Electronic Supplementary Material (ESI) for Sustainable Energy & Fuels.

Bio-oil and biochar production from halophyte biomass: effects of pre-treatment and temperature on *Salicornia bigelovii* pyrolysis

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Figure S5. Adsorption isotherm obtained for the char from the pyrolysis of (a) USB and (b) PSB at 600 °C. (Note: The adsorption isotherms for biochars obtained at 700 and 800 °C were qualitatively similar for both the cases).

Supplementary Data

Table S1. GC/MS Analysis of bio-oil obtained from pyrolysis of USB and PSB at different temperatures.

	Area%					
	USB			PSB		
Alkanes						
	600 °C	**700 °C**	**800 °C**	**600 °C**	**700 °C**	**800 °C**
Octane	0.1				0.11	
Undecane	0.44	0.25			0.17	
2-Isobutylbicyclo[2.2.1]heptane	0.12					
Tridecane	0.34	0.32	0.12	1.1	0.25	
Tetradecane	0.26	0.14	0.26	0.04		
Pentadecane	0.89	1.6	0.92	0.84	0.54	
Hexadecane	0.59	0.62	0.41	0.2	0.24	
Heptadecane	0.58	0.74	0.42	0.4	0.34	
Octadecane	0.32	0.29	0.29		0.08	
Cyclopropane, 1-butyl-2-methyl-	0.08	0.08			0.15	
Cyclopropane,-1-methyl-1-ethenyl				0.11		
Nonadecane	0.23	0.32	0.19			
Eicosane	0.57	0.8	0.24		0.57	
Alkenes						
1,3-Cyclopentadiene	0.36	0.83	0.88	0.64	1.01	0.96
1-Heptene					0.07	
2-Octene	0.07		0.26		0.05	
Cyclooctene		0.06				
1-Nonene	0.14	0.07			0.22	
Cycloheptene, 5-methyl-		0.11				
1-Decene		0.15				0.06
1-Undecene					0.84	
1-dodecene	0.47	0.16	0.17		1.93	1.71
Cyclohexene, 3,5,5-trimethyl-	0.13	0.26	0.31	0.08	0.03	0.56

1-Tridecene	0.49	0.39	0.16	0.34	0.25	
1-Tetradecene	0.9	0.85	0.34	0.67	0.91	
1-Pentadecene	0.52		0.48	0.59	0.71	0.47
1-Hexadecene	0.35	0.4	0.39	0.38	0.47	
: 6(E),8(E)-Heptadecadiene	0.28	0.36	0.11	0.29	0.23	
8-Heptadecene	0.93	1.71	0.83	0.92	0.26	
1-Heptadecene	0.2	0.76	0.5	0.26	0.69	
6(E),8(E)-Heptadecadiene	0.65		0.74	0.89		
(5E)-5-Tetradecene			0.07			
(4E)-8-Methyl-4-decene		0.64	0.57	0.57		0.35
Cyclonona-1,2,6-triene		0.08		0.22		
1-Nonadecene	0.27	0.19	0.28	0.21	0.2	
Cyclohexene, 1-pentyl-4-(4-propylcyclohexyl)-		0.83	0.34	0.23	0.19	0.4
Cyclooctene, 1,2-dimethyl-	0.04			0.15		
1-Tricosene	0.16	0.3	0.12		0.14	
Alkynes						
2-Hexyne, 4-methyl						
5-Undecyne	0.45					
1-Hexadecyne		0.08				
7-Pentadecyne		1.38		1.38	0.57	0.47
Amides/Amines						
Acetamide	0.25		0.74	0.27	0.04	0.82
N,N-Dimethyl formamide	0.91	0.26	0.53	0.1	1.23	0.45
Acetamide, N-methyl-	0.11		0.36		0.33	0.45
Propanamide	0.12		0.38		0.13	0.24
N,N-Dimethylacetamide	2.84	1.48	2.73	0.93	4.65	3.72
Pentanamide			0.15		0.08	0.09
Propanamide, N,N-dimethyl-	0.06		0.08			
Butanamide, 3-methyl-		0.34	0.33	0.06	0.48	0.21
Pentanamide, 4-methyl-					0.57	
Hexadecanamide	0.91	2.01	0.53	3.84	1.27	1.16

