

Supporting information

Green and efficient approach of selective conversion of xylose and biomass hemicellulose into furfural in aqueous media using high-pressure CO₂ as sustainable catalyst

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The reaction (heating and holding time) profiles

Effect of water/organic solvent biphasic systems

Reaction conditions: 180 °C, 60 min, 50 bar of initial CO₂ pressure and 12.5 g/L of xylose concentration in the feed, with equal volume (7.5 mL) of each solvent.

Water			Water/THF			Water/MIBK			Water/THF/MIBK		
T (min)	T (°C)	p (bar)	t (min)	T (°C)	p (bar)	t (min)	T (°C)	p (bar)	t (min)	T (°C)	p (bar)
0.00	22	49.7	0.00	19	49.9	0.00	22	50.5	0.00	23	49.5
1.00	23	49.6	1.00	33	53.4	1.00	26	54.9	1.00	27	50.2
2.00	33	51.7	2.00	48	58.8	2.00	37	62.3	2.00	39	54.9
3.00	43	54.4	3.00	67	64.8	3.00	50	67.4	3.00	54	61.8
4.00	54	57.1	4.00	82	68.7	4.00	63	71.9	4.00	68	66.4
5.00	67	59.8	5.00	92	71.6	5.00	77	75.8	5.00	82	70.4
6.00	79	62.2	6.00	99	74.2	6.00	91	79.4	6.00	94	74.1
7.00	92	64.4	7.00	113	78.2	7.00	106	83.6	7.00	107	77.2
8.00	105	66.0	8.00	123	81.5	8.00	118	88.2	8.00	118	80.0
9.00	114	67.4	9.00	128	84.6	9.00	128	92.7	9.00	127	83.2
10.00	123	68.7	10.00	134	89.0	10.00	134	97.3	10.00	134	86.4
11.00	132	69.9	11.00	144	94.9	11.00	142	101.5	11.00	142	89.5
12.00	139	70.7	13.00	157	102.0	12.00	149	105.7	12.00	147	92.6
13.00	144	72.0	14.00	163	105.0	13.00	154	109.6	13.00	154	95.7
14.00	154	73.4	15.00	167	108.4	14.00	156	114.2	14.00	157	98.7
15.00	160	74.5	16.00	173	111.4	15.00	167	120.7	15.00	164	101.7
16.00	165	75.7	17.14	180	116.5	16.00	171	123.5	16.00	168	104.9
17.00	169	77.2	22.14	179	118.9	17.00	174	126.7	17.00	173	107.6
18.00	175	78.7	27.14	182	120.8	18.00	180	131.0	18.00	176	110.5
19.00	177	79.7	37.14	177	119.0	23.00	181	134.9	19.00	180	113.3
19.57	180	80.4	47.14	182	122.6	28.00	178	134.0	24.00	179	119.8
24.57	178	82.4	57.14	182	122.4	38.00	181	137.7	29.00	179	122.3
29.57	179	83.8	67.14	179	122.0	48.00	177	135.5	39.00	179	124.9
39.57	181	85.8	77.14	179	122.0	58.00	182	139.3	49.00	179	126.0
49.57	178	86.7				68.00	177	136.6	59.00	179	127.0
59.57	177	86.8				78.00	181	139.3	69.00	179	127.7
69.57	177	87.6							79.00	179	128.1
79.57	181	88.6									

Effect of amount of extracting agent on the furfural production

Reaction conditions: 180 °C, 60 min of holding time, 50 bar of initial CO₂ pressure and 12.5 g/L of xylose concentration in the feed.

