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

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Electro Supplemental 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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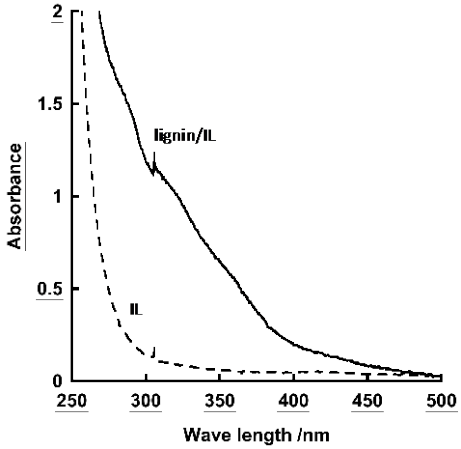

Figure S1 UV-vis stpectra of $[C_2mim][(MeO)(H)PO_2]$ and lignin/$[C_2mim][(MeO)(H)PO_2]$ solution.

Lignin/$[C_2mim][(MeO)(H)PO_2]$ 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.

$[C_2mim][(MeO)(H)PO_2]$ has UV absorption under 350 nm, and it was saturated under 260 nm. Lignin dissolved in $[C_2mim][(MeO)(H)PO_2]$ 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.

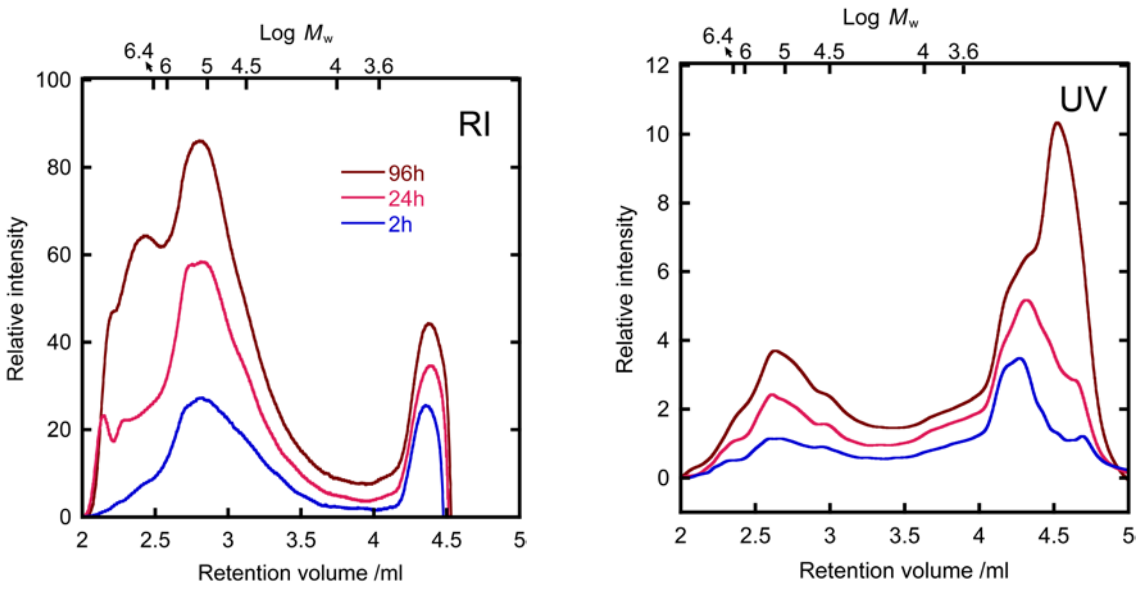

Figure S2 Chromatogram of extracts for various extraction time from wheat bran with $[C_2mim][(MeO)(H)PO_2]$ (load amount: 70 mg, IL amount: 1.0 g extraction temperature: 25 °C, left: detected with RI detector, right: detected with UV detector).

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.