N-Methylhexadecanamide	0.95	0.65		0.65	0.32	
N ,N-Dimetylpalmitamide	1.15	1.07	0.58	1.03	0.44	0.18
9-Octadecenamide	1.34	1.88	1.74	2.15	1.44	1.93
Octadecanamide	0.2			0.34	0.28	0.03
Non-7-enoic acid, dimethylamide		0.75	0.35			
9-Octadecenamide, N,N-dimethyl-	1.25	0.59	0.18	0.73	0.59	
Behenic amide		0.16	0.13			
Methylamine, N,N-dimethyl-	0.42		0.44		0.51	
3,5-dimethyl-benzenamine					0.2	
Benzenamine, 3,4-dimethyl-	0.1					
1,3-Benzenediamine	0.12		0.24			0.35
Benzenemethanol, 2-(methylamino)-					0.14	
2-Buten-1-one, 3-amino-1-phenyl-		0.33				
Benzenamine, 3-methoxy-						0.18
Benzenemethanamine, N,N,4-trimethyl-	0.18	0.43			0.26	
Aromatic hydrocarbons						
Toluene	0.48	0.2	0.35	2.95	0.98	2.57
Xylene	0.07		0.05	0.02	0.12	
Styrene	0.11	0.04	0.16	0.13	0.18	0.18
Benzene, 2-propenyl-					0.03	
Benzene, propyl-	0.1	0.1	0.07	0.08	0.19	
Benzene, 1-ethyl-3-methyl-		0.12			0.02	
Benzene, 2-propenyl-	0.05	0.04			0.07	
Benzene, 3-butenyl-					0.16	
Benzene, butyl-	0.43	0.24	0.18	0.16	0.71	
1-Methyl-1H-indene					0.29	
Benzene, pentyl-	0.41	0.42	0.25	0.41	0.35	
Benzene, 1-methyl-4-butyl	0.66	0.21				
1,4-Dihydronaphthalene			0.1		0.11	
2,6-Xylene			0.28			0.29
Naphthalene		0.34	0.38	0.24	0.76	0.61

Benzene, hexyl-	0.9			0.54	0.28	
Naphthalene, 1,2-dihydro-6-methyl-					0.23	0.54
Naphthalene, 2-methyl-	0.26	0.07	0.39	0.17	0.19	0.11
Benzene, heptyl-	0.17	0.23	0.43	0.28		
Benzene, 1,4-bis(1-methylethenyl)-					0.09	
Benzene, heptyl-					0.08	
1-Methyl-4-n-hexylbenzene	0.14	0.07		0.09	0.06	
Naphthalene, 2,7-dimethyl-		0.08		0.18	0.15	
Benzene, 2,5-cyclohexadien-1-yl-	0.2					0.57
Naphthalene, 1,4,5-trimethyl-	0.19	0.4	0.18	0.21	0.4	0.32
Benzene, (1-methyldecyl)-	0.42	0.28	0.76			
Isopropyl biphenyl			0.07			
(4aR,5R,6R,8aR)-3,4,4a,5,6,7,8,8a-Octahydro-5-(2'-hydroxyethyl)-5,6,8a-trimethylnaphthalene-1(2H)-one ethylene			0.16	0.19		
Carbonyl compounds						
2-Pentanone					0.08	
Cyclopentanone		0.2		0.06		
2-Cyclopenten-1-one		0.12		0.17		
2-Heptanone	0.04	0.06		0.04	0.07	
2-Cyclopenten-1-one, 2-methyl-	0.34	0.83	0.42		0.45	0.91
2-Cyclopenten-1-one, 3-methyl-	0.6	0.89	0.69	0.4	0.65	1.29
2-Cyclopenten-1-one, 2-hydroxy		1.39	0.89	0.37		
2-Cyclopenten-1-one, 2,3-dimethyl-	0.48	0.45	0.96	0.19	0.66	1.6
2-Cyclopenten-1-one, 3-ethyl-2-hydroxy-		0.11			0.16	
2-METHYL-3-PARA-TOLYL PROPIONALDEHYDE	0.67	0.46			0.15	
E-9-Tetradecenal				0.12		0.16
9-Undecen-2-one, 6,10-dimethyl-				0.06		
2-Cyclohexen-1-one, 2-hydroxy-3,5,5-trimethyl-						1.86
9-Undecenal, 2,10-dimethyl-			0.09	0.28	0.18	
9-Hydroxy-7-methyl-8-oxatetracyclo[5.4.1.1(3,10).0(5,9)]tridecane-2-one	0.03		0.15		0.04	
Cyclopropanecarboxaldehyde, 1-methyl-2,2-diphenyl-				0.08		