Water/THF/MIBK														
7.5/-/-			7.5/7.5/5			7.5/7.5/7.5			7.5/7.5/15.0			7.5/7.5/30.0		
t (min)	T (°C)	p (bar)	t (min)	T (°C)	p (bar)	t (min)	T (°C)	p (bar)	t (min)	T (°C)	p (bar)	t (min)	T (°C)	p (bar)
0.00	22	49.7	0.00	21	49.9	0.00	23	49.5	0.00	25	49.5	0.00	25	49.8
1.00	23	50.6	1.00	39	59.0	1.00	27	50.3	1.00	34	53.2	1.00	34	50.9
2.00	33	51.7	2.00	65	65.5	2.00	39	54.9	2.00	51	63.0	2.00	46	56.4
3.00	43	54.4	3.00	67	69.7	3.00	54	61.8	3.00	62	67.5	3.00	60	53.6
4.00	54	57.1	4.00	80	74.4	4.00	68	66.4	4.00	76	73.0	4.00	74	69.2
5.00	67	59.8	5.00	93	78.1	5.00	82	70.4	5.00	93	78.5	5.00	88	74.4
6.00	79	62.2	6.00	107	82.0	6.00	94	74.1	6.00	108	83.5	6.00	100	78.9
7.00	92	64.4	7.00	116	85.8	7.00	107	77.2	7.00	119	88.1	7.00	111	83.5
8.00	105	66.0	8.00	125	89.6	8.00	118	80.0	8.00	130	93.1	8.00	122	88.1
9.00	114	67.4	9.00	133	93.4	9.00	127	83.2	9.00	138	97.5	9.00	130	92.5
10.00	123	68.7	10.00	139	97.4	10.00	134	86.4	10.00	146	101.4	10.00	138	97.3
11.00	132	69.9	11.00	146	100.5	11.00	142	89.5	11.00	152	105.6	11.00	146	102.1
12.00	139	70.7	12.00	152	103.8	12.00	147	92.6	12.00	161	111.0	12.00	152	106.6
13.00	144	72.0	13.00	157	106.8	13.00	154	95.7	13.00	167	115.0	13.00	158	110.8
14.00	154	73.4	14.00	161	109.8	14.00	157	98.7	14.00	170	116.8	14.00	164	115.6
15.00	160	74.5	15.00	164	112.8	15.00	164	101.7	15.00	174	120.1	15.00	169	118.9
16.00	165	75.7	16.00	166	115.7	16.00	168	104.9	15.77	179	123.9	16.00	174	122.9
17.00	169	77.2	17.00	167	118.8	17.00	173	107.6	20.77	177	129.0	16.87	178	126.4
18.00	175	78.7	18.00	168	121.6	18.00	176	110.5	25.77	179	132.7	21.87	179	131.4
19.00	177	79.7	19.00	170	124.2	19.00	180	113.3	35.77	179	136.4	26.87	178	133.2
19.57	180	80.4	20.00	176	127.9	24.00	179	119.8	45.77	179	137.9	36.87	180	13.7
24.57	178	82.4	20.23	180	130.4	29.00	179	122.3	55.77	179	138.5	46.87	178	136.7
29.57	179	83.8	25.23	177	128.1	39.00	179	124.9	65.77	179	139.1	56.87	182	138.3
39.57	181	85.8	30.23	180	129.4	49.00	179	126.0	75.77	179	139.3	66.87	178	136.7
49.57	178	86.7	40.23	181	128.2	59.00	179	127.0				76.87	181	138.6
59.57	177	86.8	50.23	182	127.4	69.00	179	127.7						
69.57	177	87.6	60.23	175	121.7	79.00	179	128.1						
79.57	181	88.6	70.23	183	123.8									
			80.23	176	118.7									

Effect of temperature and reaction time

Reaction conditions: 50 bar of initial CO₂ pressure and 12.5 g/L of xylose concentration in the feed and 7.5 mL water/ 7.5 mL THF/ 7.5 mL MIBK system.

