

Electronic Supplementary Information

Molecular weight distribution of polysaccharides and lignin extracted from plant biomass with a polar ionic liquid analysed without derivatisation process

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Lignin/[C₂mim][(MeO)(H)PO₂] solutions (0.005 wt%) were placed into quartz cells with 1 mm light-path length. Absorbance of the sample solution was measured with wavelength from 800 to 200 nm using UV-*vis* spectrophotometer (UV-2450; Shimadzu) at room temperature. Fig. S1 shows UV-*vis* spectra of [C₂mim][(MeO)(H)PO₂] with and without lignin. [C₂mim][(MeO)(H)PO₂] has UV absorption under 350 nm, and it was saturated under 260 nm. Lignin dissolved in [C₂mim][(MeO)(H)PO₂] shows a different UV-*vis* spectrum; absorbance considerably increased in spite of low concentration of lignin. We chose 300 nm for detection of lignin with UV detector because their absorbance was most different.

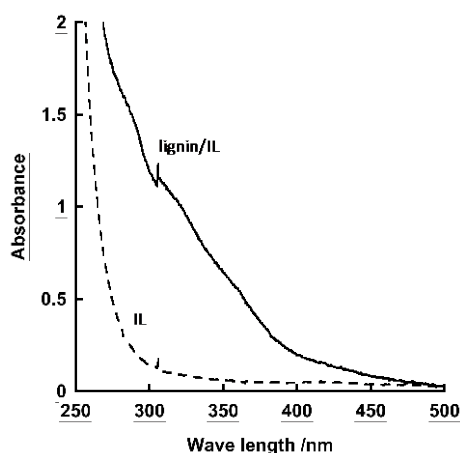


Figure S1 UV-*vis* spectra of [C₂mim][(MeO)(H)PO₂] and lignin/[C₂mim][(MeO)(H)PO₂] solution.

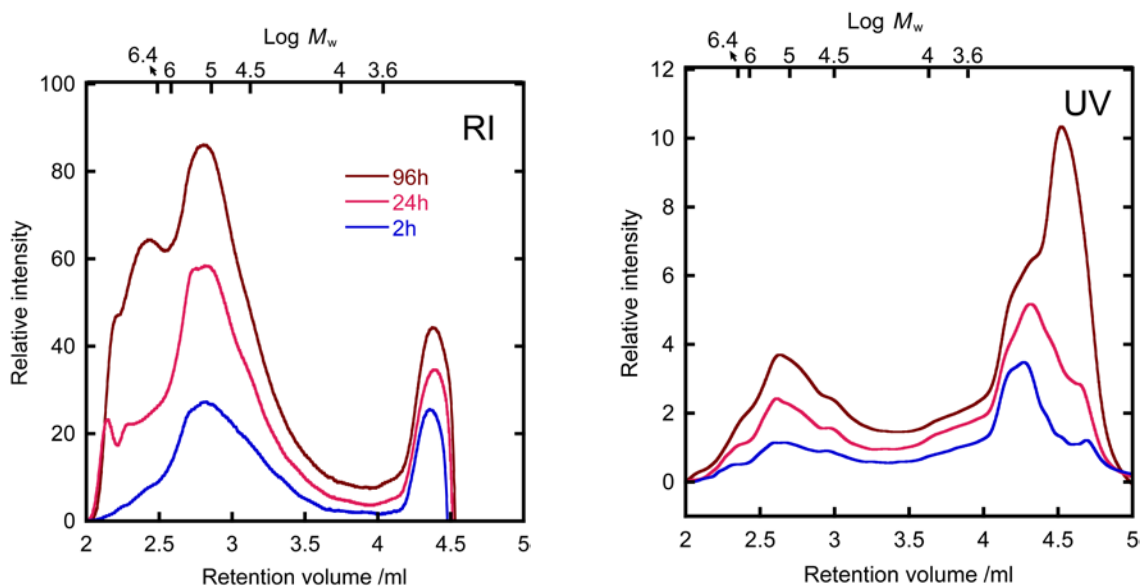


Figure S2 Chromatogram of extracts for various extraction time from wheat bran with $[C_2mim][(MeO)(H)PO_2]$ (load amount: 70 mg, IL amount: 1.0 g extraction temperature: 25 °C, left: detected with RI detector, right: detected with UV detector).

At 25 °C for 2h, only low MW polysaccharides were extracted when extraction time was 2h. However, longer extraction time led extraction of high Mw polysaccharides. This result strongly suggests that $[C_2mim][(MeO)(H)PO_2]$ is capable of extraction of high MW polysaccharides even at 25 °C.