28-Norolean-17-en-3-one		0.26	2.43	0.63	0.96	
Carboxylic compounds						
Propanoic acid, 2-methyl-		0.17				
Pyruvic acid				0.18		
Butanoic acid, 3-methyl-		0.52		0.02		0.24
Butanoic acid, 2-methyl-				0.19		
Octanoic acid		0.12	0.01			
Benzenepropanoic acid				0.08		
Nonanoic acid		0.19				
Undecylenic acid	0.16	0.12		0.56	0.28	
Cyclopentanecarboxylic acid, 3,3-dimethyl-	0.4	0.12				
Dodecanoic acid				0.27		
2-Butenoic acid, 3-methyl-		0.05				
n-Hexadecanoic acid	13.85	6.43	5.74	24.43	2.25	
Linoleic acid	6.3	4.83	4.22	4.93	0.39	1.42
Octadecanoic acid				2.76		
Esters						
Propanoic acid, 2-oxo-, ethyl ester		0.08				
Methyl 3-dimethylaminopropionate						0.36
Decanedioic acid, didecyl ester	0.45	0.35		0.15		
2-Butynedioic acid, di-2-propenyl ester		0.04			0.15	
Acetic acid, (1,2,3,4,5,6,7,8-octahydro-3,8,8-trimethylnaphth-2-yl)methyl ester		0.57				
Hexadecanoic acid, methyl ester	1.07	0.89	0.89	0.73	0.47	0.14
Hexadecanoic acid, ethyl ester	0.91	0.22	0.67	0.81		
9,12-Octadecadienoic acid, methyl ester	2.09	0.78	0.71	1.49	0.88	0.18
cis-13-Octadecenoic acid, methyl ester	0.96	0.79	0.55	0.64		0.13
cis-7,*cis*-11-Hexadecadien-1-yl acetate						0.23
9-Hexadecenoic acid, methyl ester	0.56		0.31	0.47	0.26	
9,12-Octadecadienoic acid, ethyl ester	1.07		0.33			
cis-7,*cis*-11-Hexadecadien-1-yl acetate	0.12	0.21			0.11	0.19

9-Octadecynoic acid, methyl ester	0.09					
Methyl 9-cis,11-trans-octadecadienoate		0.14				
Methyl 9,12-heptadecadienoate	0.08	0.21	1.04	0.11		
Ethyl 9,12-hexadecadienoate	0.07		0.57	0.77		0.35
Methyl 9,12-heptadecadienoate		0.34	0.31			
N-aromatic compounds						
2-Methyl-1-pyrroline			0.31		0.39	0.3
1H-Pyrazole, 1-ethyl-3,5-dimethyl-			0.28		0.48	0.37
Pyrazine	0.26	0.29		0.15		
Pyrimidine	0.07				0.07	
1H-Pyrrole, 1-methyl-	0.77	0.39	0.51		1.48	0.92
Pyridine	1.16				1.1	0.39
(1H)-pyrrole	0.59	0.39	0.47	0.16	1.16	0.83
Pyridine, 2-methyl-	1.06	0.69	0.84	0.29	1.79	1.32
2-methyl pyrazine	0.03					
1H-Pyrrole, 1-methyl-	0.18			0.15	0.05	
Pyridine, 2-ethyl-	0.69	0.8	0.38		0.94	0.64
Pyrazine, 2,6-dimethyl-	0.14	0.08	0.1	0.05	0.19	0.18
Pyrazine, ethyl-					0.15	0.17
Pyrazine, 2,3-dimethyl-	0.35	0.22	0.19	0.42	0.6	0.42
Pyridine, 2,4-dimethyl-	0.07	0.12				
Pyridine, 2,3-dimethyl-	0.02	0.03	0.04		0.03	
Pyridine, 3-ethyl-			0.28			0.27
2-Pyrimidinamine	0.13	0.54			0.11	0.13
Pyrazine, 2-ethyl-6-methyl-	0.28	0.13	0.3	0.09	0.33	0.35
Pyridine, 3-methoxy-		0.5	0.17	0.16		
2,3,5-trimethyl pyrazine	0.81	0.26	0.47	0.2	1.06	1.5
2-Aminopyridine	0.09				0.06	
Pyridine, 2-ethyl-6-methyl-	0.08					
Dimethyl-(1H-pyrrol-3-ylmethyl)-amine					0.22	
1H-Pyrrole-2-methanamine, N,N-dimethyl-	0.55	0.13	0.8	0.08	1.16	0.63