160°C														
15 min			30 min			60 min			90 min			120 min		
t (min)	T (°C)	p (bar)	t (min)	T (°C)	p (bar)	t (min)	T (°C)	p (bar)	t (min)	T (°C)	p (bar)	t (min)	T (°C)	p (bar)
0.00	24	49.9	0.00	22	49.6	0.00	24	49.7	0.00	25	50.2	0.00	23	50.2
1.00	34	53.9	1.00	33	57.8	1.00	33	56.0	1.00	33	50.2	1.00	33	53.7
2.00	52	62.9	2.00	46	64.9	2.00	46	63.9	2.00	48	58.4	2.00	49	61.9
3.00	64	66.7	3.00	59	71.3	3.00	60	69.2	3.00	66	64.2	3.00	65	67.8
4.00	78	70.7	4.00	71	76.3	4.00	74	73.7	4.00	82	68.4	4.00	79	72.5
5.00	91	74.7	5.00	85	81.3	5.00	86	78.1	5.00	98	75.2	5.00	93	76.9
6.00	105	78.1	6.00	97	86.5	6.00	98	83.6	6.00	111	75.9	6.00	108	80.6
7.00	114	81.3	7.00	107	92.3	7.00	108	88.3	7.00	122	79.0	7.00	118	84.8
8.00	123	84.8	8.00	118	96.6	8.00	119	92.6	8.00	131	82.0	8.00	128	89.4
9.00	131	88.4	9.00	127	102.1	9.00	127	97.1	9.00	139	85.4	9.00	135	93.0
10.00	138	92.1	10.00	135	106.9	10.00	134	101.2	10.00	146	88.8	10.00	142	96.9
11.00	145	95.3	11.00	141	111.8	11.00	140	105.3	11.00	152	92.1	11.00	148	100.7
12.00	150	98.7	12.00	147	116.5	12.00	146	109.0	12.00	158	95.1	12.00	156	104.8
13.00	156	102.1	13.00	152	120.9	13.00	151	112.8	12.32	160	96.4	13.00	159	107.9
13.73	160	104.5	14.00	157	124.8	14.00	156	116.2	17.32	159	100.9	13.12	160	108.1
18.73	158	109.2	14.43	160	126.6	14.83	160	119.2	22.32	158	103.7	18.12	158	113.3
23.73	159	112.2	19.43	158	133.4	19.83	159	123.1	32.32	159	107.0	23.12	159	116.7
28.73	159	113.7	24.43	159	140.1	24.83	159	123.8	42.32	159	108.2	33.12	159	119.2
			29.43	159	141.8	34.83	159	123.7	52.32	159	108.8	43.12	159	120.2
			34.43	160	143.4	44.83	159	122.8	62.32	159	109.0	53.12	159	121.1
			44.43	161	145.5	54.83	159	121.4	72.32	159	109.5	63.12	159	121.5
						64.83	159	119.9	82.32	160	109.7	73.12	160	121.7
						74.83	160	117.8	92.32	160	109.9	83.12	159	121.8
									102.32	159	110.1	93.12	159	121.9
												103.12	159	121.8
												113.12	159	122.0
												123.12	160	121.9
												133.12	159	122.1

