

Supplementary Materials

Techno-economic bottlenecks of fungal pretreatment of lignocellulosic biomass

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Table S1. Summary of data from fungal pretreatment literature.

Feedstock	Feedstock composition				Fungal pretreatment parameters			Degradation of components during fungal pretreatment				Sugar yield		Enzymatic hydrolysis parameters			
	Cellulose (%)	Hemicellulose (%)	Lignin (%)	Ash (%)	Inoculum incubation time (d)	Moisture (%)	Time (d)	Temp (°C)	Cellulose (%)	Hemicellulose (%)	Lignin (%)	Total solids (%)	Glucose yield (%)	Xylose yield (%)	Time (h)	Temp (°C)	Solid loading (%)
Grasses																	
Average	35	21	22	4	8	68	29	28	1	13	21	13	58	30	72	50	2
Standard deviation	2	4	2	0	3	8	6	1	1	3	10	10	16	10	0	0	0
Minimum	33	17	18	3	7	60	18	28	0	10	6	4	38	21	72	50	2
Maximum	38	25	23	4	14	75	36	30	3	16	28	30	76	41	72	50	3
Corn stover																	
Average	38	25	19	6	6	74	24	28	17	40	41	25	61	39	72	48	3
Standard deviation	3	4	3	3	2	2	6	1	12	19	10	12	9	4	19	2	2
Minimum	35	23	14	4	1	70	15	28	3	19	28	7	47	31	24	45	2
Maximum	42	31	23	9	7	75	30	30	32	71	60	40	75	44	96	50	10
Agricultural residues																	
Average	36	25	21	4	5	74	28	28	34	38	33	30	51	38	55	47	5
Standard deviation	4	5	5	2	3	5	17	2	18	14	10	11	18	22	22	4	3
Minimum	27	15	11	1	1	62	21	25	13	20	19	20	25	15	16	40	1
Maximum	41	34	27	6	7	80	84	30	69	59	52	50	69	59	72	50	10

Table S1. *Cont.*

Feedstock	Feedstock composition				Inoculum incubation time (d)	Fungal pretreatment parameters			Degradation of components during fungal pretreatment				Sugar yield		Enzymatic hydrolysis parameters		
	Cellulose (%)	Hemicellulose (%)	Lignin (%)	Ash (%)		Moisture (%)	Time (d)	Temp (°C)	Cellulose (%)	Hemicellulose (%)	Lignin (%)	Total solids (%)	Glucose yield (%)	Xylose yield (%)	Time (h)	Temp (°C)	Solid loading (%)
Hardwood																	
Average	35	17	24	4	7	73	31	28	5	18	20	15	30	23	88	50	3
Standard deviation	8	4	3	2	1	7	8	1	16	6	9	6	15	10	32	0	1
Minimum	21	10	21	2	5	60	18	25	0	13	1	10	17	11	72	50	2
Maximum	44	20	28	5	7	78	48	30	48	31	29	27	55	29	96	50	5

Table S2. Cost of utilities used for model.

Utility	Cost
Electricity (\$/kWh)	0.10
Process water (\$/t)	0.20
Cooling water - 25°C (\$/t)	0.05
Chilled water - 5°C (\$/t)	0.40
Steam (\$/t)	12.00

Table S3. Direct fixed capital estimate summary (million dollars)

Total Plant Direct Cost (TPDC)	Grasses	Corn Stover	Ag. Residues	Hardwood
Equipment Purchase Cost	126	130	169	212
Installation	43	45	58	73
Process Piping	44	46	59	74
Instrumentation	50	52	67	85
Insulation	6	7	8	11
Electrical	13	13	17	21
Buildings	57	59	76	95
Yard Improvement	19	20	25	32
Auxiliary Facilities	50	52	67	85
TPDC	408	423	547	688
Total Plant Indirect Cost (TPIC)				
Engineering	82	85	109	138
Construction	82	85	109	138
TPIC	163	169	219	275
Total Plant Cost (TPC = TPDC+TPIC)				
TPC	571	592	766	963
Contractor's Fee & Contingency (CFC)				
Contractor's Fee	29	30	38	48
Contingency	57	59	77	96
CFC	86	89	115	145
Direct Fixed Capital Cost				
(DFC = TPC+CFC)				
DFC	657	681	881	1,108