2-Amino-4-methylpyrimidine		0.17	0.23	0.11		0.26
Ethanone, 1-(1H-pyrrol-2-yl)-	0.53	0.07			1.27	0.46
1H-Pyrazole, 1,3,5-trimethyl-	0.23	1.36	0.49	1.29	0.62	0.8
2-Pyrrolidinone	0.21					
Pyrazine, 2-ethyl-3,5-dimethyl-				0.02	0.39	
2-Pyridinamine, 3-methyl-	0.51				0.14	
2-Amino-4,6-dihydroxypyrimidine				0.09		
2-Pyrazinamine		0.11	1.17	0.06	0.68	1.87
3-Pyridinol		0.13			0.53	
2(1H)-Pyridinone, 6-methyl-			0.2		0.34	
4-Pyrimidinamine, 2,6-dimethyl-		0.8	0.39	0.13		0.31
2,5-Pyrrolidinedione	0.36					
3,4,5-Trimethylpyrazole				0.38		1.74
2,5-Pyrrolidinedione, 3-methyl-	0.14		0.68			
Pyrazine, 3,5-diethyl-2-methyl-		0.14				
3-Pyridinol, 6-methyl-			0.5		1.35	
Imidazole, 1,4,5-trimethyl-			0.18		0.14	0.19
1H-Imidazole, 4,5-dimethyl-	0.62					
2-methyl 5H-6,7-dihydrocyclopentapyrazine	0.43				1.28	0.08
1H-Pyrazole, 1,3,4,5-tetramethyl-			0.67			
1H-Imidazole, 1,2,4,5-tetramethyl-	0.31	0.16	0.19		0.1	
2-Amino-4-methylpyrimidine		0.55				0.18
1,2-Bis(2-propenyl)pyrrole	0.17	0.28	0.52		0.47	1.28
Picolinamide		0.36			0.25	1.52
5,5-Dimethyl-1-oxy-4,5-dihydro-3H-pyrrol-2-ylamine			0.3			
Pyrazine, 2-ethyl-5-methyl-	1.42	0.82	2.58	1.23	0.98	3.99
1H-Indole					1.01	0.2
2,4-Imidazolidinedione, 5,5-dimethyl-	0.12		0.04			
2,4-Imidazolidinedione, 5-methyl	0.32	0.22				
5-(3-Ethoxy-4,5-dihydro-isoxazol-5-yl)-5-methyl-imidazolidine-2,4-dione					0.22	1.23

3-Methoxy-2,5-dimethylpyrazine			0.15	0.11	0.15	0.15
2,4-Imidazolidinedione, 5-ethyl-5-methyl-					2.23	0.3
1H-Indole, 5-methyl-	0.35	0.27	0.58	0.53		0.91
1H-Benzimidazole, 2-methyl-					0.11	
2,4-Imidazolidinedione, 5-(2-methylpropyl)-			0.59		2.53	1.18
5-Isopropyl-2,4-imidazolidinedione	1.15					
Pyridine, 4-ethyl-		0.25			0.07	0.18
1,2-Dimethyl-5-vinylpyrrole			0.21		0.15	0.14
6-Methylthieno[2,3-b]pyridine					0.42	0.45
(3R,8aS)-3-Methyl-1,2,3,4,6,7,8,8a-octahydropyrrolo[1,2-a]pyrazine-1,4-dione	0.29		0.8		0.33	2.09
2-Amino-3-cyano-5-aldoximinopyrazine-1-oxide				0.05		
Ethanone, 1,1'-(3-amino-2,4-pyridinediyl)bis-			0.49	0.56		
Thioguanine		0.14				
Pyrrolo[1,2-a]pyrazine-1,4-dione, hexahydro-	0.28	0.27	0.47	0.49	0.29	1.03
Acetamide, N-(4-oxo-1,4-dihydro-2H-quinazolin-3-yl)					0.16	0.29
9H-Carbazole	0.12			0.19	0.13	
3,7-dimethyl-1H-purine-2,6(3H,7H)-dione		0.06			0.09	0.15
5H,10H-Dipyrrolo[1,2-a:1',2'-d]pyrazine-5,10-dione, octahydro-		1.1	1.04		1.67	1.4
9H-Pyrido[3,4-b]indole	0.24	0.24	0.26	1.06	0.65	0.68
Pyrrolo[1,2-a]pyrazine-1,4-dione, hexahydro-3-(phenylmethyl)-			0.36			0.42
Nitriles/Cyano compounds						
Methane, isothiocyanato-		0.1	0.08		0.08	
Butanenitrile, 3-methyl					0.18	0.16
Acetonitrile			2.37	0.11		
Cyanamide, dimethyl-			0.24			
Pentanenitrile, 4-methyl-			0.19		0.24	
Pentanitrile	0.11			0.27		
Hexanenitrile	0.05					
Propanenitrile, 3-(dimethylamino)-	0.29	0.19	0.5	0.1	1.77	0.57
3-Dimethylaminoacrylonitrile					0.11	