180°C														
15 min			30 min			60 min			90 min			120 min		
t (min)	T (°C)	p (bar)	t (min)	T (°C)	p (bar)	t (min)	T (°C)	p (bar)	t (min)	T (°C)	p (bar)	t (min)	T (°C)	p (bar)
0.00	23	49.4	0.00	23	49.5	0.00	23	49.5	0.00	25	49.8	0.00	25	49.7
1.00	31	55.1	1.00	31	58.4	1.00	27	51.3	1.00	34	50.4	1.00	33	51.4
2.00	45	63.5	2.00	43	61.9	2.00	39	54.9	2.00	46	56.8	2.00	50	57.5
3.00	60	70.3	3.00	58	67.4	3.00	54	61.8	3.00	61	62.1	3.00	66	63.0
4.00	76	75.7	4.00	71	72.1	4.00	68	66.4	4.00	76	66.7	4.00	84	67.5
5.00	89	80.8	5.00	84	76.3	5.00	82	70.4	5.00	89	70.3	5.00	99	71.1
6.00	102	85.5	6.00	97	80.2	6.00	94	74.1	6.00	100	73.7	6.00	114	75.0
7.00	114	90.5	7.00	108	84.2	7.00	107	77.2	7.00	112	76.6	7.00	123	77.5
8.00	123	95.2	8.00	119	88.2	8.00	118	80.0	8.00	122	79.3	8.00	131	80.3
9.00	132	99.9	9.00	128	92.9	9.00	127	83.2	9.00	132	82.8	9.00	138	83.1
10.00	139	104.6	10.00	135	96.2	10.00	134	86.4	10.00	138	85.0	10.00	146	86.0
11.00	146	109.1	11.00	142	100.0	11.00	142	89.5	11.00	144	87.8	11.00	152	88.9
12.00	152	113.1	12.00	147	103.3	12.00	147	92.6	12.00	150	90.6	12.00	158	91.7
13.00	158	117.0	13.00	153	107.0	13.00	154	95.7	13.00	155	93.7	13.00	162	94.4
14.00	163	119.9	14.00	158	109.7	14.00	157	98.7	14.00	160	96.0	14.00	168	97.1
15.00	165	124.5	15.00	163	112.8	15.00	164	101.7	15.00	165	98.8	15.00	172	99.9
16.00	170	127.9	16.00	166	115.7	16.00	168	104.9	16.00	169	101.6	16.00	178	103.4
17.00	172	131.3	17.00	169	118.5	17.00	173	107.6	17.00	173	104.1	17.00	180	105.1
18.00	172	135.0	18.00	176	120.7	18.00	176	110.5	18.00	176	106.7	22.00	178	109.6
19.00	172	139.1	19.00	180	123.2	19.00	180	113.3	19.00	179	109.2	27.00	179	112.4
20.00	173	142.6	24.00	178	127.3	24.00	179	119.8	24.00	178	114.1	37.00	179	115.8
20.77	180	144.8	29.00	179	127.1	29.00	179	122.3	29.00	179	116.8	47.00	179	116.5
25.77	177	148.6	39.00	179	123.0	39.00	179	124.9	39.00	179	119.1	57.00	180	116.5
30.77	179	151.2	49.00	179	117.5	49.00	179	126.0	49.00	179	120.7	67.00	179	116.9
35.77	180	153.2				59.00	179	127.0	59.00	179	121.5	77.00	179	117.1
						69.00	179	127.7	69.00	179	121.9	87.00	179	117.4
						79.00	179	128.1	79.00	179	122.2	97.00	179	117.3
									89.00	179	122.3	107.00	179	117.6
									99.00	179	122.3	117.00	179	117.6
									109.00	179	122.5	127.00	180	117.9
												137.00	179	117.6

200°C					
15 min			30 min		
t (min)	T (°C)	p (bar)	t (min)	T (°C)	p (bar)
0.00	23	49.2	0.00	22	49.2
1.00	31	52.7	1.00	26	51.9
2.00	43	58.9	2.00	39	55.8
3.00	57	64.3	3.00	52	62.0
4.00	71	69.4	4.00	64	66.5
5.00	86	74.7	5.00	78	70.4
6.00	94	77.2	6.00	91	74.3
7.00	105	80.6	7.00	102	77.4
8.00	116	84.1	8.00	113	80.3
9.00	124	87.7	9.00	123	83.8
10.00	131	91.2	10.00	129	87.0
11.00	137	94.7	11.00	138	91.3
12.00	143	98.2	12.00	142	93.5
13.00	148	101.6	13.00	148	96.9
14.00	153	104.9	14.00	154	99.6
15.00	159	108.3	15.00	159	102.6
16.00	163	111.6	16.00	163	105.3
17.00	167	115.0	17.00	167	108.1
18.00	172	118.2	18.00	171	110.9
19.00	174	121.2	19.00	174	113.5
20.00	178	124.0	20.00	176	116.2
21.00	182	127.2	21.00	179	118.9
22.00	183	130.0	22.00	183	121.6
23.00	183	133.6	23.00	184	124.2
24.00	179	135.9	24.00	184	127.3
25.00	179	138.4	25.00	186	129.6
26.00	189	144.1	26.00	182	132.1
27.00	190	146.6	27.00	184	134.9
28.00	192	148.4	28.00	193	140.1
29.00	194	151.3	29.00	193	141.8
30.00	197	154.4	30.00	195	143.7
31.00	198	156.0	31.00	198	146.1
31.50	200	156.5	36.00	198	149.4
41.50	201	160.8	41.00	197	149.5
46.50	197	158.4	51.00	199	152.0
			61.00	199	152.7

Influence of CO₂ pressure on catalytic dehydration

Reaction conditions: 180 °C, 60 min of holding time and 12.5 g/L of xylose concentration in the feed and 7.5 mL water/ 7.5 mL THF/ 7.5 mL MIBK system.

