Supporting Information

Efficient Fractionation of Green Bamboo Using an Integrated Hydrothermal–Deep Eutectic Solvent Pretreatment for Its Valorization

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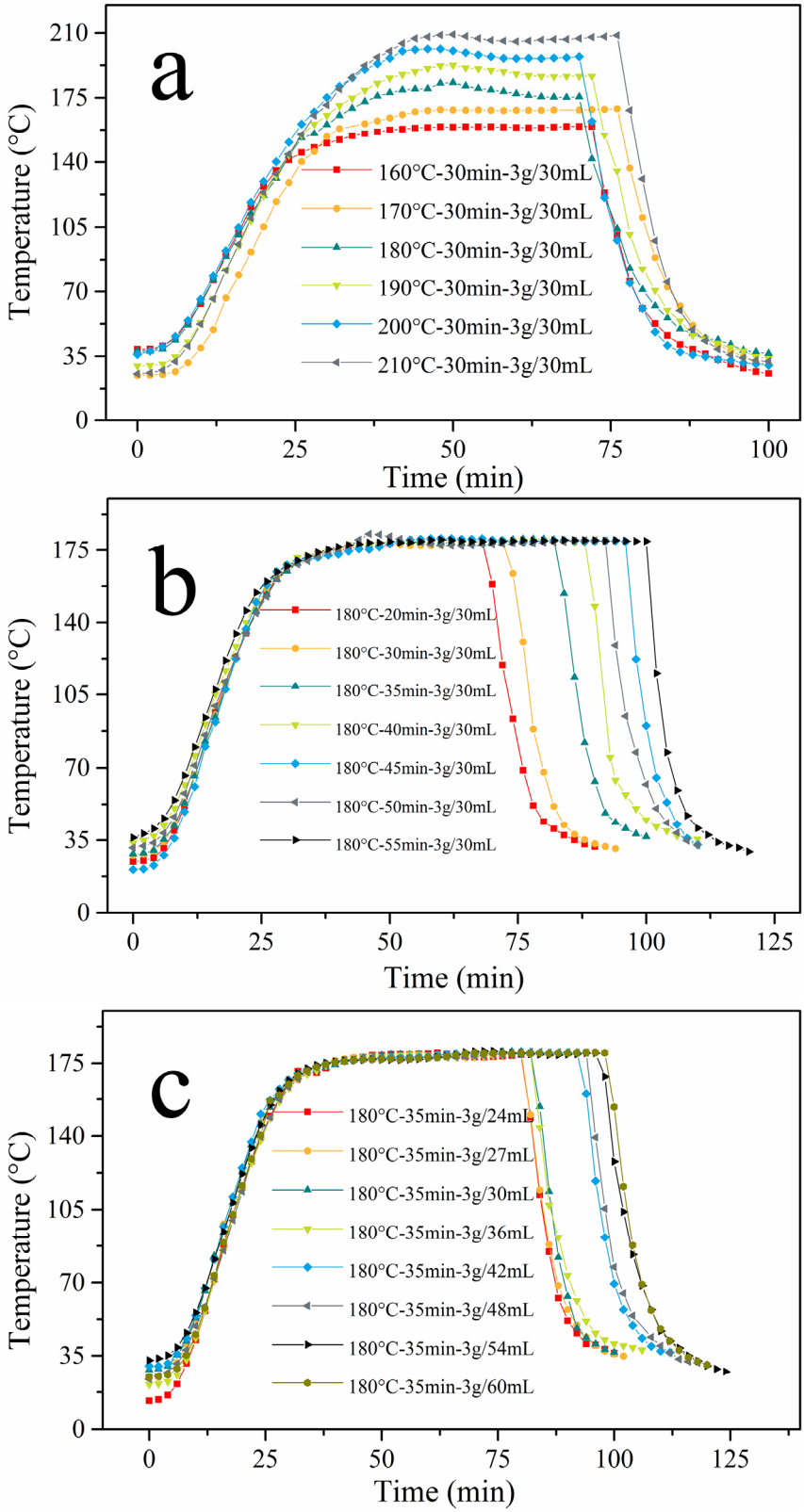