Benzyl nitrile	0.23	0.23	1.08	0.21	0.28	0.29
2-Butenenitrile, 2-(ethylamino)-					0.07	
Benzene-propanenitrile	0.45	0.59	0.34	0.45	0.57	0.81
Benzeneacetonitrile, 4-methoxy-	0.11		0.12		0.23	0.19
2-Butenenitrile, 4-(2-methyl-4-thiazolyl)-4-oxo-				0.11		0.14
Pentadecanenitrile	1.81	2.74	1.12	2.07	0.76	0.39
Oleanitrile	1.1	0.32	0.38	0.72	0.29	
heptadecanenitrile	1.32	0.52	0.13	0.32		
Octadecanenitrile	0.29	0.76	0.12	0.18	0.1	
Nonadecanenitrile	0.29	0.48	0.19	0.65		
Other N-containing compounds						
2-Piperidinone	0.26	0.17	0.23			0.6
Glutarimide		0.14		0.08		
2-Pyrrolidinone, 4,4-dimethyl-5-methylidene-						0.2
Piperazine, 1,4-dimethyl-					0.53	
5-Ethylhydantoin			1.69		1.71	3.43
4-Morpholineethanamine	1.15					
Piperidine, 2-propyl-				0.34		
5-Isopropyl-2,4-imidazolidinedione		0.36	0.09			4.37
4-(2-Hydroxypropyl)morpholine			1.85		4.2	0.23
2,4-Dimethyl-3-nitrobicyclo[3.2.1]octan-8-one		0.05				0.12
Indeno[1,2-b]azirine, 1,1a,6,6a-tetrahydro-3-methoxy-		0.03				
Phenols						
1,3-Benzenediol, 2-methyl-					0.12	0.14
Phenol	0.38	2.37	0.2	0.83	1.19	3.2
o-Cresol	0.25	0.14		0.04		
m-Cresol				0.03		
p-Cresol	0.33	1.63	2.33	0.5	2.23	3.9
Phenol, 2-methoxy-	1.06	1.51	1.66	0.86		2.32
Phenol, 4-methoxy	0.3				0.82	0.82
Phenol, 2,3-dimethyl-		0.4			0.28	

m-Ethyl-phenol	0.19	0.1	0.81	0.31		0.58
Guaiacol, 4-ethyl-	0.21	0.56	0.16	0.23	0.13	
2-Methoxy-4-vinylphenol	0.06	0.32	0.21	0.43		0.44
Phenol, 2,6-dimethoxy-	0.11	0.46	1.42	0.22		0.57
Phenol, 2-methoxy-4-(2-propenyl)	0.07	0.18	0.13	0.29		
(3-Methylphenyl) methanol, n-propyl		0.16	0.42			0.12
Benzene, 1-methyl-4-(phenylmethyl)-			0.91	0.46		
1-Hydroxy-1-phenyl-2-butyne			0.13			
Phenol, 4-phenoxy-		0.74			0.47	
Phenol, 3,5-dimethoxy-		0.27	1.26		1.08	0.9
Phenol, 3,4-dimethoxy-	0.32	0.17	0.75	0.54		0.37
Others						
[1,4,7]Trioxonane		0.08				
2-Propanone, 1-(acetyloxy)-				0.12		
2H-Pyran-2-one		0.1	0.11			
1H-Inden-1-one				0.09		
1-Methoxy-1,3-cyclohexadiene					0.21	
5-Methylene-1,3a,4,5,6,6a-hexahydropentalen-1-ol		0.19				
Bicyclo[2.2.1]heptan-2-ol, 1,7,7-trimethyl-,		0.09				0.11
6-Octen-1-ol, 3,7-dimethyl-		0.22		0.12		
3-Phenpropanol, 2'-hydroxy-3',4',6'-trimethyl-		0.11	0.39			
Pentamethylenehydantoin	0.25		0.17	0.12	0.45	
1-Oxaspiro[4.5]dec-3-ene, 2,6,6-trimethyl-10-methylene-						0.14
3,5,5-Trimethyl-2-hydroxy-1-cyclohexanone-2-ene		0.68	0.12			
9-Hydroxy-7-methyl-8-oxatetracyclo[5.4.1.1(3,10).0(5,9)]tridecane-2-one	0.09	0.1	0.08	0.08	0.1	0.16
6-Methylbicyclo[4.4.0]decane-2,9-diol				0.14		
E,E,Z-1,3,12-Nonadecatriene-5,14-diol		0.18				
8-Methyl-nonanoic acid, pyrrolidide		0.12		0.14		
Undecanoic acid, pyrrolidide	0.14					
2-[4-(2-Oxiranylmethoxy)phenyl]acetamide		0.28				

Glycine, N,N-dimethyl-, ethyl ester			1.05			
N,N-dimethyl urea	0.09			0.2		0.36
Oxazole, trimethyl-		0.25	0.9		1.36	0.41
3,5-Dioxo-1,2,4-triazine		0.41				
Furan derivatives						
2-Furanmethanol					0.06	0.19
Ethanone, 1-(2-furanyl)-		0.31	0.26		0.41	0.59
2(3H)-Furanone, dihydro-	0.38			0.09		
2(3H)-Furanone, dihydro-5-methyl-		0.05				
2,4-Dimethylfuran					1.12	
4-Methyl-2(5H)-furanone		0.13				
Ethanone, 1-(2-furanyl)-2-hydroxy-			0.67			
2,5-Dimethyl-3-ethylfuran			0.17			
2,3-Dihydro-benzofuran				0.06	0.04	
5-Ethyl-2-furaldehyde		0.17			0.24	
2(3H)-Benzofuranone, 3a.alpha.,4,5,6,7,7a.alpha.-hexahydro-		0.3		0.03		
2-Methyl-3-furanthiol			0.05			0.38
4-Hydroxy-5-hexylfuran-2(5H)-one	0.34		0.3			0.46
4,5-dihydro-3aH-benzo[e]benzofuran-2-one				0.99		
5-Isopropylidene-3,3-dimethyl-dihydrofuran-2-one	0.7					
2,5-Furandione, 3-dodecyl-	0.24	0.56	0.1	0.73		

Table S2. Different functional groups observed in the FTIR spectra of biochar obtained from the pyrolysis of USB and PSB.

