Supporting Information for

Fast pyrolysis of *Opuntia ficus-indica* and *Grindelia squarrosa*

Phillip Cross[a], *Calvin Mukarakate*[b*], *Mark Nimlos*[b], *Daniel Carpenter*[b], *Bryon S. Donohoe*[c], *Jesse A. Mayer*[e], *John C. Cushman*[d], *Bishnu Neupane*[e], *Glenn C. Miller*[e], *and Sushil Adhikari*[a*]

[a] Biosystems Engineering Department, Auburn University, 350 Mell Street, Auburn, Alabama 36894, United States.

[b] National Bioenergy Center, National Renewable Energy Lab, 15013 Denver West Parkway, Golden, Colorado 80401, United States.

[c] Biosciences Center, National Renewable Energy Lab, 15013 Denver West Parkway, Golden, Colorado 80401, United States.

[d] Department of Biochemistry & Molecular Biology, MS330, University of Nevada, Reno, NV 89557-0330, USA

[e] Department of Natural Resource and Environmental Science, University of Nevada, Reno, 1664 North Virginia Street, Reno, Nevada 89557, United States

[*]Corresponding author. E-mail: calvin.mukarakate@nrel.gov (C. Mukarakate) and sza0016@auburn.edu (S. Adhikari)

Number of pages: 7

Number of tables: 2

Contents

Table S1. Carbon yield (%), retention time, and classification of pyrolysis vapors determined by GC-MS/FID/TCD for *Opuntia ficus-indica* (Prickly pear) during fast pyrolysis at temperatures ranging from 450°C to 550°C

R.T.	Compound Name	MS Quality	Classification 1	Classification 2	Temperature					
					450°C		550°C		650°C	
					Avg.	Stdv.	Avg.	Stdv.	Avg.	Stdv.
1.53	Ethene	78	Alkene	C2	0.3	0.0	0.7	0.1	2.4	0.2
2.14	Carbon dioxide	4	CO2	CO2	19.6	2.2	24.4	2.7	25.7	1.9
2.19	Propene	89.73	Alkene	C3	0.4	0.0	1.2	0.2	1.9	0.1
2.24	1,2-Propadiene	91	Alkene	C3	0.0	0.0	0.1	0.0	0.5	0.0
2.33	Acetaldehyde	90	Oxygenate	Aldehyde	0.9	0.0	1.1	0.1	1.2	0.0
2.37	1,3-Butadiene	81	Alkene	C4	0.2	0.0	0.2	0.0	0.8	0.0
2.39	1-Propene, 2-methyl-	76	Alkene	C4	0.2	0.0	0.6	0.0	0.9	0.1
2.70	2-Propenal	64	Oxygenate	Aldehyde	0.0	0.0	0.8	0.0	0.9	0.0
2.73	Acetone	80	Oxygenate	Carbonyl	1.2	0.0	1.4	0.1	1.5	0.1
2.80	1-pentene		Alkene	C5	0.0	0.0	0.1	0.0	0.3	0.0
2.83	Furan	90	Oxygenate	Furan	1.4	0.0	1.1	0.4	0.8	0.0
2.92	1,3-Butadiene, 2-methyl-	93	Alkene	C5	0.1	0.0	0.3	0.1	0.4	0.0
3.05	3-Buten-2-one	78	Oxygenate	Carbonyl	0.6	0.0	0.4	0.0	0.0	0.0
3.18	1,3-Cyclopentadiene	94.79	Alkene	C5	0.2	0.0	0.3	0.0	0.5	0.0
3.59	2,3-Butanedione	95.07	Oxygenate	Carbonyl	0.7	0.0	0.8	0.0	0.8	0.0
3.74	2-Butanone	95.36	Oxygenate	Carbonyl	0.7	0.0	0.7	0.0	0.7	0.0
3.87	1-Hexene	95	Alkene	C6	0.3	0.0	0.3	0.0	0.4	0.0
4.00	Furan, 2-methyl-	91	Oxygenate	Furan	0.6	0.0	1.3	0.6	2.0	0.0
4.02	Carbon Monoxide (TCD)	TCD	CO	CO	0.0	0.0	1.2	2.5	2.0	0.1
4.47	Acetic acid	90	Oxygenate	Acid	0.9	0.0	0.9	0.1	0.8	0.0
4.78	1,3-Cyclopentadiene, 1-methyl-	91	Alkene	C6	0.5	0.0	0.8	0.0	1.1	0.1
5.12	Benzene	81.89	Aromatic	1-Ring	0.2	0.0	0.4	0.0	0.5	0.1

