



HOKKAIDO UNIVERSITY

Title	Determination of the absolute molar mass of acetylated eucalyptus kraft lignin by two types of size-exclusion chromatography combined with multi-angle laser light-scattering detectors
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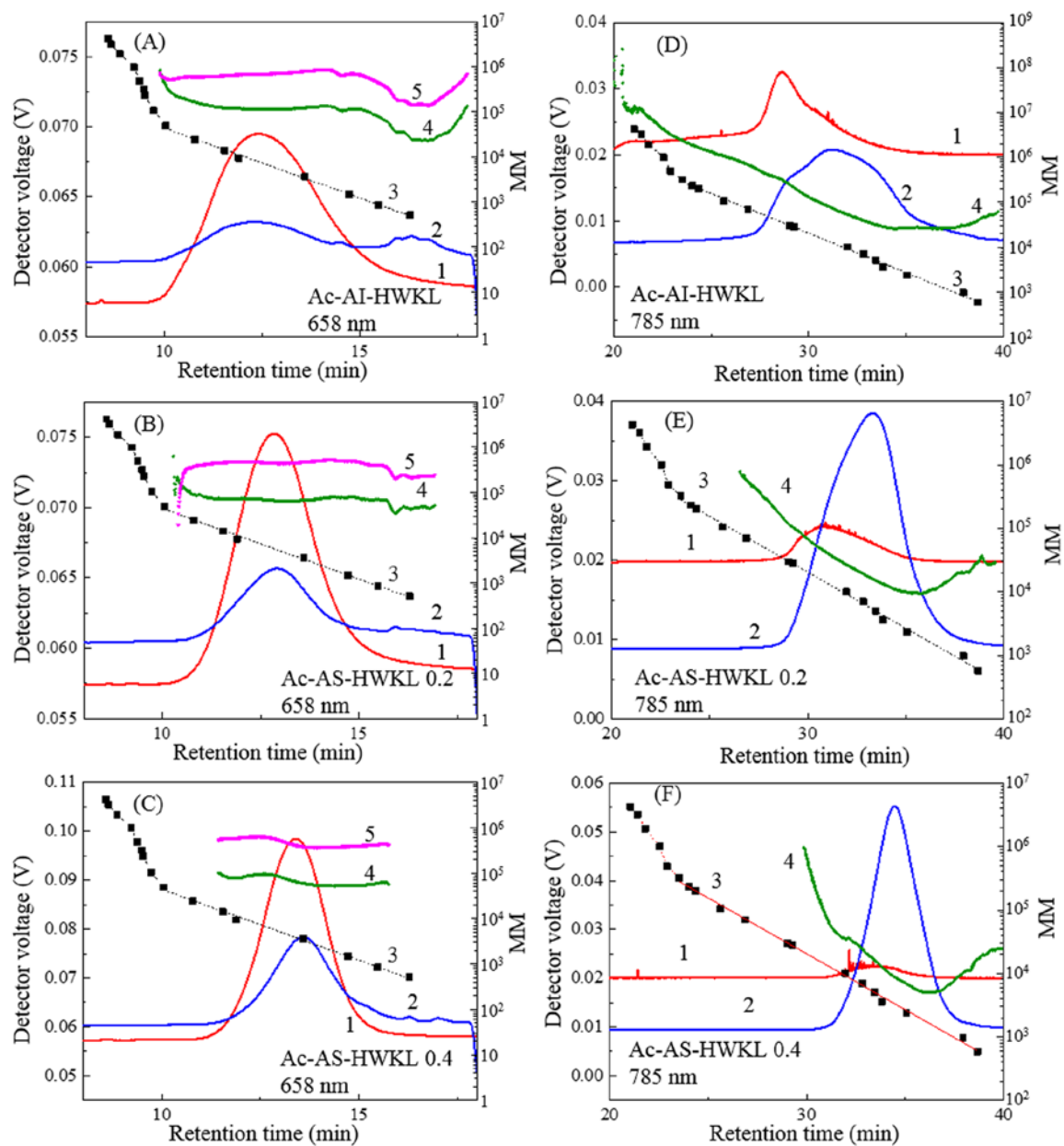


