

SUPPORTING INFORMATION

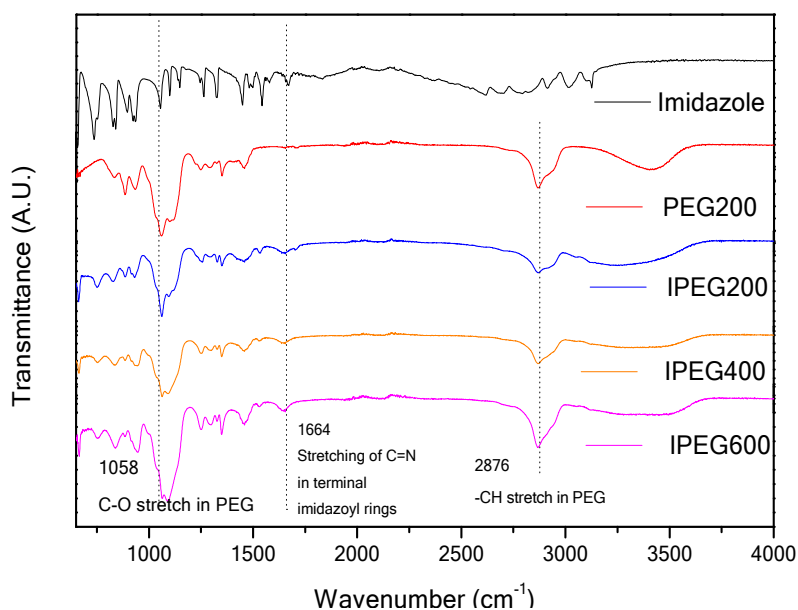
Development of Novel Imidazole-Poly(ethylene glycol) Solvent for the Conversion of Lignocellulosic Agro Residues to Valuable Chemicals

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Figure S1. FTIR spectra of imidazole, PEG200 and IPEG solvents.



Wavenumber (cm ⁻¹)	Functional group assignment
1058	C-O stretch in PEG
1664	Stretching of C=N in terminal imidazolyl rings
2876	-CH stretch in PEG
3300	O-H stretch
1252-1356	Primary or secondary OH, in-plane bend

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Figure S2. XRD profiles of raw and pre-treated rice straw. The marked peaks correspond to cellulose.

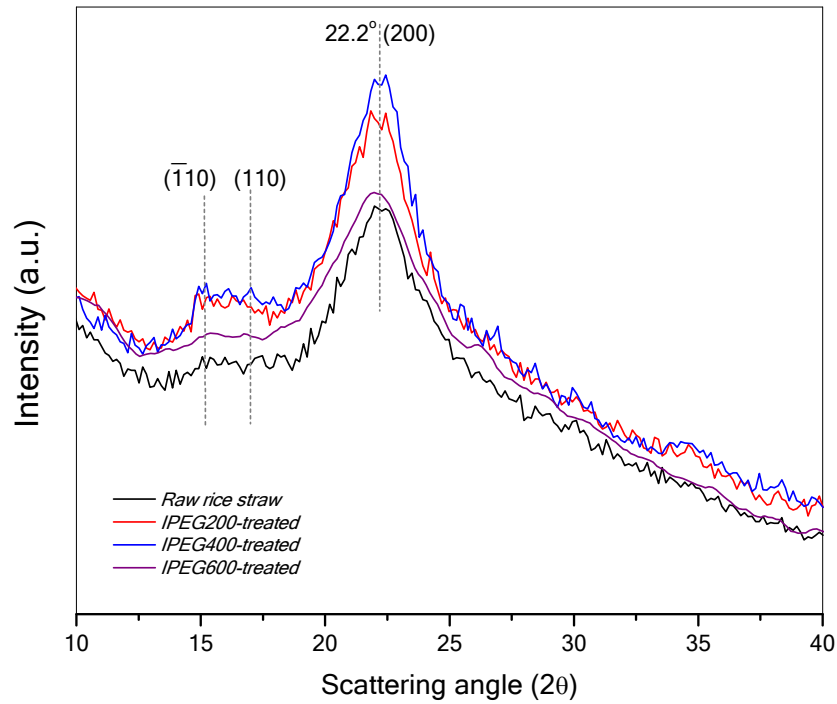


Table S1. Segal crystallinity index and LOI of raw and pre-treated biomass

Pretreatment solvent	Rice straw (CrI %)	Rice straw LOI	Sugarcane bagasse (CrI%)	Sugarcane bagasse LOI
Untreated	75.5	0.43	74.7	0.60
IPEG200	74.3	0.43	73.5	0.57
IPEG400	76.6	0.42	78.5	0.61
IPEG600	68.7	0.60	78.8	0.64

Segal crystallinity index (CrI%) was calculated using the expression:

$$Segal\ CI = \frac{I_{total} - I_{am}}{I_{total}} \times 100$$

Where I_{total} is the intensity of the major peak at 22.2°, and I_{am} is the intensity at 18°, which lies in between the major peaks and the minor peaks in the range of 14-16°.