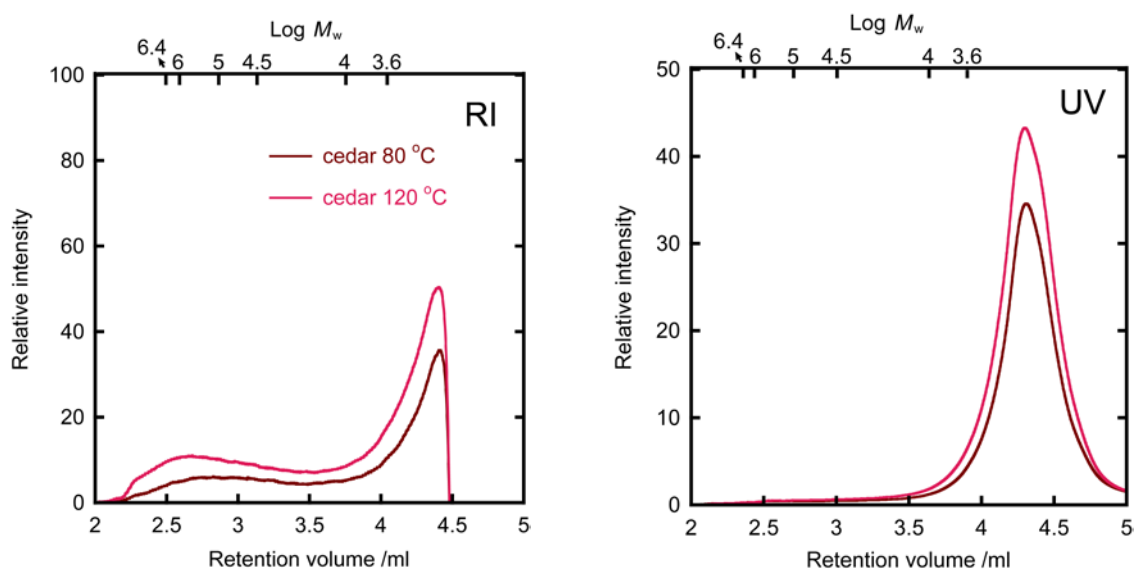


Figure S3 Chromatograms of extracts at 80 °C and 120 °C from cedar with $[C_2mim][(MeO)(H)PO_2]$ (load amount: 70 mg, IL amount: 1.0 g, extraction time: 2h, left: detected with RI detector, right: detected with UV detector).

Japanese cedar (*Cryptomeria japonica*, softwood) was analysed with HPILC. Similar to extracts of pine, broad peak of polysaccharides and narrow peak of lignin were confirmed. At 120 °C, MWD was not changed but extracted amount increased.

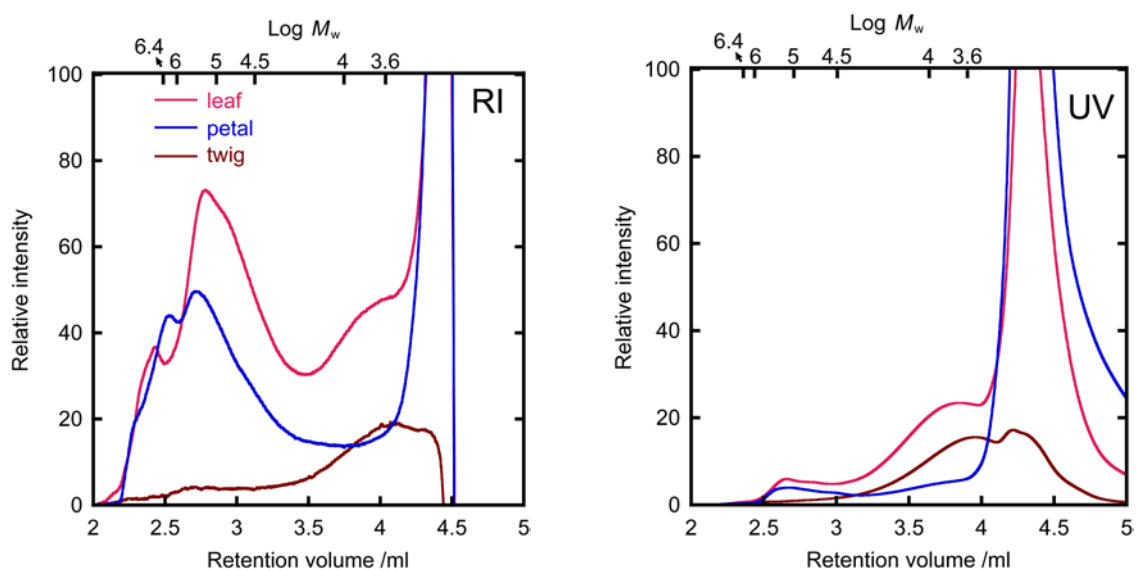


Figure S4 Chromatograms of extracts from various parts of cherry wood with $[C_2mim][(MeO)(H)PO_2]$ (load amount: 70 mg, IL amount: 1.0 g, extraction temperature: 80 °C, extraction time: 2h, left: detected with RI detector, right: detected with UV detector).

Extracts from twig, leaf, and petal of *Prunus × yedoensis* 'Somei-yoshino' were analysed with HPILC. Extraction conditions were as follows: load amount: 70 mg, IL amount: 1.0 g, extraction temperature: 80 °C, extraction time: 2h. Concerning UV-chromatogram of leaf and petal, much amount of low molecular weight lignin was detected but other components such as dye molecules may be included.