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

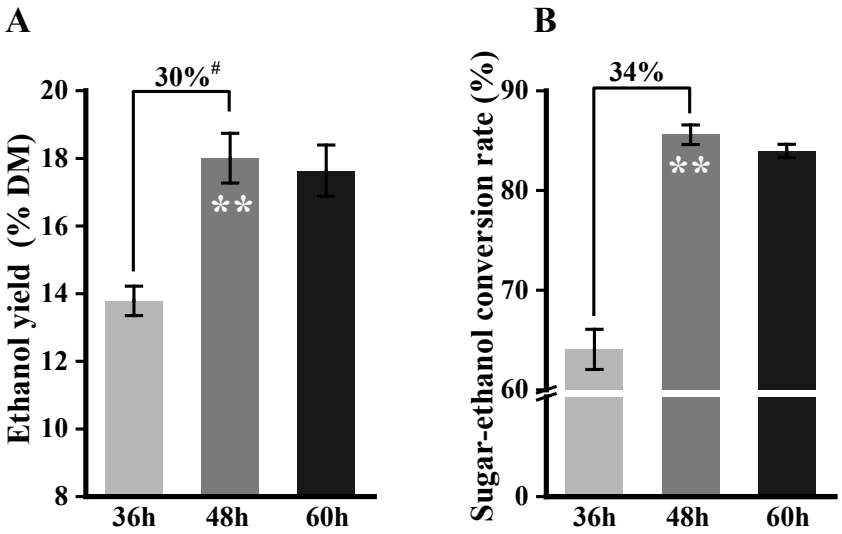

Fig. S1 A time course of yeast fermentation for bioethanol production by using hexoses as carbon source released from enzymatic hydrolysis after optimal green liquor pretreatment with the BP-1 banana sample. (A) Ethanol yield (% dry matter); (B) Sugar-ethanol conversion rate (%). # Indicated the increased percentage by subtraction of two values divided by the value of 36 fermentation. **Indicated significant differences by *t*-test at $p < 0.01$ (n = 3).

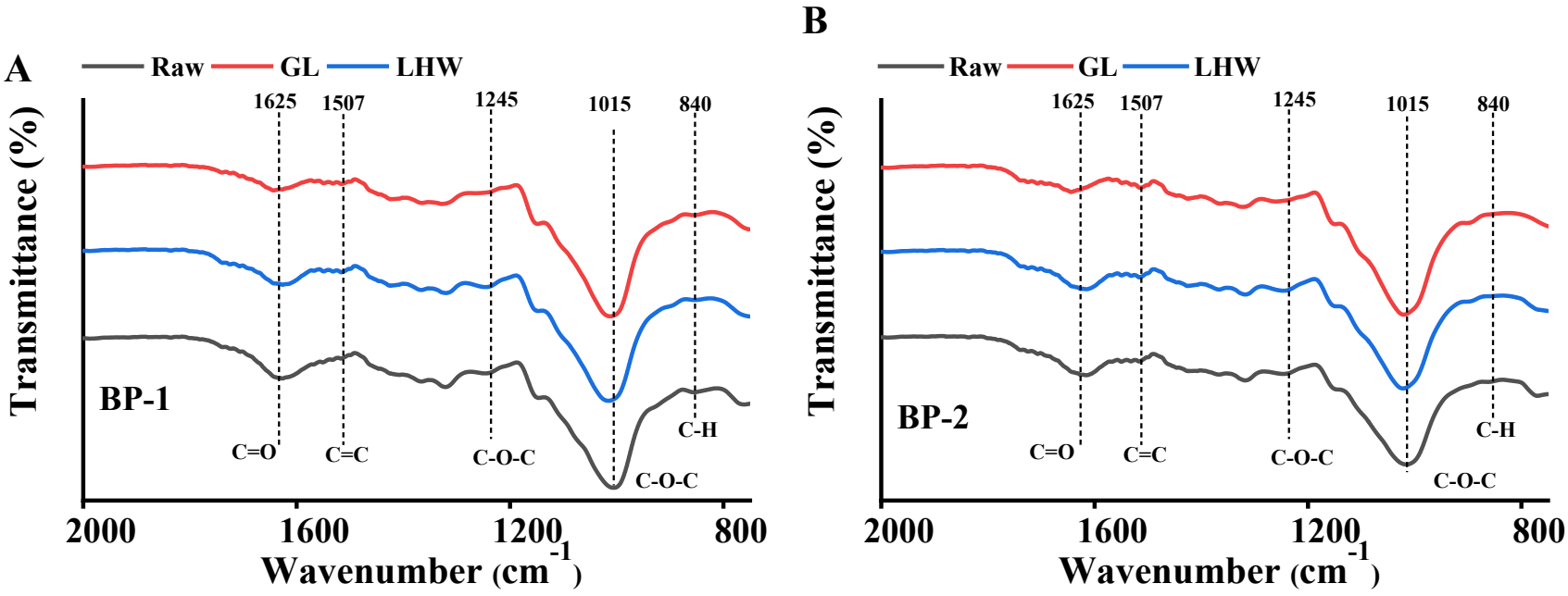

Fig. S2. Attenuated total reflection-flourier transform infrared (ATR-FTIR) spectroscopic profiling of raw materials and the lignocellulose residues after optimal GL and LHW pretreatments performed with two banana pseudostem samples. (A) BP-1; (B) BP-2.