5.81	1-heptene	95	Alkene	C7	0.0	0.0	0.1	0.0	0.3	0.0
5.97	Furan, 2,5-dimethyl-	85.24	Oxygenate	Furan	0.6	0.0	1.0	0.3	1.2	0.0
6.09	Propanoic acid	46	Oxygenate	Acid	0.0	0.0	0.2	0.0	0.6	0.0
6.84	Toluene	91.1	Aromatic	1-Ring	0.2	0.0	0.4	0.1	0.6	0.1
6.95	Cyclopentanone	68.87	Oxygenate	Carbonyl	0.6	0.0	0.6	0.0	0.6	0.0
7.49	2-Cyclopenten-1-one	90	Oxygenate	Carbonyl	0.4	0.3	0.6	0.0	0.7	0.0
7.54	Furfural	64	Oxygenate	Aldehyde	0.6	0.1	0.8	0.0	0.9	0.4
8.10	Benzene, 1,3-dimethyl-	95	Aromatic	1-Ring	0.0	0.0	0.2	0.0	0.3	0.1
8.35	2-Cyclopenten-1-one, 2-methyl-	85.78	Oxygenate	Carbonyl	0.6	0.0	1.1	0.1	0.7	0.0
8.93	2-Furancarboxaldehyde, 5-methyl-	76	Oxygenate	Furan	0.4	0.4	1.0	0.4	1.1	0.4
9.18	Phenol	91	Oxygenate	Phenol	0.0	0.0	0.3	0.0	0.7	0.1
9.75	Indene	77.28	Aromatic	1-Ring	0.0	0.0	0.1	0.0	0.3	0.1
9.78	Phenol, 2-methyl-	44	Oxygenate	Phenol	0.0	0.0	0.3	0.0	0.6	0.3
9.96	Phenol, 3-methyl-	74	Oxygenate	Phenol	0.0	0.0	0.2	0.0	0.8	0.1
10.54	Phenol, 2,4-dimethyl-	46	Oxygenate	Phenol	0.0	0.0	0.2	0.0	0.4	0.3
10.61	1H-Indene, 1-methyl-	42	Aromatic	1-Ring	0.0	0.0	0.2	0.1	0.6	0.0
10.63	6-Hepten-2-one, 7-phenyl-	68	Oxygenate	Carbonyl	0.6	0.0	0.0	0.0	0.0	0.0
10.67	2,5-Cyclohexadiene-1,4-dione, 2,5-dimethyl-	58	Oxygenate	Carbonyl	0.6	0.0	0.0	0.0	0.0	0.0
10.69	Phenol, 4-ethyl-	56.07	Oxygenate	Phenol	-	-	0.2	0.0	0.6	0.0
12.90	1-Pentadecene	95	Alkene	C15	0.3	0.0	0.4	0.0	0.7	0.1

35 **Table S2.** FID Area %, and retention time of pyrolysis vapors determined by GC-MS/FID/TCD for *Opuntia ficus-indica* (Prickly pear) during
36 fast pyrolysis at temperatures ranging from 450°C to 650°C