Wavenumber (cm^{-1})	**Functional group assigned**
3325	O-H stretching/ aliphatic secondary amine, NH stretching
2925 and 2855	aliphatic C-H stretching
1737	C=O (aldehydes/ketones)
1625	secondary amine, NH bend
1573	aromatic C=C-C ring stretching/ secondary amine NH bend
1407	phenol or tertiary alcohol OH bend
1370	methyne C-H bend/ phenol or tertiary alcohol OH bend
1240	skeletal C-C vibrations
1030	skeletal C-C vibrations/ cyclohexane ring vibrations/ aromatic C-H in-plane-bend/ C-O and C-O-C bonds stretch
900–940	skeletal C-C vibrations/ aromatic C-H out-of-plane bend
828–874	aromatic C-H out-of-plane bend

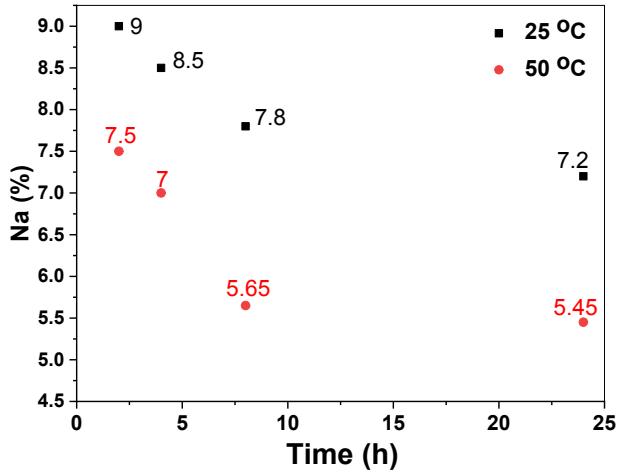


Figure S1. Effect of time and temperature on the Na content present in SB.

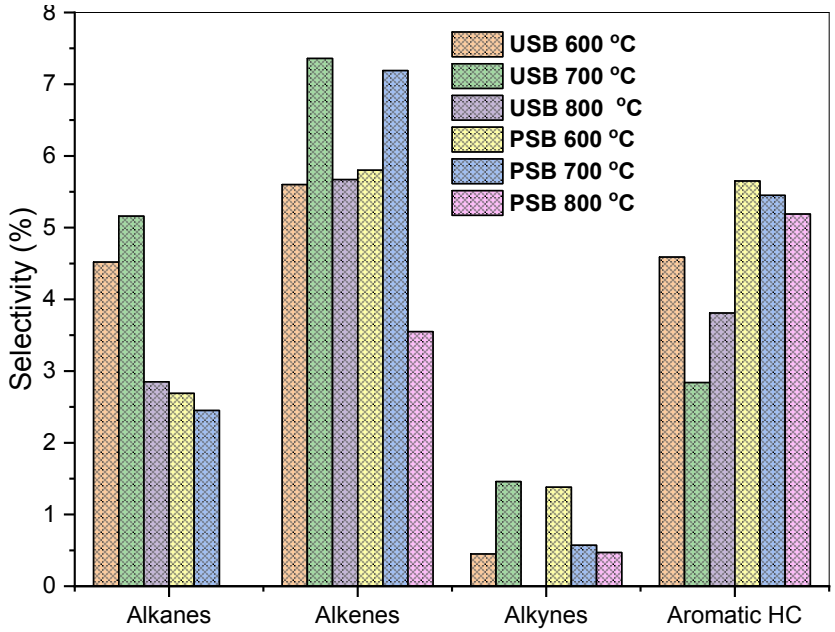


Figure S2 (a). Selectivity to various hydrocarbons in the bio-oil obtained from pyrolysis of USB and PSB at different temperatures.

