Supporting Information

Methanolysis fractionation and catalytic conversion of poplar wood toward methyl levulinate, phenolics, and glucose.

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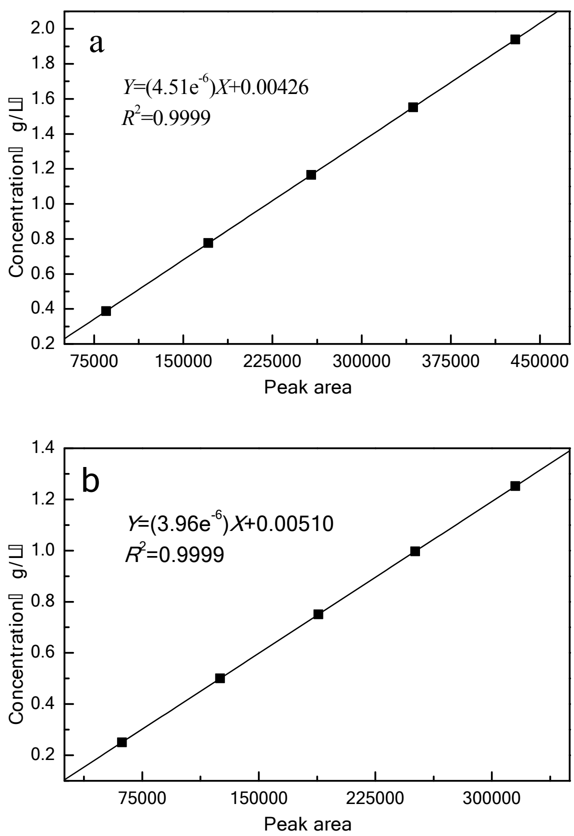

a. Methyl xyloside; b. Methyl glucoside

Fig.S1 The standard curve of concentration of methyl xyloside and methyl glucoside.

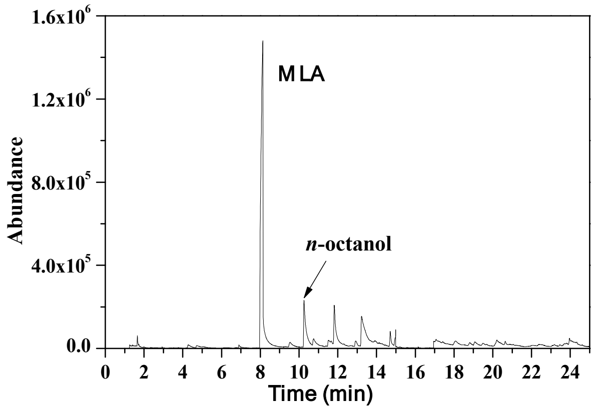

Fig.S2 GC chromatograms for quantitative analysis of methyl levulinate by internal standard method

Table S1 Methanolysis of poplar wood with different acid and acid concentration

Catalytic [a]	Amount of acid equivalent	Conv. (%)	Yield of methyl glycoside (%)	Delignification (%)	Carbohydrate retention (%)	
					Cellulose	Hemicellulose
No acid		18.24	5.31	18.04	95.25	87.54
H_2SO_4	1	52.25	24.85	74.21	82.63	14.33
	2	60.27	30.54	78.35	74.15	10.13
HCl	1	26.62	7.29	36.54	90.21	82.34
	5	33.70	10.43	43.27	84.66	62.45
	10	40.21	16.77	50.25	73.34	38.39
	15	42.57	18.52	54.45	68.97	34.54
H_3PO_4	1	25.39	7.04	30.64	91.42	85.33
	5	31.37	9.49	38.47	82.34	70.15
	10	37.06	15.64	46.93	78.83	42.53
	15	39.87	16.37	50.25	76.34	37.56
HPW	0.1	24.34	8.12	32.48	90.46	83.15
	0.2	36.17	13.35	47.52	80.83	62.17
	0.3	45.35	18.42	52.32	76.34	23.51
$C_7H_7SO_3H$	1	49.36	21.48	61.32	70.34	16.51
	2	57.87	26.37	66.37	65.87	10.27
p-TSOH	1	51.71	25.92	69.56	78.53	18.12
	2	60.24	29.28	74.65	74.38	13.36

[a] Reaction conditions: temperature: 160°C; catalyst: 1.0 g; poplar: 20 g; methanol: 200 mL; time: 40min. The acid dose is based on the amount of H_2SO_4.

Table S2 Decomposition behavior of the methyl-β-D-xylopyranoside at various temperatures

Reaction temperature/°C	Reaction time/min	Conversion/%	Byproducts	
			furfural/%	β-methoxy-2-furanethanol /%
200	10	94	8	42
180	10	65	5	40
160	10	27	3	18
140	10	19	-	12
120	10	5	-	-

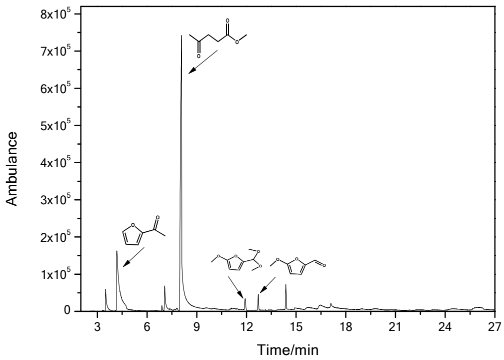

Fig S3. The GC-MS analysis of product distributions of the conversion of methyl glycoside in methanol/DMM

Table S3. Molecular distribution (Mw and Mn) and polydispersity (Mw/Mn) of the lignin fragments.

Sample	Mw /g mol^{-1}	Mn /g mol^{-1}	Mw/Mn
Lignin 1#	2376	1443	1.65
Lignin 2#	1316	723	1.82
Lignin oil	368	251	1.47

Table. S4 The composition analysis of the lignin oil based on the GC-MS analysis

Type	Retention time (min)	Compounds	Relative content (%)
	15.109	4-Hydroxy-3-methoxybenzaldehyde	6.73
	15.932	Benzene, 1,3-bis(1-methylethenyl)-	1.07
	19.938	2-methoxy-4-propylphenol	14.50
	22.633	4-Hydroxy-3-methoxyphenylacetic acid	9.85
	24.829	4-Hydroxy-3-methoxyphenethanol	2.83
	25.287	3-methoxy-4-hydroxybenzoic acid methyl ester	6.12
	25.511	(1,1'-Biphenyl)-2,2'-dicarboxaldehyde	2.25
	27.546	Benzaldehyde, 3,4-dimethoxy-, methylmonoacetal	3.67
	28.192	2-(3,5-dimethoxy-4-methylphenyl)ethanol	11.58
	29.139	3,5-diethyl-4-methylbenzaldehyde	4.18
	31.696	3-(4-hydroxyphenyl)-2-propenoic acid methyl ester	7.80
	34.013	1-(2,2-dimethoxyethyl)-4-methoxybenzene	6.70
		Total	**77.28**
	9.739	Pentanoic acid, 4-oxo-, methyl ester	**3.61**
	11.963	1,4-Cyclohexanedione	1.46
	14.723	5-methoxymethyl-furfural	4.17
Others	15.927	Pentanoic acid, 4,4-dimethoxy-, ethyl ester	1.78
	21.759	Methyl-α-D-Xylofuranoside	6.09
	24.571	Methyl(methyl 4-O-methyl-.alpha.-d-mannopyranoside)uronate	3.68
		Total	**20.79**