R.T.	Compound Name	Temperature					
		450°C		550°C		650°C	
		Avg.	Stdv.	Avg.	Stdv.	Avg.	Stdv.
1.53	Ethene	1.99	0.12	5.40	1.71	10.47	0.24
2.14	Carbon dioxide	35.95	2.54	29.51	0.20	18.89	1.94
2.19	Propene	3.07	0.11	6.71	0.81	8.16	0.39
2.24	1,2-Propadiene	-	-	-	-	1.07	0.10
2.33	Acetaldehyde	4.09	0.44	5.02	0.43	3.59	0.26
2.37	1,3-Butadiene	2.75	0.04	-	-	3.52	0.22
2.39	1-Propene, 2-methyl-	3.48	0.12	5.01	1.06	4.45	0.21
2.70	2-Propenal	-	-	1.64	0.04	1.97	0.08
2.73	Acetone	8.56	0.30	7.72	0.15	5.48	0.26
2.80	1-pentene	-	-	-	-	0.80	0.02
2.83	Furan	4.25	0.30	2.26	0.32	1.43	0.07
2.92	1,3-Butadiene, 2-methyl-	0.48	0.14	0.92	0.23	1.48	0.13
3.05	3-Buten-2-one	0.61	0.17	0.27	0.11	-	-
	1,3-Cyclopentadiene	0.80	0.04	1.24	0.04	1.67	0.02

3.18							
3.59	2,3-Butanedione	1.41	0.16	2.13	0.17	1.48	0.08
3.74	2-Butanone	1.41	0.11	1.81	0.15	1.06	0.04
3.87	1-Hexene	0.38	0.01	0.44	0.02	0.74	0.04
4.00	Furan, 2-methyl-	1.03	0.09	0.78	0.19	0.95	0.04
4.02	Carbon Monoxide (TCD)	2.01	0.20	1.49	1.29	4.49	0.56
4.47	Acetic acid	4.08	0.21	3.22	1.09	1.63	0.12
4.78	1,3-Cyclopentadiene, 1-methyl-	0.54	0.04	1.13	0.19	1.60	0.21
5.12	Benzene	1.02	0.30	1.39	0.23	1.78	0.26
5.81	1-heptene	-	-	-	-	0.34	0.08
5.97	Furan, 2,5-dimethyl-	1.32	0.07	1.17	0.07	0.80	0.06
6.09	Propanoic acid	-	-	-	-	0.40	0.09
6.84	Toluene	1.93	0.07	2.27	0.31	2.37	0.05
6.95	Cyclopentanone	0.67	0.15	0.87	0.06	0.55	0.03
7.49	2-Cyclopenten-1-one	0.08	0.07	0.75	0.10	0.64	0.18
7.54	Furfural	1.04	0.70	0.51	0.31	0.57	0.09
8.10	Benzene, 1,3-dimethyl-	-	-	0.51	0.14	0.97	0.14

8.35	2-Cyclopenten-1-one, 2-methyl-	1.25	0.20	1.51	0.38	0.77	0.06
8.93	2-Furancarboxaldehyde, 5-methyl-	-	-	1.58	1.18	1.15	0.32
9.18	Phenol	-	-	-	-	1.07	0.19
9.75	Indene	-	-	-	-	0.40	0.20
9.78	Phenol, 2-methyl-	-	-	-	-	0.29	0.08
9.96	Phenol, 3-methyl-	-	-	-	-	1.73	0.38
10.61	1H-Indene, 1-methyl-	-	-	0.03	0.05	0.55	0.09
10.63	6-Hepten-2-one, 7-phenyl-	0.24	0.01	-	-	-	-
10.67	2,5-Cyclohexadiene-1,4-dione, 2,5-dimethyl-	1.11	0.08	-	-	-	-
10.69	Phenol, 4-ethyl-	-	-	-	-	0.54	0.09
12.90	1-Pentadecene	0.33	0.11	0.17	0.02	0.82	0.34

Table S3. Carbon yield (%), retention time, and classification of pyrolysis vapors determined by GC-MS/FID/TCD for *Grindelia squarrosa* (Gumweed) during fast pyrolysis at temperatures ranging from 450°C to 550°C