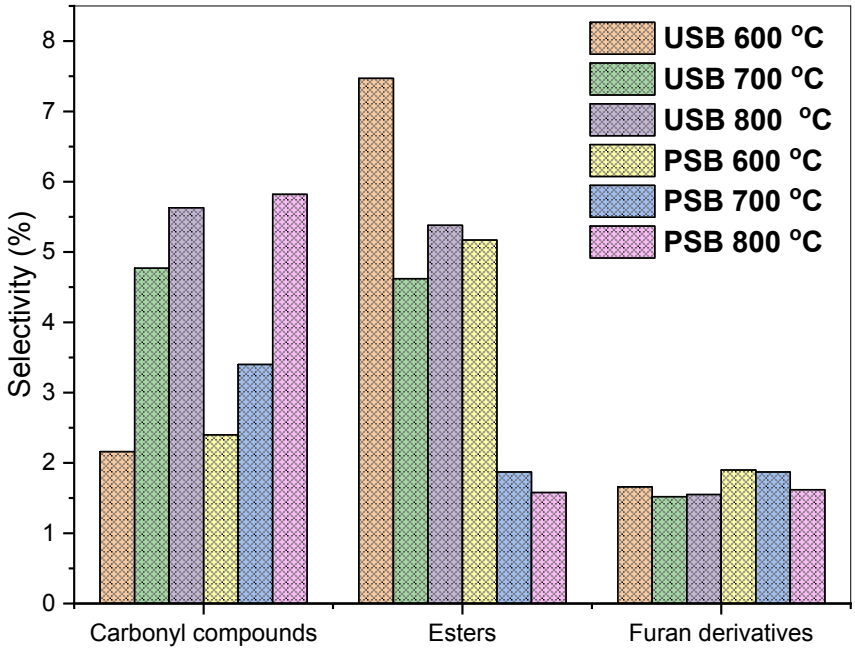


Figure S2 (b). Selectivity to various oxygenated compounds in the bio-oil obtained from the pyrolysis of USB and PSB at different temperatures.

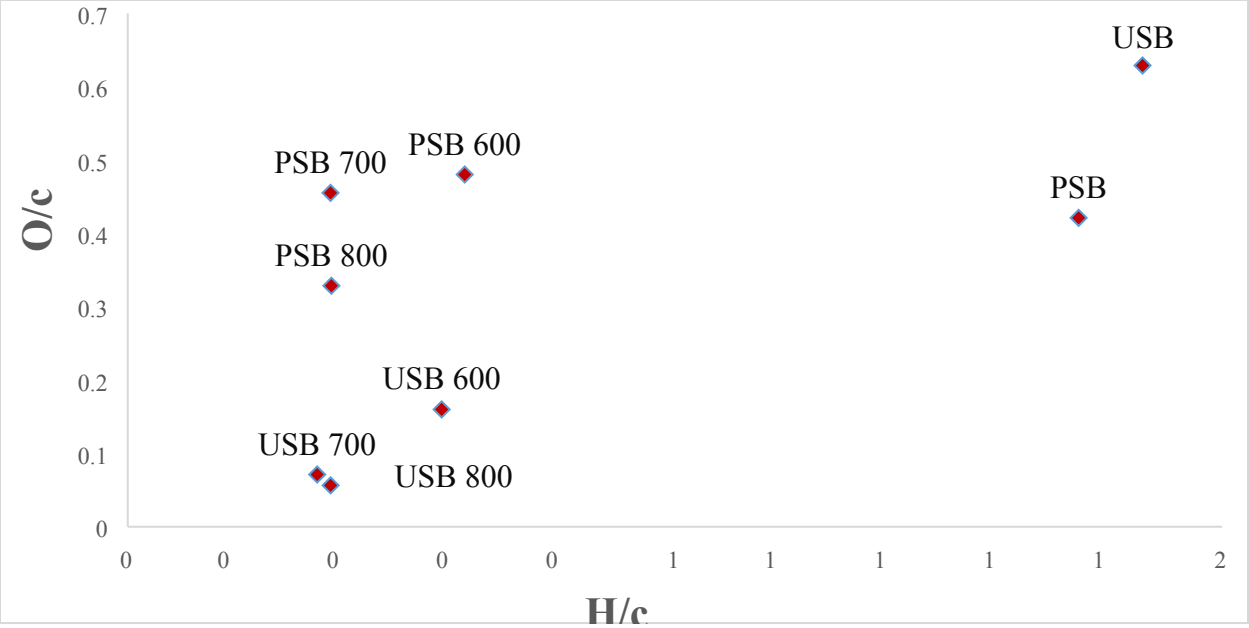


Figure S3. Van Krevelen diagram of the biomass (USB and PSB) and the biochars obtained from the pyrolysis of USB (USB 600, USB 700 and USB 800) and PSB (PSB 600, PSB 700 and PSB 800) at 600, 700 and 800 °C.