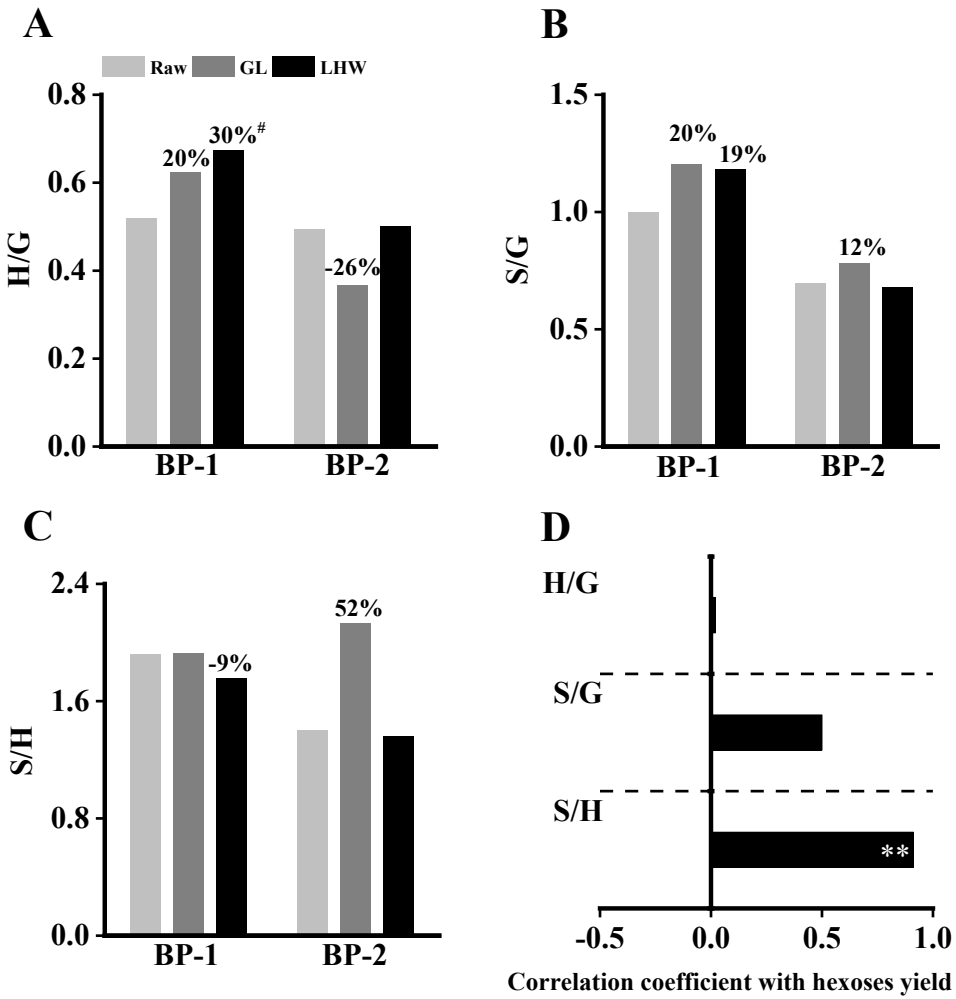

Fig. S3. Characterization of lignin monomers (H, S, G) proportions in the banana BP-1 and BP-2 samples after optimal GL and LHW pretreatments. (A, B, C) H/G, S/G, S/H ratios; (D) Correlation analysis between H/G or S/G or S/H and hexoses yield released from enzymatic hydrolyses. #Indicated the percentage of increased/decreased rate between the raw material and pretreated residue by subtraction of two values divided by the raw material. **As significant correlation at $p < 0.01$ level.