0 bar			20 bar			30 bar			40 bar			50 bar		
t	T	p	t	T	p	t	T	p	t	T	p	t	T	p
(min)	(°C)	(bar)	(min)	(°C)	(bar)	(min)	(°C)	(bar)	(min)	(°C)	(bar)	(min)	(°C)	(bar)
0.00	24	0.4	0.00	24	20.0	0.00	24	29.8	0.00	25	39.9	0.00	23	49.5
1.00	53	0.6	1.00	39	20.3	1.00	40	30.1	1.00	37	41.9	1.00	27	50.3
2.00	84	1.0	2.00	58	21.1	2.00	58	32.3	2.00	52	47.1	2.00	39	54.9
3.00	97	1.9	3.00	85	22.1	3.00	78	33.9	3.00	66	51.1	3.00	54	61.8
4.00	107	2.7	4.00	97	23.3	4.00	95	34.3	4.00	84	55.6	4.00	68	66.4
5.00	115	3.5	5.00	114	25.1	5.00	113	36.8	5.00	98	59.2	5.00	82	70.4
6.00	121	4.1	6.00	124	26.6	6.00	124	38.5	6.00	111	62.3	6.00	94	74.1
7.00	125	4.6	7.00	136	28.0	7.00	134	40.1	7.00	123	64.8	7.00	107	77.2
8.00	129	5.2	8.00	143	29.2	8.00	142	41.6	8.00	135	66.8	8.00	118	80.0
9.00	133	5.7	9.00	150	30.2	9.00	150	43.4	9.00	141	68.4	9.00	127	83.2
10.00	136	6.2	10.00	156	31.3	10.00	157	45.1	10.00	147	70.0	10.00	134	86.4
11.00	140	6.8	11.00	161	32.2	11.00	163	47.1	11.00	153	71.6	11.00	142	89.5
12.00	144	7.5	12.00	166	33.3	12.00	169	48.6	12.00	159	73.2	12.00	147	92.6
13.00	148	8.2	13.00	170	34.1	13.00	173	49.8	13.00	166	74.7	13.00	154	95.7
14.00	151	8.9	14.00	174	35.3	14.00	177	50.1	14.00	172	76.4	14.00	157	98.7
15.00	155	9.8	15.00	176	36.6	14.72	180	50.2	15.00	177	78.0	15.00	164	101.7
16.00	161	11.1	16.00	180	37.8	19.72	178	53.0	16.00	180	79.4	16.00	168	104.9
17.00	164	11.9	21.00	178	39.1	24.72	179	54.0	21.00	178	82.4	17.00	173	107.6
18.00	169	13.2	26.00	179	39.6	34.72	179	54.0	26.00	179	84.7	18.00	176	110.5
19.00	173	14.3	36.00	179	39.4	44.72	179	54.3	36.00	179	87.1	19.00	180	113.3
20.00	173	14.8	46.00	179	40.1	54.72	179	54.7	46.00	179	88.3	24.00	179	119.8
21.00	177	16.0	56.00	179	40.3	64.72	179	55.0	56.00	179	89.0	29.00	179	122.3
22.00	180	16.8	66.00	179	40.5	74.72	179	55.2	66.00	179	89.2	39.00	179	124.9
27.00	179	16.8	76.00	179	40.7				76.00	179	89.5	49.00	179	126.0
32.00	179	16.9										59.00	179	127.0
42.00	179	17.0										69.00	179	127.7
52.00	179	17.1										79.00	179	128.1
62.00	179	17.1												
72.00	179	17.1												
82.00	179	17.2												

Furfural from hemicellulose hydrolysate as feed

1st step

Reaction conditions: 50 bar of initial CO₂ pressure, mixture loading of 10 (75 g of H₂O/ 7.5 g of dry wheat straw)