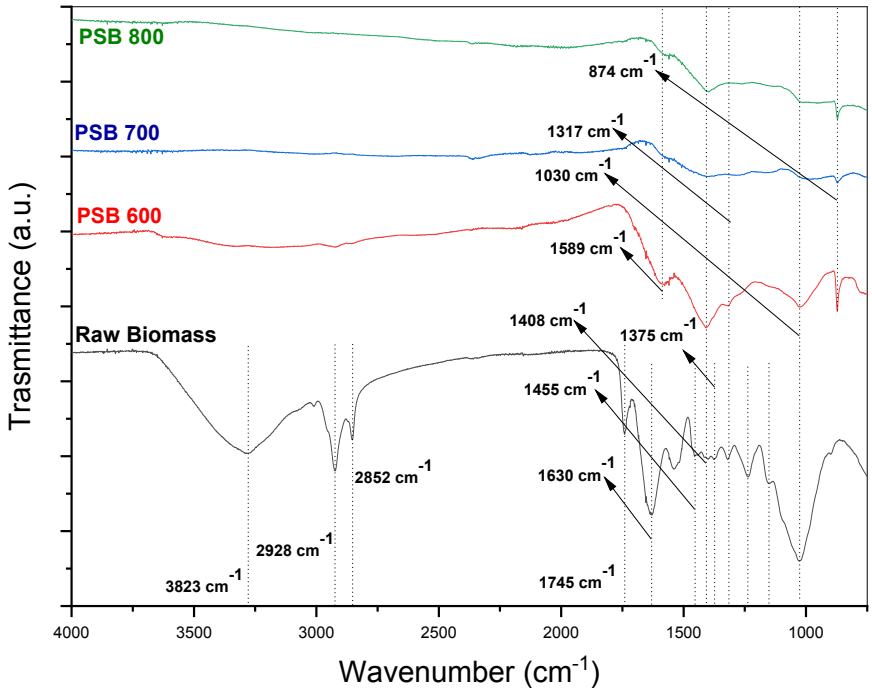
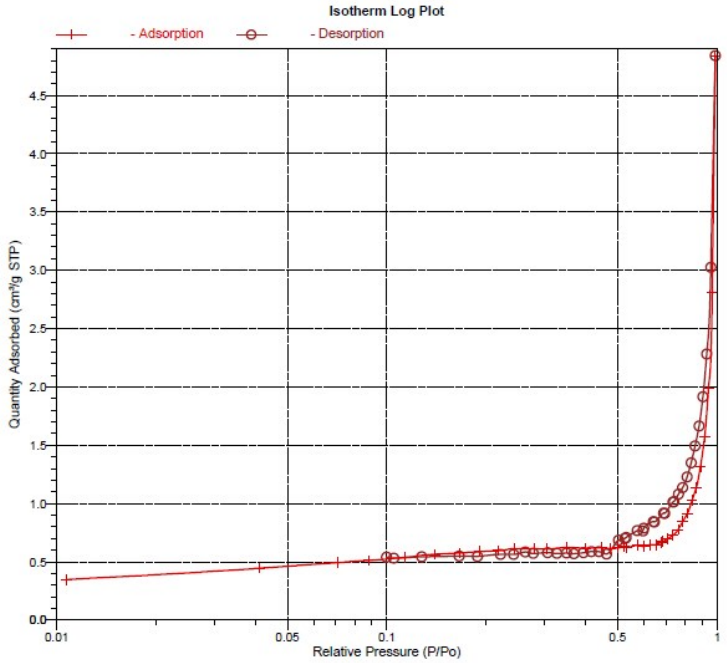
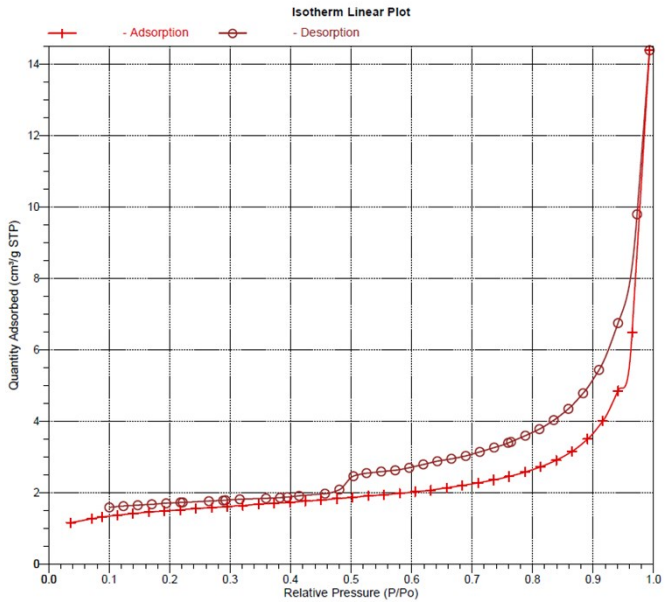


Figure S4. FTIR spectra of PSB and pyrolysis biochar obtained at different temperatures.



(a)



(b)

Figure S5. Adsorption isotherm obtained for the char from the pyrolysis of (a) USB and (b) PSB at 600 °C. (Note: The adsorption isotherms for biochars obtained at 700 and 800 °C were qualitatively similar for both the cases).