Bacillus</i>	1.38207
<i>Derxia</i>	1.45713	<i>Mesorhizobium</i>	1.33731
<i>Sulfurospirillum</i>	1.41753	<i>Syntrophus</i>	1.26939
<i>Hyphomonas</i>	1.40683	<i>Bryobacter</i>	1.04169
<i>Azoarcus</i>	1.38081	<i>Acinetobacter</i>	1.03987
<i>Desulfonatronum</i>	1.35002	<i>Pseudorhodobacter</i>	1.03672
<i>ML635J-</i>	1.34839		
<i>40_aquatic_group</i>			
<i>Paracoccus</i>	1.19918		
<i>Immundisolibacter</i>	1.18879		
<i>Hyphomicrobium</i>	1.14858		
<i>SBR1031</i>	1.09114		
<i>AKYG1722</i>	1.05208		

Table S4 Determination of differential microorganisms by pairwise comparisons of microbial communities in biological reaction tanks of A2 and O2.

Differential microorganisms with higher relative abundance in A2		Differential microorganisms with higher relative abundance in O2	
Microorganisms	VIP values of microorganisms compared in A2 and O2	Microorganisms	VIP values of microorganisms compared in A2 and O2
<i>Bacillus</i>	1.75796	<i>Sphingobium</i>	1.50074
<i>Thiobacillus</i>	1.67257	<i>Pseudomonas</i>	1.43342
<i>Pusillimonas</i>	1.62935	<i>Mycobacterium</i>	1.29246
<i>Rivibacter</i>	1.4523	<i>AKYG1722</i>	1.23837
<i>Thioalkalispira</i>	1.39477	<i>Nitrosomonas</i>	1.18952
<i>Hyphomicrobium</i>	1.31034	<i>Pedomicrobium</i>	1.14211
<i>Alcaligenes</i>	1.23158	<i>Truepera</i>	1.12728
<i>Thioalkalivibrio</i>	1.15777	<i>Nitrospira</i>	1.01083
<i>Thauera</i>	1.03289		

Table S5 Determination of differential microorganisms by pairwise comparisons of microbial communities in biological reaction tanks of O1 and O2.

Differential microorganisms with higher relative abundance in O1		Differential microorganisms with higher relative abundance in O2	
Microorganisms	VIP values of microorganisms compared in O1 and O2	Microorganisms	VIP values of microorganisms compared in O1 and O2
<i>Thioalkalivibrio</i>	1.70984	<i>Syntrophus</i>	1.44791
<i>SBR1031</i>	1.6309	<i>Bryobacter</i>	1.42417
<i>Acinetobacter</i>	1.57008	<i>Truepera</i>	1.34299
<i>Paracoccus</i>	1.55209	<i>Legionella</i>	1.24307
<i>Desulfonatronum</i>	1.51341		
<i>Rivibacter</i>	1.47853		
<i>Immundisolibacter</i>	1.46697		
<i>Hyphomicrobium</i>	1.35123		
<i>Sulfurospirillum</i>	1.29042		
<i>Halomonas</i>	1.18776		
<i>Thiobacillus</i>	1.11282		
<i>Mesorhizobium</i>	1.07308		