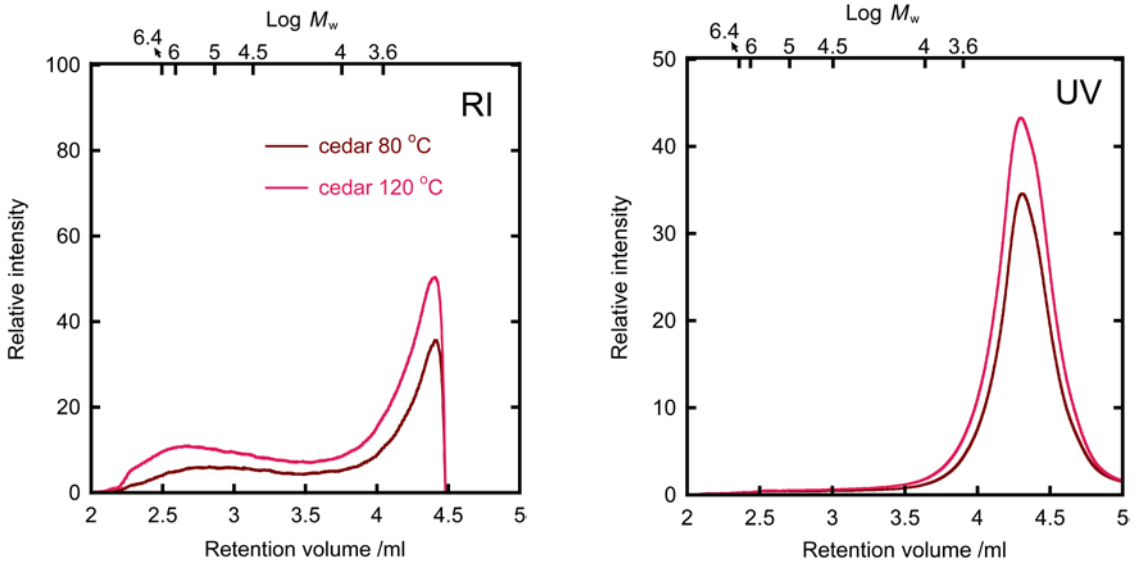

Figure S3 Chromatograms of extracts at 80 °C and 120 °C from cedar with $[C_2mim][(MeO)(H)PO_2]$ (load amount: 70 mg, IL amount: 1.0 g, extraction time: 2h, left: detected with RI detector, right: detected with UV detector).

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.

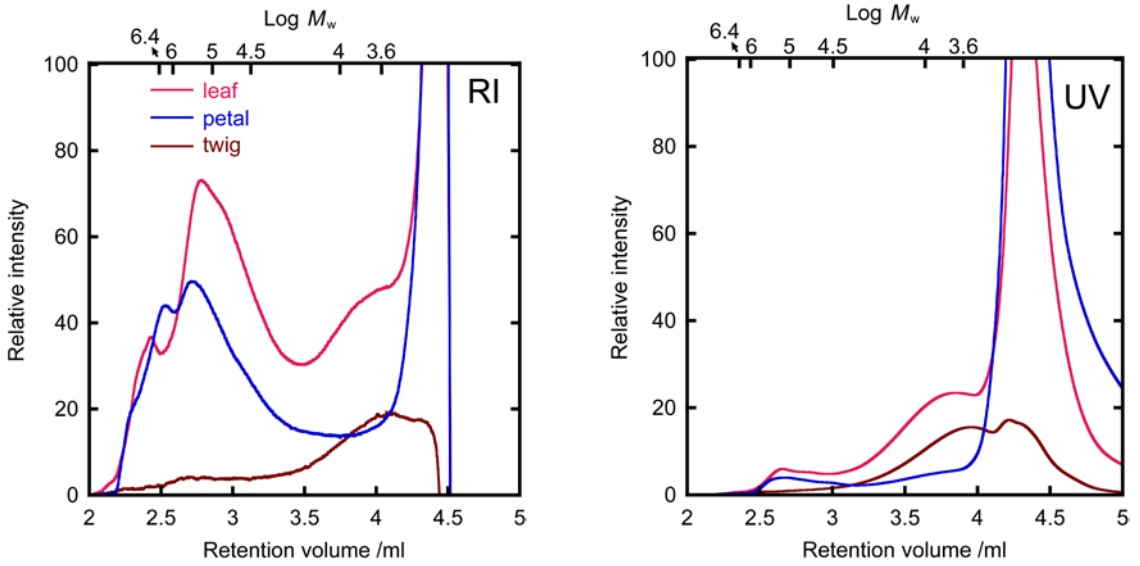

Figure S4 Chromatograms of extracts from various parts of cherry wood with $[C_2mim][(MeO)(H)PO_2]$ (load amount: 70 mg, IL amount: 1.0 g, extraction temperature: 80 °C, extraction time: 2h, left: detected with RI detector, right: detected with UV detector).

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.