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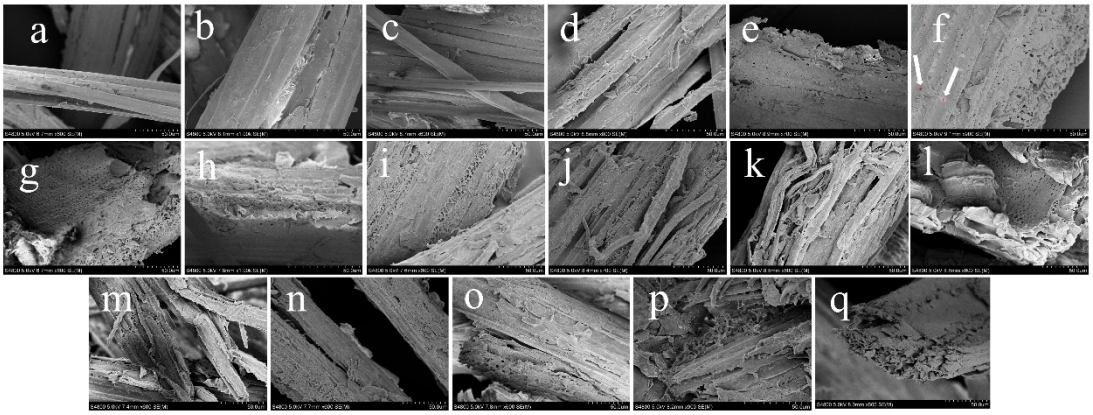


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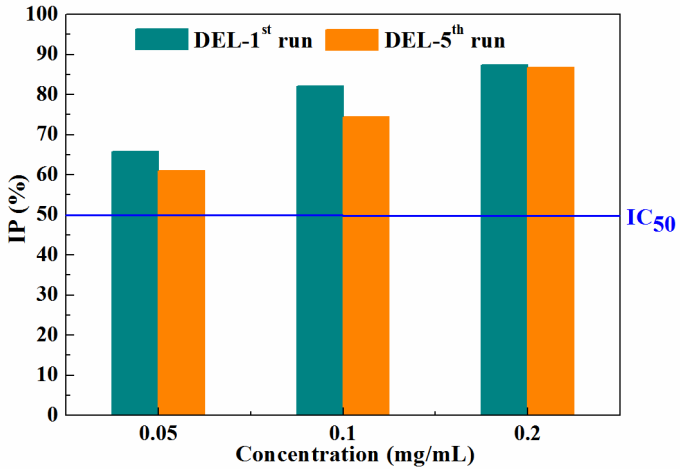


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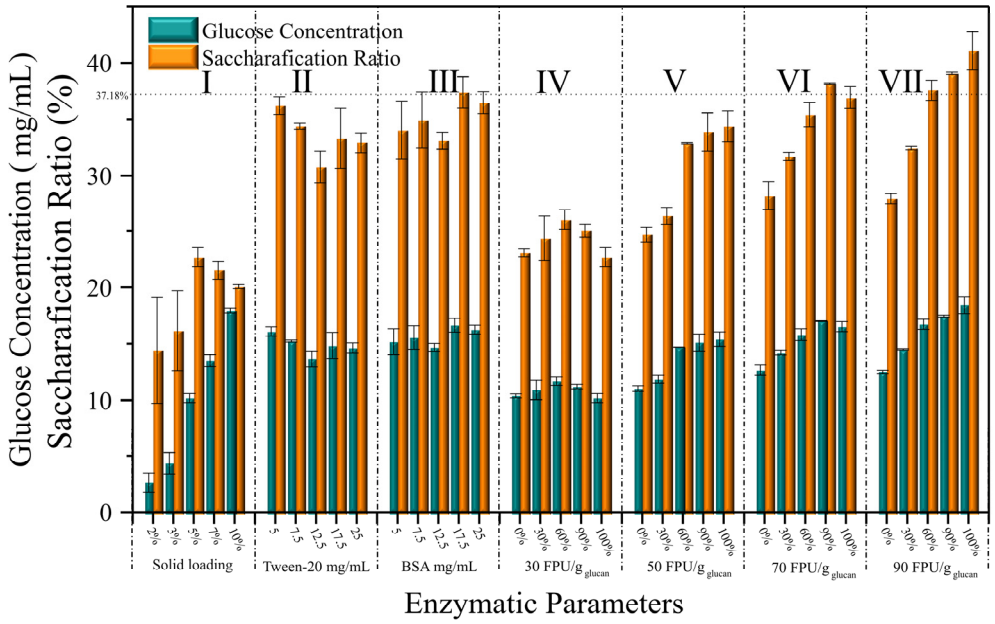


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2. Supplementary Table

Table S1. Characteristic bands of FTIR spectra of bamboo samples.