200°C											
0 min			5 min			10 min			15 min		
t (min)	T (°C)	p (bar)	t (min)	T (°C)	p (bar)	t (min)	T (°C)	p (bar)	t (min)	T (°C)	p (bar)
0.00	31	51.6	0.00	36	51.3	0.00	36	50.6	0.00	29	51.3
2.00	35	52.9	1.00	36	53.3	1.00	47	52.9	1.00	38	53.9
3.00	43	53.9	2.00	40	55.9	2.00	54	53.9	2.00	44	55.5
4.00	47	55.6	3.00	47	57.7	3.00	61	55.7	3.00	52	57.6
5.00	56	57.4	4.00	55	59.5	4.00	73	58.4	4.00	62	59.6
6.00	67	59.3	5.00	66	61.3	5.00	83	60.3	5.00	74	61.0
7.00	78	61.2	7.00	74	62.1	6.00	93	61.2	6.00	84	63.2
8.00	87	62.0	7.00	84	63.0	6.32	100	62.0	7.00	92	65.1
9.00	97	62.8	8.00	93	63.8	7.00	105	62.8	7.43	100	67.0
9.32	100	63.1	8.37	100	64.5	8.00	114	63.1	8.00	103	68.4
10.00	104	63.5	9.00	103	65.0	9.00	120	63.5	9.00	117	70.3
11.00	112	64.6	13.00	144	72.7	10.00	133	64.6	10.00	121	71.4
12.00	121	65.7	14.00	148	734.0	11.00	139	65.7	11.00	129	72.6
13.00	130	66.9	15.00	155	74.3	12.00	147	66.9	12.00	138	74.3
14.00	139	68.7	16.00	171	78.2	13.00	156	68.7	13.00	147	75.9
15.00	151	71.1	17.00	181	79.5	14.00	168	71.1	14.00	155	77.3
16.00	169	74.2	18.00	192	83.4	15.00	178	74.2	15.00	162	79.6
17.00	174	75.2	19.00	198	85.8	16.00	189	75.2	16.00	177	83.0
18.00	181	76.7	19.27	200	86.9	17.00	198	76.7	17.00	183	85.0
19.00	189	78.7	20.27	204	87.4	17.38	200	78.7	18.00	192	87.9
20.00	200	80.9	21.27	201	87.0	18.38	204	73.8	18.35	200	90.2
			22.27	197	86.6	19.38	202	73.6	19.35	203	91.6
			23.27	196	87.6	20.38	197	73.0	20.35	201	91.3
			24.27	198	88.0	21.38	196	73.7	21.35	196	90.9
						22.38	203	75.2	22.35	200	92.8
						23.38	204	75.5	23.35	204	95.4
						24.38	203	75.2	24.35	203	93.1
						25.38	198	74.6	25.35	202	93.0
						26.38	196	74.3	26.35	201	94.1
						27.38	195	74.2	27.35	196	93.3

28.35	195	93.8
29.35	197	94.7
30.35	200	95.1
31.35	204	95.9
32.35	203	93.0
33.35	200	92.8

210°C, 0 min			220°C, 0 min		
t	T	p	t	T	p
(min)	(°C)	(bar)	(min)	(°C)	(bar)
0.00	32	50.4	0.00	29	50.3
1.00	39	52.7	1.00	33	52.9
2.00	46	53.7	2.00	38	54.8
3.00	54	55.4	3.00	47	56.4
4.00	61	57.4	4.00	56	58.5
5.00	71	58.8	5.00	68	60.5
6.00	80	59.4	6.00	0	61.3
7.00	91	60.7	7.00	92	62.3
7.58	100	61.4	8.02	100	62.9
8.00	102	61.4	9.00	112	63.9
9.00	106	61.8	10.00	121	64.6
10.00	117	62.6	11.00	129	65.4
11.00	123	63.2	12.00	139	66.6
12.00	134	64.2	13.00	147	67.7
13.00	143	65.1	14.00	161	69.8
14.00	151	66.2	15.00	170	70.6
15.00	165	67.5	16.00	182	73.0
16.00	179	69.0	17.00	193	75.2
17.00	186	70.0	18.00	200	76.7
18.00	194	71.0	19.00	208	78.9
19.00	205	73.1	20.00	214	80.9
20.05	210	73.7	20.41	220	82.3

2nd step

Reaction conditions: 50 bar of initial CO₂ pressure and 7.5 mL liquor/ 7.5 mL THF/ 7.5 mL MIBK.