42

R.T.	Compound Name	MS Quality	Classification 1	Classification 2	Temperature					
					450°C		550°C		650°C	
					Avg.	Stdv.	Avg.	Stdv.	Avg.	Stdv.
1.92	Ethene	83	Alkene	C2	-	-	0.77	0.03	3.28	0.19
2.13	Carbon dioxide	4	Carbon dioxide	Carbon dioxide	11.85	1.3	14.41	0.21	17.21	1.68
2.17	Propene	42	Alkene	C3	0.35	0.03	0.74	0.15	2.84	0.08
2.24	1,2-Propadiene	87	Alkene	C3	-	-	-	-	0.44	0.03
2.31	Acetaldehyde	90	Oxygenate	Carbonyl	0.7	0.01	0.87	0.05	0.98	0.05
2.37	1-Propene, 2-methyl-	53	Alkene	C4	0.66	0.03	0.80	0.31	3.87	0.16
2.73	Acetone	86	Oxygenate	Carbonyl	0.83	0.1	0.89	0.03	1.26	0.05
2.81	Furan	91	Oxygenate	Furan	0.6	0.02	-	-	1.14	0.06
2.92	1,4-Pentadiene	94	Alkene	C5	-	-	0.43	0.04	-	-
3.03	Acetic acid, methyl ester	50	Oxygenate	Acid	0.5	0.02	0.51	0.01	1.4	0.03
3.17	1,3-Cyclopentadiene	87	Alkene	C5	0.14	0.01	0.09	0.12	0.5	0.02
3.41	2-Propenal, 2-methyl-	81	Oxygenate	Alcohol	-	-	-	-	0.56	0.04
3.54	2-Pentene, 4-methyl-, (Z)-	93	Alkane	C6	-	-	-	-	0.75	0.03
3.64	2-Pentanone	59	Oxygenate	Carbonyl	-	-	0.74	0.05	-	-
3.78	5,9-Dodecadien-2-one, 6,10-dimethyl-, (E)-	64	Oxygenate	Carbonyl	-	-	-	-	-	-
3.98	Furan, 2-methyl-	91	Oxygenate	Furan	0.49	0.02	0.25	0.35	0.59	0.02

4	Carbon Monoxide (TCD)	TCD	Carbon Monoxide	Carbon Monoxide	-	-	0.07	0.00	2.59	0.2
4.47	Acetic acid	91	Oxygenate	Acid	1.06	0.04	1.62	0.42	0.55	0.02
4.79	1,3-Cyclopentadiene, 1-methyl-	93	Alkene	C6	-	-	-	-	0.91	0.06
5.07	2-Propanone, 1-hydroxy-	72	Oxygenate	Carbonyl	0.69	0.04	0.78	0.07	-	-
5.13	Benzene	91	Aromatic	1-Ring	-	-	-	-	0.68	0.03
5.97	Furan, 2,5-dimethyl-	76	Oxygenate	Furan	0.53	0.01	-	-	0.51	0.05
6.48	Toluene	94	Aromatic	1-Ring	0.2	0.01	0.34	0.06	1.05	0.06
7.52	1,5-Dimethyl-1,4-cyclohexadiene	95	Alkane	C8	-	-	-	-	0.36	0.07
7.81	Butanoic acid, 3-methyl-	72	Oxygenate	Acid	0.48	0.01	0.54	0.08	-	-
7.92	Butanoic acid, 2-methyl-	58	Oxygenate	Acid	0.51	0.01	0.52	0.03	-	-
8.06	Cyclopentane, 2-ethylidene-1,1-dimethyl-	91	Alkane	C8	0.28	0.02	0.48	0.05	0.49	0.28
8.09	p-Xylene	97	Aromatic	1-Ring	-	-	-	-	0.68	0.12
8.3	1,3,5,7-Cyclooctatetraene	96	Alkene	C8	0.23	0.02	0.30	0.04	0.28	0.02
8.56	1,2-Cyclopentanedione	74	Oxygenate	Carbonyl	0.54	0.06	0.58	0.07	-	-
9.13	Phenol	94	Oxygenate	Phenol	1.14	0.24	1.64	0.10	0.67	0.06
9.31	Benzene, 1,2,3-trimethyl-	76	Aromatic	1-Ring	0.2	0.11	-	-	0.54	0.06
9.66	Limonene	97	Alkene	C10	0.28	0	0.34	0.04	-	-
10.04	Phenol, 3-methyl-	95	Oxygenate	Phenol	0.58	0.06	-	-	0.55	0.03
10.61	1H-Indene, 1-methyl-	95	Aromatic	1-Ring	-	-	-	-	0.59	0.06
10.85	Phenol, 2-methoxy-4-methyl-	70	Oxygenate	Methoxy Phenol	0.47	0.27	-	-	-	-
11.7	Naphthalene, 2-methyl-	93	Aromatic	2-Ring	-	-	-	-	0.4	0.16
11.71	2-Methoxy-4-vinylphenol	95	Oxygenate	Methoxy Phenol	0.66	0.04	0.69	0.05	-	-
11.92	Phenol, 2,6-dimethoxy-	74	Oxygenate	Methoxy Phenol	0.49	0.01	0.52	0.03	-	-
12.11	Naphthalene, 1,2,3,4-tetrahydro-1,1,6-trimethyl-	97	Aromatic	2-Ring	0.22	0.01	0.35	0.02	0.74	0.04

