Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary Information

Effluent of Cooking with Active Oxygen and Solid Alkali (CAOSA): Components Separation, Recovery and Characterization

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S1. Figures

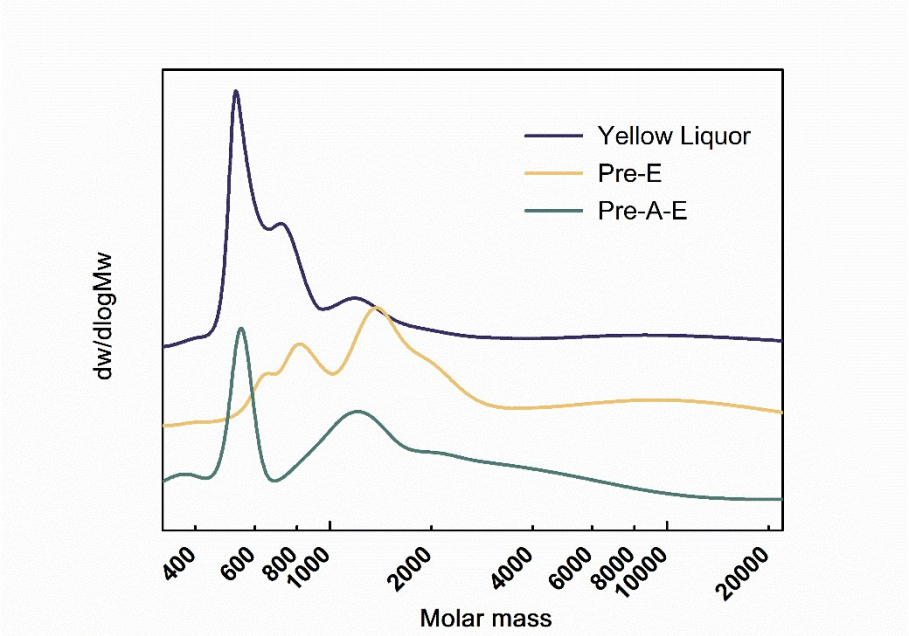

Figure S1 GPC results of YL/Pre-E/Pre-A-E

S2. Tables

Table S1 Dry components and precipitates in YL

Entry	Dry components in YL/%	Precipitates in YL dry components/%			
		Pre-E	Pre-E-A	Pre-A	Pre-A-E
1	10.52	82.83	1.59	15.55	4.31
2	11.13	81.77	1.66	15.47	4.23
3	10.73	81.36	1.81	15.49	4.33
4	10.99	81.64	1.73	15.44	4.34
5	10.39	81.73	1.81	15.41	4.28
Average	10.75	81.87	1.72	15.47	4.30

Table S2 Ash contents of YL dry components and precipitates

Entry	Ash content/%				
	YL	Pre-E	Pre-E-A	Pre-A	Pre-A-E
1	25.23	27.03	3.35	1.63	0.81
2	25.77	27.58	3.78	1.64	0.88
3	25.06	28.21	3.82	1.7	0.84
Average	25.35	27.61	3.65	1.66	0.84

Table S3 Assignments of main ^{13}C-^{1}H cross-signals in the HSQC spectra of MWL

