

Supplementary information

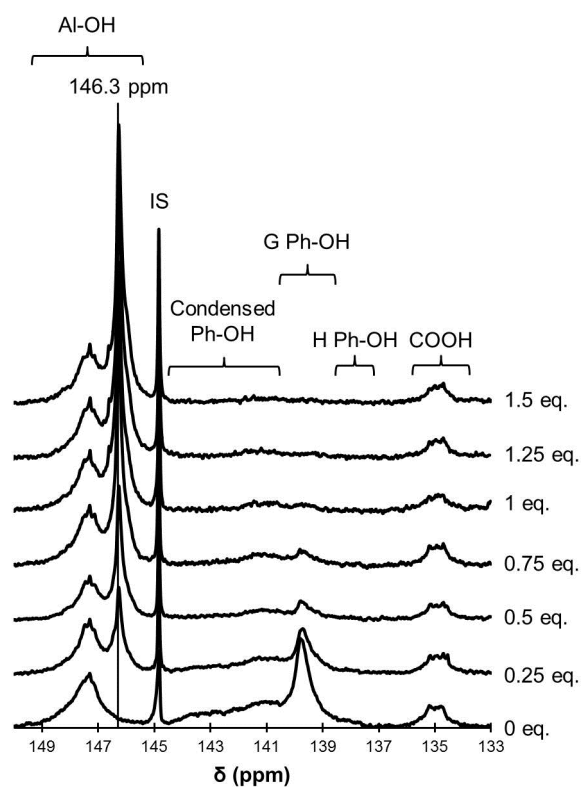


Figure S1. ^{31}P NMR spectra of the lignins functionalized with 0 to 1.5 eq. FGE (phosphitylation with 2-chloro-4,4,5,5-tetramethyl-1,3,2-dioxaphospholane)

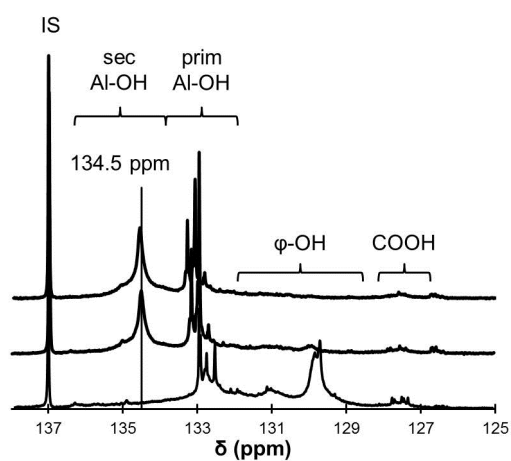


Figure S2. ^{31}P NMR spectra of the lignins functionalized with 0 to 1.5 eq. FGE (phosphitylation with 2-chloro-1,3,2-dioxaphospholane)