12.55	Naphthalene, 2,7-dimethyl-	94	Aromatic	2-Ring	-	-	-	-	0.31	0.04
12.6	Phenol, 2-methoxy-4-(1-propenyl)-	96	Oxygenate	Methoxy Phenol	0.49	0.03	0.50	0.02	-	-
13.14	1H-Inden-1-one, 2,3-dihydro-3,3,5,7-tetramethyl-	93	Terpenoid	Carbonyl	0.49	0	-	-	0.51	0
13.18	1H-Cycloprop[e]azulene, 1a,2,3,4,4a,5,6,7b-octahydro-1,1,4,7-tetramethyl-, [1aR-(1a.alpha.,4.alpha.,4a.beta.,7b.alpha.)]-	91	Terpenoid	Hydrocarbon	0.43	0.08	0.58	0.05	0.51	0.01
14.02	Phenol, 2,6-dimethoxy-4-(2-propenyl)-	91	Oxygenate	Phenol	0.48	0.03	-	-	-	-
15.2	5,6-Azulenedimethanol, 1,2,3,3a,8,8a-hexahydro-2,2,8-trimethyl-, (3a.alpha.,8.beta.,8a.alpha.)-	45	Terpenoid	Alcohol	1.28	0.03	-	-	-	-
15.39	Cadina-1(10),6,8-triene	94	Terpenoid	Hydrocarbon	1.63	0.15	-	-	-	-
15.41	Benzene, 1-(5,5-dimethyl-1-cyclopenten-1-yl)-2-methoxy-	41	Terpenoid	Ester	-	-	0.99	0.20	-	-
15.46	3-Buten-2-ol, 3-methyl-4-(2,6,6-trimethyl-2-cyclohexen-1-yl)-	64	Terpenoid	Alcohol	0.54	0.01	-	-	-	-
15.56	14-Oxatricyclo[9..2.1.0(1,10)]tetradecane, 2,6,6,10,11-pentamethyl-	97	Terpenoid	Hydrocarbon	0.76	0.16	0.56	0.01	-	-
15.66	1H-Indole-2,3-dione, 7-(3-methylbutyl)-	30	Terpenoid	Carbonyl	0.96	0.11	-	-	-	-
15.92	Cyclopenta[g]-2-benzopyran, 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethyl-	62	Terpenoid	Ester	1.01	0.06	-	-	0.45	0.26
16.03	8-Decenoic acid, 5-ethenyl-3,5,9-trimethyl-, methyl ester	56	Terpenoid	Acid	0.58	0.06	-	-	-	-
16.14	Thunbergol	50	Terpenoid	Alcohol	0.62	0.03	-	-	-	-
16.24	Acetic acid, 2-(2,2,6-trimethyl-7-oxa-bicyclo[4.1.0]hept-1-yl)-propenyl ester	84	Terpenoid	Acid	0.53	0.01	-	-	-	-
16.47	Silane, trimethyl[5-methyl-2-(1-methylethyl)phenoxy]-	41	Terpenoid	Ether	0.47	0.01	-	-	0.45	0.01

16.57	Alloaromadendrene oxide-(1)	47	Terpenoid	Ester	0.64	0.05	-	-	-	-
16.76	2-Aziridinone, 1-(1-adamantyl)-3-(1-methylcyclopentyl)-	51	Terpenoid	Carbonyl	0.68	0.02	-	-	-	-
17.07	3-Methoxy-8,14-secoestra-1,3,5(10),9(11)-tetraen-14,17-dione	53	Terpenoid	Ester	0.71	0.03	-	-	-	-
17.23	4-Cyclohexene-1,2-dicarboximide, N-butyl-, cis-	38	Terpenoid	Carbonyl	0.51	0.04	-	-	-	-
17.31	Grindelic acid	62	Terpenoid	Acid	0.53	0.04	-	-	-	-

