Supplemental Information for

Biological Production and Downstream Separation of Xylitol using *Candida tropicalis*

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Table 1A. Descriptive ANOVA statistics for Figure 3 data on xylitol concentrations under different fermentation conditions measured using a D-sorbitol/D-xylitol assay kit (Megazyme/Neogen).

	N Analysis	N Missing	Mean	Standard Deviation	SE of Mean
16hr 10g/L xylose	3	0	3.38333	1.95065	1.12621
16hr NaOH 10g/L xylose	3	0	4.98333	0.78213	0.45157
PBS 16 hr 10 g/L xylose	3	0	2.07667	0.59518	0.34362
16 hr 30 g/L xylose	3	0	4.45067	3.24691	1.8746
16hr NaOH 30g/L xylose	3	0	9.13333	1.90875	1.10202
PBS 16 hr 30 g/L xylose	3	0	2.89333	0.83716	0.48333
40hr 10g/L xylose	3	0	7.34333	3.08703	1.7823
40hr NaOH 10g/L xylose	3	0	7.97667	3.73176	2.15453
PBS 40 hr 10 g/L xylose	3	0	2.56	0.3651	0.21079
40 hr 30 g/L xylose	3	0	13.86667	1.70098	0.98206
40 hr NaOH 30g/L xylose	3	0	19.16667	7.75263	4.47599
PBS 40 hr 30 g/L xylose	3	0	6.71333	1.05368	0.60834
72hr 10g/L xylose	3	0	5.6	1.92533	1.11159
72hr NaOH 10g/L xylose	3	0	9.25667	1.1767	0.67937
PBS 72 hr 10 g/L xylose	3	0	2.79333	0.34269	0.19785
72 hr 30 g/L xylose	3	0	15.9	3.11929	1.80093
72 hr NaOH 30g/L xylose	3	0	21.36667	3.99291	2.30531
PBS 72 hr 30 g/L xylose	3	0	6.33333	0.90007	0.51966
96hr 10g/L xylose	3	0	4.725	1.95888	1.13096
96hr NaOH 10g/L xylose	3	0	7.60333	4.63062	2.67349
PBS 96 hr 10 g/L xylose	3	0	3.05333	0.46436	0.2681
96hr 30 g/L xylose	3	0	12.84333	4.72225	2.72639
96 hr NaOH 30g/L xylose	3	0	17.13333	6.49333	3.74893
PBS 96 hr 30 g/L xylose	3	0	8.79	2.72776	1.57488

Overall ANOVA

	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	23	2144.33677	93.23203	9.46337	<0.0001
Error	48	472.89025	9.85188		
Total	71	2617.22703			

Null Hypothesis: The means of all levels are equal.
Alternative Hypothesis: The means of one or more levels are different.
At the 0.05 level, the population means are significantly different.

Fit Statistics

R-Square	Coeff Var	Root MSE	Data Mean
0.81932	0.37675	3.13877	8.33107

Means Comparisons Grouping Letter Tukey Test

	Mean	Groups					
72 hr NaOH 30g/L xylose	21.36667	A					
40 hr NaOH 30g/L xylose	19.16667	A					
96 hr NaOH 30 g/L xylose	17.13333	A	B				
72 hr 30 g/L xylose	15.9	A	B	C			
40 hr 30 g/L xylose	13.86667	A	B	C	D		
96 hr 30 g/L xylose	12.84333	A	B	C	D	E	
72 hr NaOH 10g/L xylose	9.25667		B	C	D	E	F
30g/L xylose (pH using NaOH)	9.13333		B	C	D	E	F
PBS 96 hr 30 g/L xylose	8.79		B	C	D	E	F
40 hr NaOH 10g/L xylose	7.97667		B	C	D	E	F
96 hr NaOH 10g/L xylose	7.60333		B	C	D	E	F
40hr 10g/L xylose	7.34333		B	C	D	E	F
PBS 40 hr 30 g/L xylose	6.71333			C	D	E	F
PBS 72 hr 30 g/L xylose	6.33333			C	D	E	F
72hr 10g/L xylose	5.6				D	E	F
10g/L xylose (pH using NaOH)	4.98333				D	E	F
96hr 10g/L xylose	4.725				D	E	F
30 g/L xylose	4.45067				D	E	F
10 g/L xylose	3.38333					E	F
PBS 96 hr 10 g/L xylose	3.05333					E	F
30 g/L xylose (pH using PBS buffer)	2.89333						F
PBS 72 hr 10 g/L xylose	2.79333						F
PBS 40 hr 10 g/L xylose	2.56						F
10 g/L xylose (pH using PBS buffer)	2.07667						F

Means that do not share a letter are significantly different.