Label	δ_C/δ_H (ppm)	Assignments
C_β	53.1/3.46	C_β-H_β in phenylcoumaran (C)
B_β	53.5/3.07	C_β-H_β in β-β (resinol) (B)
OCH_3	56.4/3.70	C-H in methoxyls
A_γ	59.9/3.35-3.80	C_γ-H_γ in β-O-4 substructures (A)
A'_γ	63.0/4.36	C_γ-H_γ in γ-acylated β-O-4 (A')
C_γ	62.2/3.76	C_γ-H_γ in phenylcoumaran (C)
B_γ	71.2/3.82-4.18	C_γ-H_γ in β-β (resinol) (B)
A_α	71.8/4.86	C_α-H_α in β-O-4 unit (A)
A_β(G)	83.4/4.38	C_β-H_β in β-O-4 linked to G (A)
B_α	84.8/4.66	C_α-H_α in β-β (resinol) (B)
A'_β(G)	80.8/4.52	C_β-H_β in β-O-4 linked to G (A')
A_β(S)	85.8/4.12	C_β-H_β in β-O-4 linked to S (A)
C_α	86.8/5.45	C_α-H_α in phenylcoumaran (C)
$T'_{2,6}$	103.9/7.34	$C'_{2,6}$-$H'_{2,6}$ in tricin (T)
T_6	98.9/6.23	$C_{2,6}$-$H_{2,6}$ in tricin (T)
T_8	94.2/6.60	C_8-H_8 in tricin (T)
T_3	106.2/7.07	C_3-H_3 in tricin (T)
$S_{2,6}$	103.9/6.70	$C_{2,6}$-$H_{2,6}$ in syringyl unit (S)
$S'_{2,6}$	106.3/7.32	$C_{2,6}$-$H_{2,6}$ in oxidized S unit (S)
G_2	110.8/6/97	C_2-H_2 in guaiacyl unit (G)
G_5	114.5/6.70	C_5-H_5 in guaiacyl unit (G)
G_6	119.0/6.78	C_6-H_6 in guaiacyl unit (G)
$H_{2,6}$	127.7/7.17	$C_{2,6}$-$H_{2,6}$ in p-hydroxyphenyl unit (H)
$PCE_{3,5}$	115.6/6.77	$C_{3,5}$-$H_{3,5}$ in p-Coumarates (PCE)
$PCE_{2,6}$	130.2/7.48	$C_{2,6}$-$H_{2,6}$ in p-Coumarates (PCE)

PCE_7	144.8/7.51	C_7-H_7 in p-Coumarates (PCE)
PCE_8	113.7/6.24	C_8-H_8 in p-Coumarates (PCE)
FA_2	110.7/7.35	C_2-H_2 in p-Ferulate (FA)
FA_6	123.1/7.20	C_6-H_6 in p-Ferulate (FA)
FA_7	144.8/7.51	C_7-H_7 in p-Ferulate (FA)

Table S4 Band assignment of lignin in FTIR spectra

Entry	Wavenumber(cm^{-1})	Functional group
1	3412-3460	O-H stretch
2	3000-2842	C-H stretch in methyl and methylene groups
3	2900	C-H aliphatic axial deformation
4	2865	C-H of methoxy group
5	1738-1709	C=O stretch in unconjugated ketone, carbonyl and in ester groups; conjugated aldehydes and carboxylic acids absorb around and below 1700 cm-1
6	1655-1675	C=O stretch ; in conjugated p-subst. aryl ketones; strong electronegative substituents lower the wavenumber
7	1593-1605	aromatic skeletal vibrations plus C=O stretch; S > G; G condensed > G etherified
8	1505-1515	aromatic skeletal vibrations; G > S
9	1460-1470	C-H deformations; asym. in -CH3 and -CH2-
10	1422-1430	aromatic skeletal vibrations combined with C-H in-plane deform
11	1365-1370	aliphatic C-H stretch in CH3, not in OMe; phen. OH
12	1325-1330	S ring plus G ring condensed
13	1266-1270	G ring plus C=O stretch
14	1221-1230	C-C plus C-O plus C=O stretch; G condensed > G etherified
15	1166	typical for HGS lignins; C=O in ester groups (conj.)
16	1140	aromatic C-H in-plane deformation; typical for G units; whereby G condensed > etherified (typical

		for S units); plus secondary alcohol plus C=O stretch
17	1086	C-O deformation in secondary alcohols and aliphatics ethers
18	1030-1035	aromatic C-H in-plane deformation, G > S; plus C-O deform, in primary alcohols; plus C=O stretch (conj.)
19	966-990	-CH=CH- out-of-plane deform
20	915-925	C-H out-of-plane; aromatic
21	853-858	C-H out-of-plane in position 2,5, and 6 of G units
22	834-835	C-H out-of-plane in position 2,6 of S and in all position of H units
23	817-832	C-H out-of-plane in positions 2,5 and 6 of G units