43

Table S4. FID area percent, and retention time of pyrolysis vapors determined by GC-MS/FID/TCD for *Grindelia squarrosa* (Gumweed) during fast pyrolysis at temperatures ranging from 450°C to 550°C

44

R.T.	Compound Name	Temperature					
		450°C		550°C		650°C	
		Avg.	Stdv.	Avg.	Stdv.	Avg.	Stdv.
1.92	Ethene	-	-	-	-	9.34	0.42
2.1259	Carbon dioxide	12.80	0.23	17.43	2.92	9.13	0.49
2.17	Propene	1.68	0.28	3.80	0.76	8.64	0.41
2.24	1,2-Propadiene	-	-	-	-	0.77	0.07
2.31	Acetaldehyde	2.04	0.18	3.69	0.28	2.28	0.04
2.37	1-Propene, 2-methyl-	0.40	0.41	-	-	1.30	0.12
2.73	Acetone	2.92	0.68	5.09	0.46	3.40	0.12
2.81	Furan	1.29	0.14	0.23	0.33	2.91	0.23

2.92	1,4-Pentadiene	-	-	2.16	0.18	-	-
3.03	Acetic acid, methyl ester	0.54	0.14	0.40	0.03	2.25	0.25
3.17	1,3-Cyclopentadiene	0.40	0.07	0.64	0.08	1.28	0.11
3.41	2-Propenal, 2-methyl-	-	-	-	-	0.53	0.15
3.54	2-Pentene, 4-methyl-, (Z)-	-	-	-	-	0.99	0.02
3.64	2-Pentanone	-	-	1.85	0.02	-	-
3.78	5,9-Dodecadien-2-one, 6,10-dimethyl-, (E)-	-	-	0.85	0.02	-	-
3.98	Furan, 2-methyl-	0.44	0.12	-	-	0.66	0.04
4.003	Carbon Monoxide (TCD)	1.49	0.17	2.55	0.18	3.26	0.38
4.47	Acetic acid	-	-	-	-	-	-
4.79	1,3-Cyclopentadiene, 1-methyl-	-	-	-	-	0.27	0.05
5.07	2-Propanone, 1-hydroxy-	-	-	2.22	0.43	-	-
5.13	Benzene	-	-	-	-	1.78	0.14
5.97	Furan, 2,5-dimethyl-	0.74	0.04	-	-	0.34	0.17
6.48	Toluene	0.90	0.05	1.48	0.40	3.05	0.03
7.52	1,5-Dimethyl-1,4-cyclohexadiene	-	-	-	-	0.54	0.18
7.81	Butanoic acid, 3-methyl-						

		0.36	0.01	0.70	0.08	-	-
7.92	Butanoic acid, 2-methyl-	0.63	0.08	0.58	0.04	-	-
8.06	Cyclopentane, 2-ethylidene-1,1-dimethyl-	0.57	0.06	1.62	0.21	0.59	0.51
8.09	p-Xylene	-	-	-	-	1.96	0.51
8.3	1,3,5,7-Cyclooctatetraene	0.28	0.08	0.32	0.02	0.30	0.06
8.56	1,2-Cyclopentanedione	0.80	0.35	0.37	0.52	-	-
9.13	Phenol	-	-	0.56	0.08	-	-
9.31	Benzene, 1,2,3-trimethyl-	0.05	0.09	-	-	1.01	0.11
9.66	Limonene	0.54	0.06	0.73	0.02	-	-
10.04	Phenol, 3-methyl-	1.14	0.58	1.53	0.80	0.49	0.08
10.61	1H-Indene, 1-methyl-	-	-	-	-	0.72	0.15
10.85	Phenol, 2-methoxy-4-methyl-	0.23	0.23	-	-	-	-
11.7	Naphthalene, 2-methyl-	-	-	-	-	0.16	0.01
11.71	2-Methoxy-4-vinylphenol	1.69	0.18	1.60	0.11	-	-
11.92	Phenol, 2,6-dimethoxy-	0.48	0.06	-	-	-	-
12.11	Naphthalene, 1,2,3,4-tetrahydro-1,1,6-trimethyl-	-	-	-	-	0.12	0.06
12.55	Naphthalene, 2,7-dimethyl-	-	-	-	-	0.47	0.09