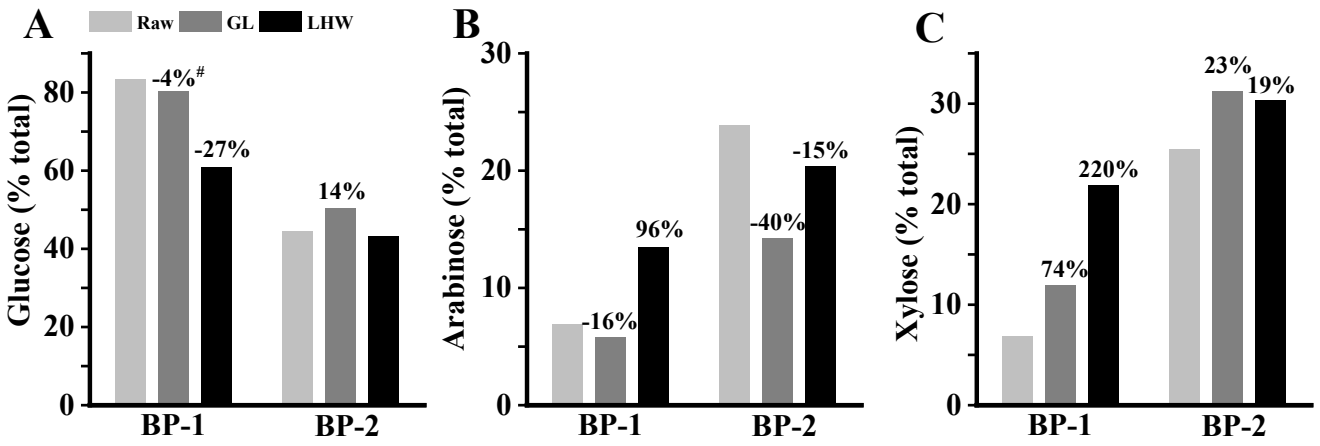

Fig. S4. Analyses of hemicellulose monosaccharides in the banana BP-1 and BP-2 samples after optimal GL and LHW pretreatments. (A) Glucose; (B) Arabinose; (C) Xylose. # Indicated the percentage of increased/decreased rate between the raw material and pretreated residue by subtraction of two values divided by the raw material.

Table S1 Statistical analysis of green liquor pretreatment parameters' impact on the hexoses yield in two banana pseudostem samples.

Response	Hexoses yield (% dry matter)			
Samples	BP-1		BP-2	
R^2	0.9815		0.9791	
Probability > F	< 0.0001		< 0.0001	
Predictors	Coefficients	*p* value	Coefficients	*p* value
β (Constant)	55.55	< 0.0001	36.5	< 0.0001
TTA	1.27	0.0053	1.77	< 0.0001
Time	0.34	0.3599	-0.52	0.0594
Temperature	-1.73	0.0007	0.94	0.0031
TTA × Time	-1.09	0.0418	-1.09	0.0063
TTA × Temperature	-1.06	0.0461	-2.36	< 0.0001
Time × Temperature	0.049	0.918	0.39	0.2497
TTA × TTA	-6.25	< 0.0001	-4.11	< 0.0001
Time × Time	-0.95	0.0205	-0.74	0.0108
Temperature × Temperature	-5.04	< 0.0001	-1.7	< 0.0001

Table S2 Statistical analysis of liquid hot water pretreatment parameters' impact on the hexoses yield in two banana pseudostem samples.

Response	Hexoses yield (% dry matter)			
Samples	BP-1		BP-2	
R^2	0.9302		0.9494	
Probability > F	0.0006		0.0002	
Predictors	Coefficients	*p* value	Coefficients	*p* value
β (Constant)	21.03	0.0006	42.1	0.0002
Time	0.01	0.9282	-1.73	0.0035
Temperature	0.14	0.242	-1.46	0.0085
Time × Temperature	-0.6	0.0058	-2.26	0.0053
Time × Time	-0.31	0.0341	-1.58	0.0082
Temperature × Temperature	-1	< 0.0001	-3.8	< 0.0001

Table S3 Characteristic bands of the FTIR spectra observed in biomass residues

Reported Wavenumber(cm^{-1})	Observed wavenumber (cm^{-1})	Functional group	Assignment	Ref.
836	840	C-H bending vibration of aromatic ring	Lignin	61
898	898	C─H vibration	Amorphous cellulose	58
1051	1015	C─O─C ring skeletal vibration	Hemicelluloses	58
1163	1159	C─O─C asymmetric stretching	Cellulose	57
1247	1245	C─O─C stretching of aryl-alkyl ether	Lignin	55
1320	1320	C-H_2 scissoring	Cellulose	59
1460	1456	C─H_3 asymmetric bending	Lignin	56
1515	1507	C=C stretching of the aromatic ring	Lignin	58
1603	1625	C=C stretching	Lignin	60
1735	1735	C=O stretching of acetyl or carboxylic acid	Hemicelluloses & lignin	54
2900	2900	C─H stretching	Cellulose	32