Lateral order index (LOI) was calculated as the ratio of absorbance of the FTIR vibrations at 1430 and 898 cm⁻¹, respectively.

$$LOI = \frac{A_{1430}}{A_{898}}$$

where A₁₄₃₀ represents the absorption due to -CH₂ symmetric bending and A₈₉₈ represents -CH deformation in cellulose. LOI, also defined as the empirical CrI, is shown to be sensitive to the amount of crystalline versus amorphous regions in the cellulose, and its lower value reflects a more disordered structure (Karimi and Taherzadeh, Bioresour. Technol. 200 (2016) 1008-1018).

Figure S3. QTOF MS spectra of spent liquid obtained from rice straw pre-treatment using IPEG200 solvent showing the presence of dimers and trimers of lignin in the m/z range of 217 to 527 g mol⁻¹.

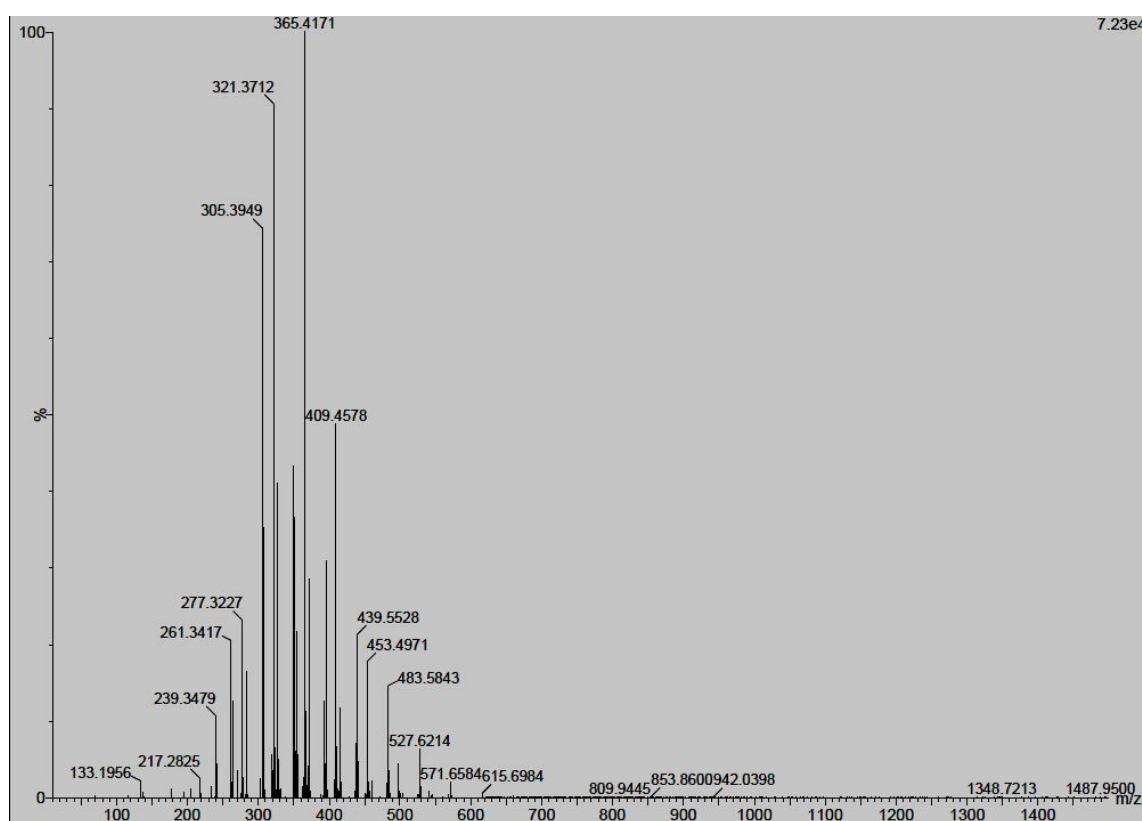


Figure S4. UV-visible spectra of IPEG200 phase and acetone phase obtained after liquid-liquid extraction of products.