Wavenumber (cm^{-1})	Assignments[1-9]
3427	O-H stretching vibration in aliphatic or aromatic hydroxyl groups
1735	C=O stretching of the ester from the acetyl group of hemicellulose and ester linkage of the carboxylic groups in the ferulic and p-coumeric acids of lignin/hemicellulose
1650	conjugated carbonyl groups
1601	aromatic skeletal vibrations in lignin
1511	Aromatic ring (lignin), stronger guaiacyl element than syringyl
1460	Asymmetric bending in CH_3 (lignin)
1425	Aromatic skeletal vibrations (lignin) and C-H deformation in plane (cellulose)
1375	C H deformation in cellulose and hemicellulose
1330	syringyl (S)-type lignin
1266	guaiacyl (G)-type lignin
1235	C-O, C-C, and C=O stretching vibrational mode of the aromatic skeletal ring of the guaiacyl type
1160, 899	C-O-C stretching at theβ-(1→4)-glycosidic linkages and in-plane bending vibration of -OH groups in cellulose
1120	aromatic C-H in-plane deformation (typical for S units)
1060, 1030	C-O stretching at C-3, and C-C and C-O stretching at C-6 in cellulose
834	*p*-hydroxyphenyl (H) units

Table S2. Assignments of ^{13}C-^{1}H correlations in the HSQC spectra of the lignin from green bamboo.

Label	δ_C/δ_H (ppm)	Assignments[9-13]
B_β	53.5/3.07	C_β-H_β in β-β' (resinol) substructures (B)
C_γ	63.2/3.72	C_γ-H_γ in phenylcoumaran (C)
-OMe	55.6/3.73	C-H in methoxyls
A_γ	59.8/3.73	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')
$S_{2,6}$	103.8/6.68	$C_{2,6}$-$H_{2,6}$ in syringyl units (S)
$S'_{2,6}$	106.5/7.26	$C_{2,6}$-$H_{2,6}$ in oxidized (C_α=O) syringyl units (S')
FA_2	110.2/7.30	C_2-H_2 in ferulate (FA)
G_2	110.3/6.99	C_2-H_2 in guaiacyl units (G)
PCE_8	113.8/6.28	C_8-H_8 in *p*-coumarate (*p*CE)
P$CE_{3,5}$	115.6/6.76	$C_{3,5}$-$H_{3,5}$ *p*-coumarate (*p*CE)
G_6	119.5/6.76	C_6-H_6 in guaiacyl units (G)
J_β	126.2/6.76	C_β-H_β in cinnamyl aldehyde end-groups (J)
$H_{2,6}$	127.8/7.17	$C_{2,6}$-$H_{2,6}$ in *p*-hydroxyphenyl (H) units (H)
P$CE_{2,6}$	130.1/7.47	$C_{2,6}$-$H_{2,6}$ in *p*-coumarate (*p*CE)
PCE_α	144.8/7.41	C_α-H_α in *p*-coumarate (*p*CE)

3. Calculation Method

The yield of xylo-oligosaccharides was calculated according to Eq. (S1):

$$\text{Xylo-oligosaccharides yield (\%)} = \frac{Weight_{xylose\ in\ hydrolysate}}{Weight_{hemicellulose\ in\ untreated\ bamboo}} \times 100\% \quad \text{(S1)}$$

Hemicellulose removal, retentions of lignin and cellulose, and lignin removal ratio were calculated using Eqs. (S2)–(S5):

$$\text{Hemicellulose removal (\%)} = \left(1 - \frac{Weight_{hemicellulose\ in\ treated\ bamboo}}{Weight_{hemicellulose\ in\ untreated\ bamboo}} \times \text{solid yield}\right) \times 100\% \quad \text{(S2)}$$

$$\text{Lignin retention (\%)} = \left(\frac{Weight_{lignin\ in\ treated\ bamboo}}{Weight_{lignin\ in\ untreated\ bamboo}} \times \text{solid yield}\right) \times 100\% \quad \text{(S3)}$$

$$\text{Cellulose retention (\%)} = \left(\frac{Weight_{cellulose\ in\ treated\ bamboo}}{Weight_{cellulose\ in\ untreated\ bamboo}} \times \text{solid yield}\right) \times 100\% \quad \text{(S4)}$$

$$\text{Lignin removal (\%)} = \left(1 - \frac{Weight_{lignin\ in\ treated\ bamboo}}{Weight_{lignin\ in\ \ bamboo}} \times \text{solid yield}\right) \times 100\% \quad \text{(S5)}$$

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