180°C									160°C		
30 min			60 min			90 min			60 min		
t	T	p	t	T	p	t	T	p	t	T	p
(min)	(°C)	(bar)	(min)	(°C)	(bar)	(min)	(°C)	(bar)	(min)	(°C)	(bar)
0.00	23	49.9	0.00	23	49.9	0.00	22	50.0	0.00	21	49.5
1.00	36	53.7	1.00	27	50.3	1.00	28	52.2	1.00	28	51.7
2.00	51	59.8	2.00	40	57.3	2.00	44	60.6	2.00	44	59.4
3.00	64	63.6	3.00	54	63.3	3.00	57	64.3	3.00	58	64.2
4.00	79	67.4	4.00	82	72.3	4.00	68	67.3	4.00	70	66.6
5.00	96	71.2	5.00	96	76.4	5.00	85	71.9	5.00	84	70.7
6.00	108	74.6	6.00	112	80.2	6.00	99	76.0	6.00	100	74.9
7.00	119	77.5	7.00	119	83.3	7.00	113	81.1	7.00	117	79.4
8.00	127	80.1	8.00	127	87.0	8.00	121	84.1	8.00	126	82.8
9.00	134	83.1	9.00	134	90.7	9.00	129	88.1	9.00	132	85.7
10.00	141	86.2	10.00	141	92.7	10.00	134	91.2	10.00	137	88.8
11.00	147	88.8	14.00	158	105.2	11.00	143	96.3	11.00	143	91.9
12.00	153	91.7	15.00	162	107.9	12.00	148	98.9	12.00	148	95.4
13.00	158	94.4	16.00	166	111.4	13.00	152	102.5	13.00	154	98.7
14.00	162	97.1	17.00	171	114.8	14.00	157	105.9	14.37	159	102.4
15.00	167	100.0	18.00	177	118.3	15.00	152	109.1	19.37	158	106.5
16.00	172	103.0	19.00	179	120.0	16.00	166	112.7	24.37	159	108.6
17.00	178	106.3	24.00	178	125.0	17.00	169	116.1	34.37	159	110.6
17.32	179	106.8	29.00	179	128.1	18.00	173	119.1	44.37	159	111.5
22.32	178	110.9	49.00	179	131.9	19.00	176	122.2	54.37	159	111.9
27.32	179	113.5	59.00	179	133.5	20.00	180	125.2	64.37	159	112.6
37.32	179	115.6	69.00	179	134.4	25.00	178	129.8	74.37	160	112.9
47.32	179	116.7	79.00	179	134.2	30.00	178	132.0			
						40.00	179	134.2			
						50.00	179	134.7			
						60.00	179	135.3			
						70.00	179	135.9			
						80.00	179	135.8			
						90.00	179	135.7			
						100.00	179	135.8			
						110.00	179	136.0			

The composition (g (100 g processed solids)⁻¹) of processed solids, and its yields (g (100 g feedstock)⁻¹), produced in CO₂-H₂O biomass pre-treatment

Reaction conditions: 50 bar of initial CO₂ pressure, mixture loading of 10 (75 g of H₂O/ 7.5 g of dry wheat straw)

T (°C)	200				210	220
Time (min)	0	5	10	15	0	0
Solid yield (wt. %)	57.14	53.79	54.51	54.12	55.06	54.87
Glucan	57.89±0.14	67.13±0.44	64.92±4.03	64.55±7.93	62.12±4.46	64.24±1.21
Xylan	8.15±0.75	6.61±4.78	4.72±2.40	Traces	Traces	Traces
Arabinan	Traces	Traces	Traces	Traces	Traces	Traces
Acetyl groups	Traces	Traces	Traces	Traces	Traces	Traces
Klason lignin	25.96±0.15	30.83±2.26	32.82±3.97	36.93±1.12	31.86±3.01	33.58±4.02