# SUPPORTING INFORMATION

## CO2-assisted Hydrolytic Hydrogenation of Cellulose and Cellulose-based Waste into Sorbitol over Commercial Ru/C

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***Product analysis***

The quantitative products analysis in the liquid phase was determined according to the following procedure. Each sample of the aqueous solution collected at the end of $CO_2$-assisted hydrogenation tests was 1:100 diluted with ultrapure water (Elga Purelab Ultra System, High-Wycombe, UK), and a labeled $^{13}$C6-levoglucosan was used as an internal standard, spiked with a final concentration of 1 mg $L^{-1}$. Determination and quantification of all compounds were performed using an ion chromatograph (Thermo Scientific Dionex ICS-5000) coupled to a single quadrupole mass spectrometer (Thermo Scientific MSQ Plus). The chromatographic method was carried out using two separated methods: (a) seven saccharides (arabinose, fructose, galactose, glucose, mannose, ribose, xylose, and sucrose) and two alcohol-sugars (erythritol and maltitol) were separated using a CarboPac PA10 column (Thermo Scientific, 2 mm × 250 mm) equipped with a CarboPac PA10 guard column (2 × 50 mm). The sodium hydroxide gradient, generated by an eluent generator (Thermo Scientific, Dionex ICS 5000EG), was as follows: 0−3 min, 1 mM; 3−20 min gradient from 10 to 20 mM; 20−45 min isocratic elution with 20 mM; 45−55 min, column cleaning with 100 mM; 55− 60 min, equilibration at 1 mM. (b) The separation of the alcoholsugars (mannitol, ribitol, sorbitol, xylitol, and galactitol) was performed using a CarboPac MA1 analytical column (Thermo Scientific, 2 mm × 250 mm) equipped with an AminoTrap column (2 × 50 mm). The sodium hydroxide gradient was as follows: 20 mM (0−23 min), 100 mM (23−43 min), and 20 mM (43−53 min). The injection volume for both methods was 50 µL, and the flow rate was 0.25 mL $min^{-1}$. Sodium hydroxide was removed using a suppressor (Thermo Scientific ASRS 500, 2 mm) before entering the mass spectrometer. To improve the ionization of the sugars in the aqueous eluent, a solution of

methanol/ammonia (7‰) was added postcolumn with a flow of 0.025 mL $min^{-1}$. The MS was operated with an electrospray ionization (ESI) interface in negative mode with a temperature of 400 °C and a needle voltage of −2500 V. Selected ion monitoring was used for detection.