12.6	Phenol, 2-methoxy-4-(1-propenyl)-	0.47	0.16	0.20	0.28	-	-
13.14	1H-Inden-1-one, 2,3-dihydro-3,3,5,7-tetramethyl-	0.48	0.02	-	-	0.34	0.02
13.18	1H-Cycloprop[e]azulene, 1a,2,3,4,4a,5,6,7b-octahydro-1,1,4,7-tetramethyl-, [1aR-(1a.alpha.,4.alpha.,4a.beta.,7b.alpha.)]-	1.46	0.34	2.39	0.70	1.03	0.05
14.02	Phenol, 2,6-dimethoxy-4-(2-propenyl)-	0.36	0.16	-	-	-	-
15.2	5,6-Azulenedimethanol, 1,2,3,3a,8,8a-hexahydro-2,2,8-trimethyl-, (3a.alpha.,8.beta.,8a.alpha.)-	2.74	0.13	-	-	-	-
15.39	Cadina-1(10),6,8-triene	7.70	0.31	-	-	-	-
15.41	Benzene, 1-(5,5-dimethyl-1-cyclopenten-1-yl)-2-methoxy-	-	-	4.01	1.61	-	-
15.46	3-Buten-2-ol, 3-methyl-4-(2,6,6-trimethyl-2-cyclohexen-1-yl)-	0.83	0.05	-	-	-	-
15.56	14-Oxatricyclo[9..2.1.0(1,10)]tetradecane, 2,6,6,10,11-pentamethyl-	2.36	1.08	0.62	0.09	-	-
15.66	1H-Indole-2,3-dione, 7-(3-methylbutyl)-	3.90	0.61	-	-	-	-
15.92	Cyclopenta[g]-2-benzopyran, 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethyl-	4.23	0.13	-	-	0.03	0.04
16.03	8-Decenoic acid, 5-ethenyl-3,5,9-trimethyl-, methyl ester	1.13	0.34	-	-	-	-
16.14	Thunbergol	1.38	0.10	-	-	-	-
16.24	Acetic acid, 2-(2,2,6-trimethyl-7-oxa-bicyclo[4.1.0]hept-1-yl)-propenyl ester	0.72	0.03	-	-	-	-
16.47	Silane, trimethyl[5-methyl-2-(1-methylethyl)phenoxy]-	0.31	0.05	-	-	0.07	0.02
16.57	Alloaromadendrene oxide-(1)	1.55	0.22	-	-	-	-
16.76	2-Aziridinone, 1-(1-adamantyl)-3-(1-methylcyclopentyl)-						

		1.84	0.08	-	-	-	-
17.07	3-Methoxy-8,14-secoestra-1,3,5(10),9(11)-tetraen-14,17-dione	2.05	0.18	-	-	-	-
17.23	4-Cyclohexene-1,2-dicarboximide, N-butyl-, cis-	0.62	0.22	-	-	-	-
17.31	Grindelic acid	0.73	0.26	-	-	-	-

Table S5. Chemicals used for FID calibrations.

	Slope	Intercept
Benzene	6.9E-08	0.16
Ethylbenzene	6.7E-08	0.16
Benzene,1,3-dimethyl-	6.7E-08	0.08
Phenol	4.9E-08	0.96
Benzofuran	4.9E-08	0.96
Benzene, 1,3,5-trimethyl-	7.6E-08	0.36
Indene	6.1E-08	0.42
Naphthalene	6.9E-08	0.13
Naphthalene, 2-methyl-	6.9E-08	0.34
Phenanthrene	8.1E-08	0.42
Carbon dioxide (MS Area)	5.5E-07	-17.34
Carbon Monoxide (TCD Area)	2.4E-07	-2.74
Ethene	6.5E-08	0.11
Propene	6.5E-08	0.11
Butene	7.1E-08	-0.18
Pentene	6.8E-08	0.15
Hexene	6.9E-08	0.39

