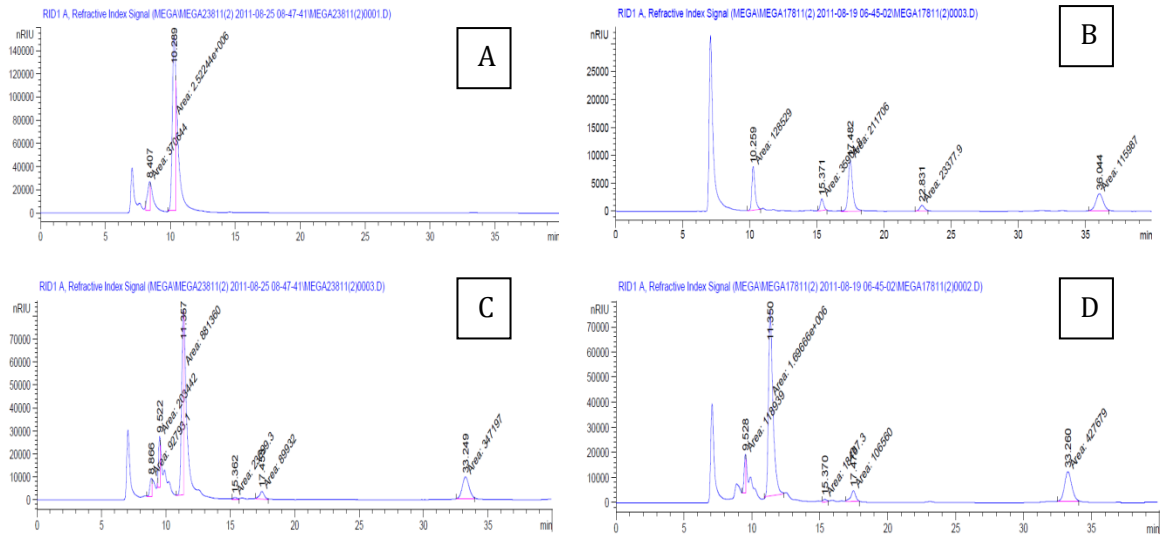
Supplementary Figure



The HPLC chromatograms of glucose conversion products, (A and B) using H_2O as a solvent and H_2SO_4 ; (C and D) using [DBDIm]I as a solvent and H_2SO_4 at optimum conditions

The quantification of HPLC measurement data

The HPLC measurement data were processed to obtain mole% yield of each conversion products. The conversion products that have been reported by previous research are generally hydroxymethyl furfural (HMF), levulinic acid (LA), and formic acid (FA) (Amarasekara & Wiredu, 2011; Chheda et al., 2007; Hsu et al., 2011). Based on the HPLC chromatograms analysis, the concentration of each conversion product was determined and the exact concentration of each product was calculated by multiplying the obtained concentration with the dilution factor.

Percentages of conversion products were further calculated based on the peak area of the HPLC chromatograms obtained by entering the actual concentration data to the equation (1)-(4) (Bicker et al., 2003; Zhang et al., 2016; Zhao et al., 2007).

The calculation was defined based on the number of the C atoms contained in the conversion products. For example, HMF has 6 C atoms; LA has 5 C atoms; and FA has one atom C; therefore, the calculation was formulated as follows Bicker method (Bicker et al., 2003).

$$\text{mole\% yield of product} = \frac{\frac{\text{amount of C}_{\text{atom}}}{\text{C}_{\text{product}}}}{\text{W}_{\text{sample}}} \times 100\% \quad \textbf{(1)}$$

$$\text{mole\% yield of LA} = \frac{\frac{5}{\text{C}_{\text{LA}}}}{\text{W}_{\text{sample}}} \times 100\% \quad \textbf{(2)}$$

$$\text{mole\% yield of HMF} = \frac{\frac{6}{\text{C}_{\text{HMF}}}}{\text{W}_{\text{sample}}} \times 100\% \quad \textbf{(3)}$$

$$\text{mole\% yield of FA} = \frac{\frac{1}{\text{C}_{\text{FA}}}}{\text{W}_{\text{sample}}} \times 100\% \quad \textbf{(4)}$$

notes:

C_{LA} = real concentration of LA produced (mole)

C_{HMF} = real concentration of HMF produced (mole)

C_{FA} = real concentration of FA produced (mole)

W_{sample} = weight of cellulose (gram)

References

1. Amarasekara, A.S., Wiredu, B. 2011. Degradation of cellulose in dilute aqueous solutions of acidic ionic liquid 1-(1-propylsulfonic)-3-methylimidazolium chloride, and p-toluenesulfonic acid at moderate temperatures and pressures. *Industrial & Engineering Chemistry Research*, **50**(21), 12276-12280.

2. Bicker, M., Hirth, J., Vogel, H. 2003. Dehydration of fructose to 5-hydroxymethylfurfural in sub-and supercritical acetone. *Green Chemistry*, **5**(2), 280-284.

3. Chheda, J.N., Román-Leshkov, Y., Dumesic, J.A. 2007. Production of 5-hydroxymethylfurfural and furfural by dehydration of biomass-derived mono-and poly-saccharides. *Green Chemistry*, **9**(4), 342-350.

4. Hsu, W.-H., Lee, Y.-Y., Peng, W.-H., Wu, K.C.-W. 2011. Cellulosic conversion in ionic liquids (ILs): Effects of H2O/cellulose molar ratios, temperatures, times, and different ILs on the production of monosaccharides and 5-hydroxymethylfurfural (HMF). *Catalysis Today*, **174**(1), 65-69.

5. Zhang, K., Pei, Z., Wang, D. 2016. Organic solvent pretreatment of lignocellulosic biomass for biofuels and biochemicals: a review. *Bioresource technology*, **199**, 21-33.

6. Zhao, H., Holladay, J.E., Brown, H., Zhang, Z.C. 2007. Metal chlorides in ionic liquid solvents convert sugars to 5-hydroxymethylfurfural. *Science*, **316**(5831), 1597-1600.