Figure S1. SEC-MALS-RI chromatograms of (A) **Ac-AI-HWKL**, (B) **Ac-AS-HWKL 0.2**, and (C) **Ac-AS-HWKL 0.4** obtained at 658 nm and (D) **Ac-AI-HWKL**, (E) **Ac-AS-HWKL 0.2**, and (F) **Ac-AS-HWKL 0.4** obtained at 785 nm. In each figure, the left Y axis represents the detector voltage for the RI and MALS responses, and the right Y axis represents the MM. Red line 1 represents the chromatograms monitored by MALS. Blue line 2 shows the chromatograms monitored by RI. Black dashed lines 3 show conventional calibration curves of polystyrene. Green lines 4 show absolute MM obtained by MALS with band filters. Pink line 5 shows absolute MM obtained by MALS without band filter.

Table S1. Raw data of viscosity measurement in THF solvent

	c(g/mL)	t1 (s)	t2 (s)	t3 (s)	t(average)	η_r	$\ln\eta_r$	η_{sp}
THF		255.0	255.1	255.1	255.1			
Ac-Al-HWKL	0.00200	258.1	258.5	258.2	258.3	1.012	0.012	0.012
	0.00222	258.5	258.6	258.5	258.5	1.013	0.013	0.013
	0.00250	258.8	258.3	258.8	258.6	1.014	0.014	0.014
	0.00286	259.2	259.4	259.5	259.4	1.017	0.017	0.017
	0.00333	260.2	259.7	260.6	260.2	1.020	0.020	0.020
	0.00400	261.2	261.5	261.1	261.3	1.024	0.024	0.024
	0.00445	262.1	262.1	261.9	262.0	1.027	0.027	0.027
	0.00500	263.0	263.2	263.4	263.2	1.032	0.031	0.032
	0.00572	264.4	264.0	264.0	264.1	1.035	0.035	0.035
	0.00667	267.5	266.7	267.0	267.1	1.047	0.046	0.047
	0.00800	268.3	268.4	267.7	268.1	1.051	0.050	0.051
AC-AS-HWKL 0.2	0.00201	257.0	256.6	256.8	256.8	1.007	0.007	0.007
	0.00224	257.6	257.3	257.1	257.3	1.009	0.009	0.009
	0.00252	257.3	257.6	257.7	257.5	1.010	0.009	0.010
	0.00288	258.0	259.0	258.4	258.5	1.013	0.013	0.013
	0.00336	258.7	258.5	258.8	258.7	1.014	0.014	0.014
	0.00403	259.5	259.1	259.9	259.5	1.017	0.017	0.017
	0.00448	260.8	260.4	261.2	260.8	1.022	0.022	0.022
	0.00504	261.5	261.1	261.4	261.3	1.024	0.024	0.024
	0.00575	261.7	261.8	262.0	261.8	1.026	0.026	0.026
	0.00671	263.2	263.7	262.9	263.3	1.032	0.032	0.032
	0.00806	264.9	265.0	265.1	265.0	1.039	0.038	0.039
AC-AS-HWKL 0.4	0.00202	257.3	257.0	256.7	257.0	1.007	0.007	0.007
	0.00224	257.4	256.8	257.2	257.1	1.008	0.008	0.008
	0.00252	256.6	257.6	257.2	257.1	1.008	0.008	0.008
	0.00288	258.6	258.0	258.0	258.2	1.012	0.012	0.012
	0.00337	258.7	257.8	258.4	258.3	1.013	0.012	0.013
	0.00404	258.9	258.5	258.7	258.7	1.014	0.014	0.014
	0.00449	259.5	259.2	259.3	259.3	1.017	0.016	0.017
	0.00505	260.7	260.1	259.7	260.2	1.020	0.020	0.020
	0.00577	261.0	261.7	261.1	261.3	1.024	0.024	0.024
	0.00673	261.5	262.4	262.8	262.2	1.028	0.028	0.028
	0.00808	263.6	264.8	264.5	264.3	1.036	0.035	0.036