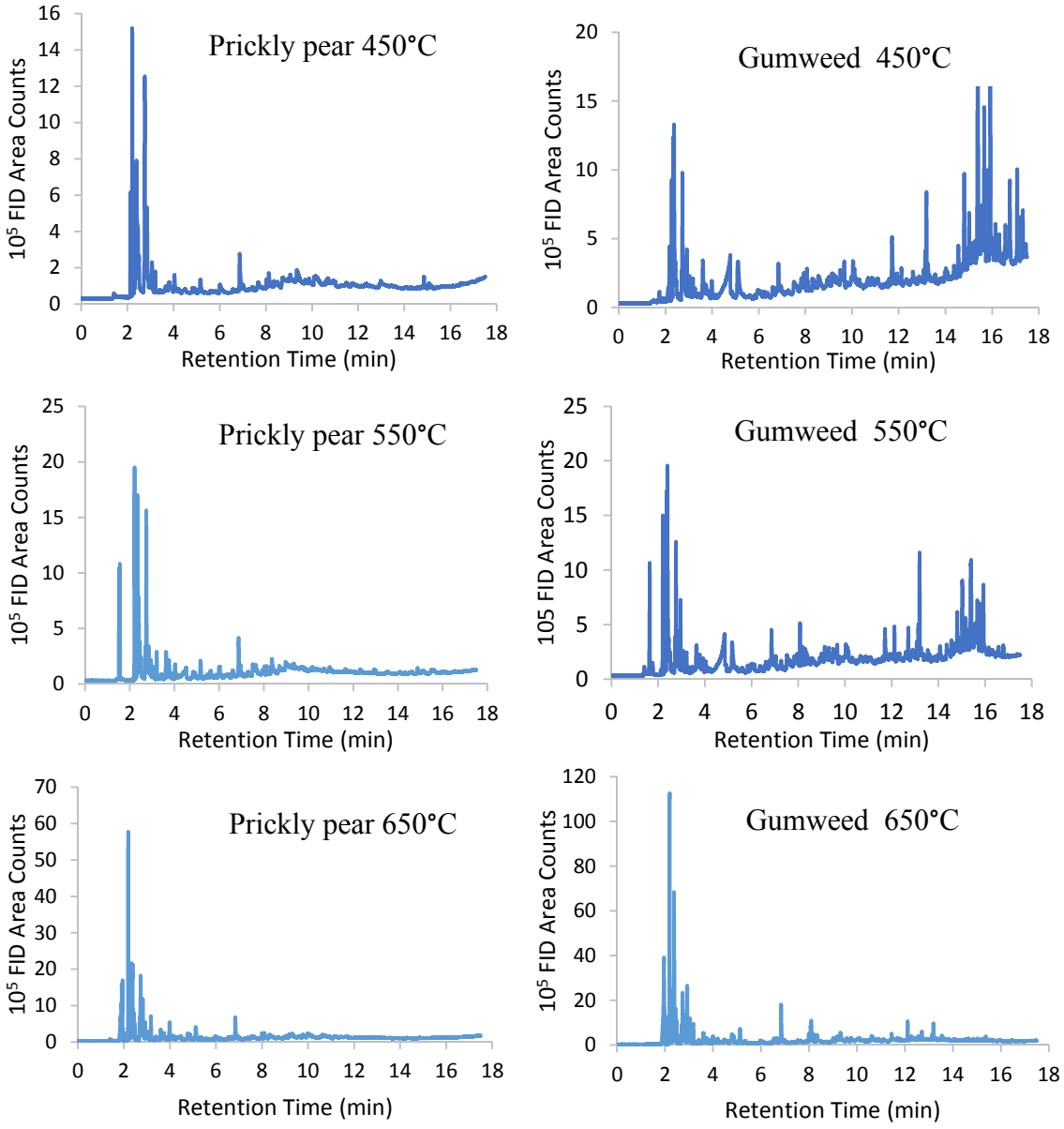

Figure S1. FID Chromatograms of *Opuntia* (prickly pear) and *Grindelia* (gumweed) at