Sig equals 1 indicates that the difference of the means is significant at the 0.05 level.
Sig equals 0 indicates that the difference of the means is not significant at the 0.05 level.

Table 2A. Descriptive ANOVA statistics for Figure 6 data on Xylitol concentration in ion-exchange eluents as measured by HPLC.

	N Analysis	N Missing	Mean	Standard Deviation	SE of Mean
Initial A	6	0	4.51742	0.28806	0.1176
elution 1 A	6	0	0.01686	0	0
elution 2 A	6	0	0.12702	0.0925	0.03776
water wash 1-1 A	6	0	0.95906	0.08104	0.03308
water wash 1-2 A	6	0	1.97462	0.93438	0.38146
water wash 2-1 A	6	0	2.16762	1.30339	0.53211
water wash 2-2 A	6	0	1.99396	0.53944	0.22023
water wash 3-1 A	6	0	1.03273	0.35692	0.14571
water wash 3-2 A	6	0	0.65181	0.06964	0.02843
Initial B	6	0	3.8404	0.36812	0.15028
elution 1 B	6	0	0.01686	0	0
elution 2 B	6	0	0.01686	0	0
water wash 1-1	6	0	0.53911	0.31392	0.12816
water wash 1-2 B	6	0	1.91595	0.46823	0.19116
water wash 2-1 B	6	0	2.52216	0.54088	0.22081
water wash 2-2 B	6	0	1.93359	0.28493	0.11632
water wash 3-1 B	6	0	1.05321	0.21192	0.08652
water wash 3-2 B	6	0	0.50032	0.12524	0.05113

Overall ANOVA

	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	17	171.94308	10.1143	45.73288	<0.0001
Error	90	19.90443	0.22116		
Total	107	191.84751			

Null Hypothesis: The mean of all levels are equal.
Alternative Hypothesis: The means of one or more levels are different.
At the 0.05 level, the population means are significantly different.

Fit Statistics

R-Square	Coeff Var	Root MSE	Data Mean
0.89625	0.32836	0.47028	1.4322

Means Comparisons Grouping Letter Tukey Test

	Mean	Groups					
initial A	4.51742	A					
initial B	3.8404	A					
water wash 2-1 B	2.52216		B				
water wash 2-1 A	2.16762		B				
water wash 2-2 A	1.99396		B	C			
water wash 1-2 A	1.97462		B	C			
water wash 2-2 B	1.93359		B	C	D		
water wash 1-2 B	1.91595		B	C	D		
water wash 3-1 B	1.05321			C	D	E	
water wash 3-1 A	1.03273			C	D	E	
water wash 1-1 A	0.95906				D	E	F
water wash 3-2 A	0.65181					E	F
water wash 1-1 B	0.53911					E	F
water wash 3-2 B	0.50032					E	F
elution 2 A	0.12702					E	F
elution 1 B	0.01686						F
elution 1 A	0.01686						F
elution 2 B	0.01686						F

Means that do not share a letter are statistically significant.

Sig equals 1 indicates that the difference of the means is significant at the 0.05 level.
Sig equals 0 indicates that the difference of the means is not significant at the 0.05 level.

Table 3A. Descriptive ANOVA statistics for Figure 7 data on Xylitol mass balance over the ion exchange separation experiments at different retention times (1, 3, and 10 minutes) for 10g/L initial xylose loading without pH control.

	N Analysis	N Missing	Mean	Standard Deviation	SE of Mean
TR 1 Sample Eluent	3	0	0	0	0
TR1 WW1	3	0	20.46667	2.89885	1.67365
TR1 WW2	3	0	44.53333	1.32791	0.76667
TR1 WW3	3	0	17.46667	2.43379	1.40515
TR1 Unaccounted	3	0	17.53333	1.55349	0.89691
TR3 Sample Eluent	3	0	0	0	0
TR3 WW1	3	0	21.7	4.07799	2.35443
TR3 WW2	3	0	48.03333	0.90738	0.52387
TR3 WW3	3	0	15.13333	11.9098	6.87613
TR3 Unaccounted	3	0	15.13333	7.00309	4.04324
TR10 Sample Eluent	3	0	0	0	0
TR10 WW1	3	0	24.8	5.05074	2.91605
TR10 WW2	3	0	49.7	4.88672	2.82135
TR10 WW3	3	0	17.36667	0.35119	0.20276
TR10 Unaccounted	3	0	8.13333	9.3586	5.40319

Overall ANOVA

	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	14	11110.84	793.63143	32.70998	<0.0001
Error	30	727.88	24.26267		
Total	44	11838.72			

Null Hypothesis: The means of all levels are equal.
Alternative Hypothesis: The means of one or more levels are different.
At the 0.05 level, the population means are significantly different.