Table S2. Raw data of viscosity measurement in DMSO solvent

	c(g/mL)	t1 (s)	t2 (s)	t3 (s)	t(average)	η_r	$\ln\eta_r$	η_{sp}
DMSO		882.2	882.7	882.4	882.4			
Ac-Al-HWKL	0.00399	904.6	904.7	905.2	904.8	1.025	0.025	0.025
	0.00443	907.7	907.9	908.4	908.0	1.029	0.029	0.029
	0.00499	914.1	915.0	914.5	914.5	1.036	0.036	0.036
	0.00570	921.7	922.2	922.6	922.2	1.045	0.044	0.045
	0.00665	926.3	925.9	926.8	926.3	1.050	0.049	0.050
	0.00798	953.3	953.6	952.8	953.2	1.080	0.077	0.080
Ac-AS-HWKL 0.2	0.00401	894.9	895.1	893.9	894.6	1.014	0.014	0.014
	0.00445	895.8	896.5	895.9	896.1	1.015	0.015	0.015
	0.00501	899.7	899.3	900.3	899.8	1.020	0.019	0.020
	0.00573	901.5	901.4	901.5	901.5	1.022	0.021	0.022
	0.00668	908.3	908.4	905.9	907.5	1.028	0.028	0.028
	0.00802	914.8	915.6	915.3	915.2	1.037	0.037	0.037
Ac-AS-HWKL 0.4	0.00404	891.2	892.5	892.5	892.1	1.011	0.011	0.011
	0.00448	893.1	892.5	894.2	893.3	1.012	0.012	0.012
	0.00505	895.7	896.6	896.2	896.2	1.016	0.015	0.016
	0.00577	899.8	897.9	898.5	898.7	1.019	0.018	0.019
	0.00673	904.3	903.8	904.1	904.1	1.025	0.024	0.025
	0.00807	909.9	909.5	908.5	909.3	1.030	0.030	0.030

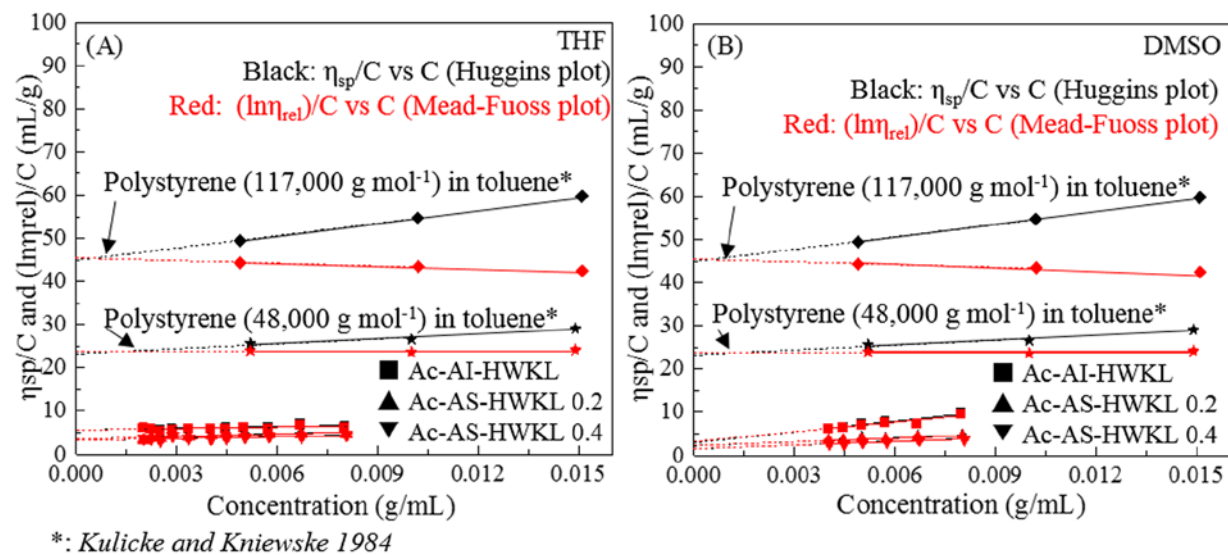


Figure S2. Huggins plot and Mead-Fuoss plot for acetylated HWKL fractions in (A) THF and (B) DMSO.

Kulicke, W., Kniewske, R. (1984) The Shear Viscosity Dependence on Concentration, Molecular Weight, and Shear Rate of Polystyrene Solutions. *Rheol Acta*. 23: 75-83.