Fit Statistics

R-Square	Coeff Var	Root MSE	Data Mean
0.093852	0.24629	4.92571	20

Means Comparisons Grouping Let Tukey Test

	Mean	Groups			
TR10 WW2	49.7	A			
TR3 WW2	48.03333	A			
TR1 WW2	44.53333	A			
TR10 WW1	24.8		B		
TR3 WW1	21.7		B	C	
TR1 WW1	20.46667		B	C	

TR1 Unaccounted	17.53333		B	C	
TR1 WW3	17.46667		B	C	
TR10 WW3	17.36667		B	C	
TR3 Unaccounted	15.13333		B	C	
TR3 WW3	15.13333		B	C	
TR10 Unaccounted	8.13333			C	D
TR10 Sample Eluent	0				D
TR3 Sample Eluent	0				D
TR1 Sample Eluent	0				D

Means that do not share a letter are significantly different.

Sig equals 1 indicates that the difference of the means is significant at the 0.05 level.
Sig equals 0 indicates that the difference of the means is not significant at the 0.05 level.

Table 3B. Descriptive ANOVA statistics for Figure 7 data on Xylitol mass balance over the ion exchange separation experiments at different retention times (1, 3, and 10 minutes) for 10g/L initial xylose loading with pH control using sodium hydroxide.

	N Analysis	N Missing	Mean	Standard Deviation	SE of Mean
TR1 Sample Eluent	3	0	0	0	0
TR1 WW1	3	0	15.31333	5.55271	3.20586
TR1 WW2	3	0	43.9	3.53836	2.04287
TR1 WW3	3	0	26.14333	2.41798	1.39602
TR1 Unaccounted	3	0	14.61	6.81075	3.93219
TR3 Sample Eluent	3	0	0	0	0
TR3 WW1	3	0	13.63333	6.38148	3.68435
TR3 WW2	3	0	40	9.4016	5.42801
TR3 WW3	3	0	36.33333	22.18881	12.81072
TR3 Unaccounted	3	0	10.03333	9.35753	5.50257
TR10 Sample Eluent	3	0	0	0	0
TR10 WW1	3	0	17.46667	3.38575	1.9577
TR10 WW2	3	0	46.1	1.12694	0.65064
TR10 WW3	3	0	25.33333	1.40475	0.81104
TR10 Unaccounted	3	0	11.2	2.04206	1.17898

Overall ANOVA

	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	14	10385.68891	741.83492	13.51277	<0.0001
Error	30	1646.96427	54.89881		
Total	44	12032.65318			

Null Hypothesis: The mean of all levels are equal.
Alternative Hypothesis: The means of one or more levels are different.
At the 0.05 level, the population means are significantly different.

Fit Statistics

R-Square	Coeff Var	Root MSE	Data Mean
0.086313	0.37051	7.40937	19.99778

Grouping Let
Tukey Test

	Mean	Groups			
TR10 WW2	46.1	A			
TR1 WW2	43.9	A			
TR3 WW2	40	A			
TR3 WW3	36.33333	A	B		
TR1 WW3	26.14333	A	B	C	
TR10 WW3	25.33333	A	B	C	
TR10 WW1	17.46667		B	C	D

TR1 WW1	15.3133		B	C	D
TR1 Unaccounted	14.61		B	C	D
TR3 WW1	13.63333			C	D
TR10 Unaccounted	11.1			C	D
TR3 Unaccounted	10.03333			C	D
TR10 Sample Eluent	0				D
TR3 Sample Eluent	0				D
TR1 Sample Eluent	0				D

Means that do not share a letter are statistically significant.

Sig equals 1 indicates that the difference of the means is significant at the 0.05 level.
Sig equals 0 indicates that the difference of the means is not significant at the 0.05 level.