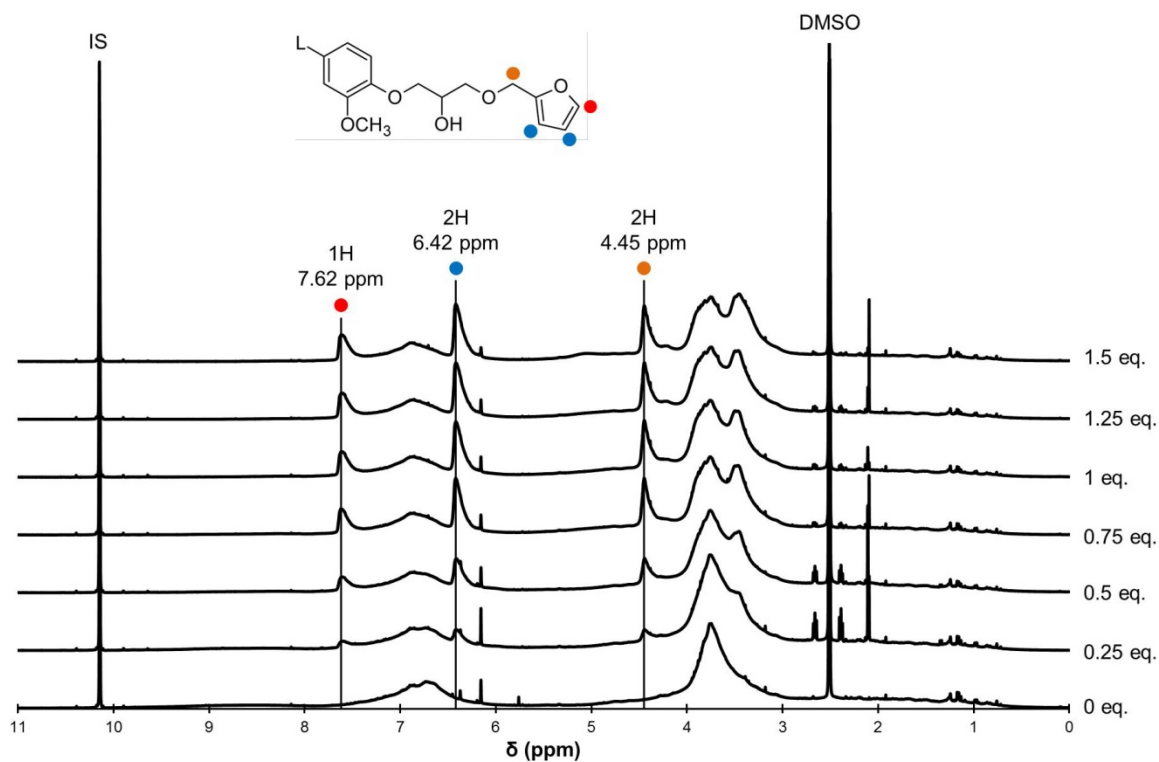


Figure S3. ^1H NMR spectra of the lignins functionalized with 0 to 1.5 eq. FGE, with the assignments of the newly introduced H atoms exhibiting distinct shifts. Other protons give rise to signals in the 3 – 4 ppm region, thus strongly overlapping with methyl and methoxy H atoms from lignin.

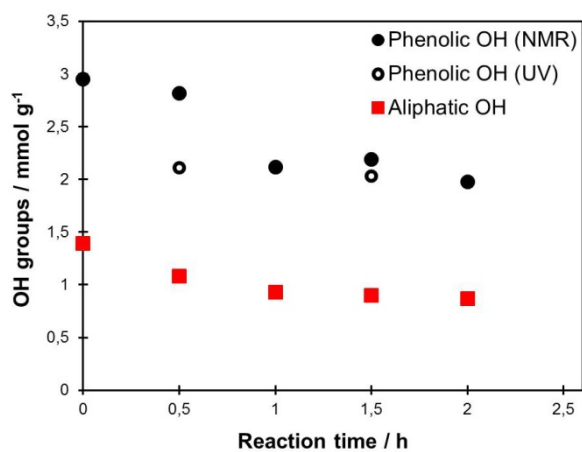


Figure S4. Kinetic study of the esterification of KL with 6-MHA (1.2 eq. with respect to lignin Ph-OH groups).

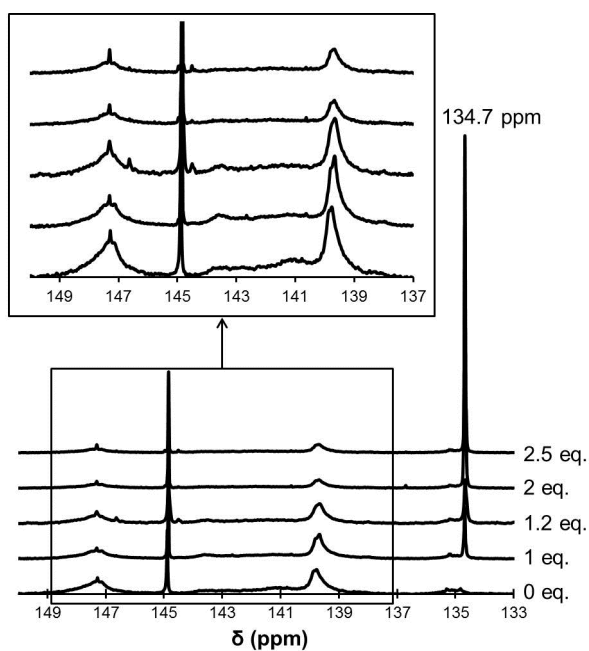


Figure S5. ^{31}P NMR spectra of the lignins functionalized with 0 to 2.5 eq. 6-MHA (phosphitylation with 2-chloro-4,4,5,5-tetramethyl-1,3,2-dioxaphospholane)

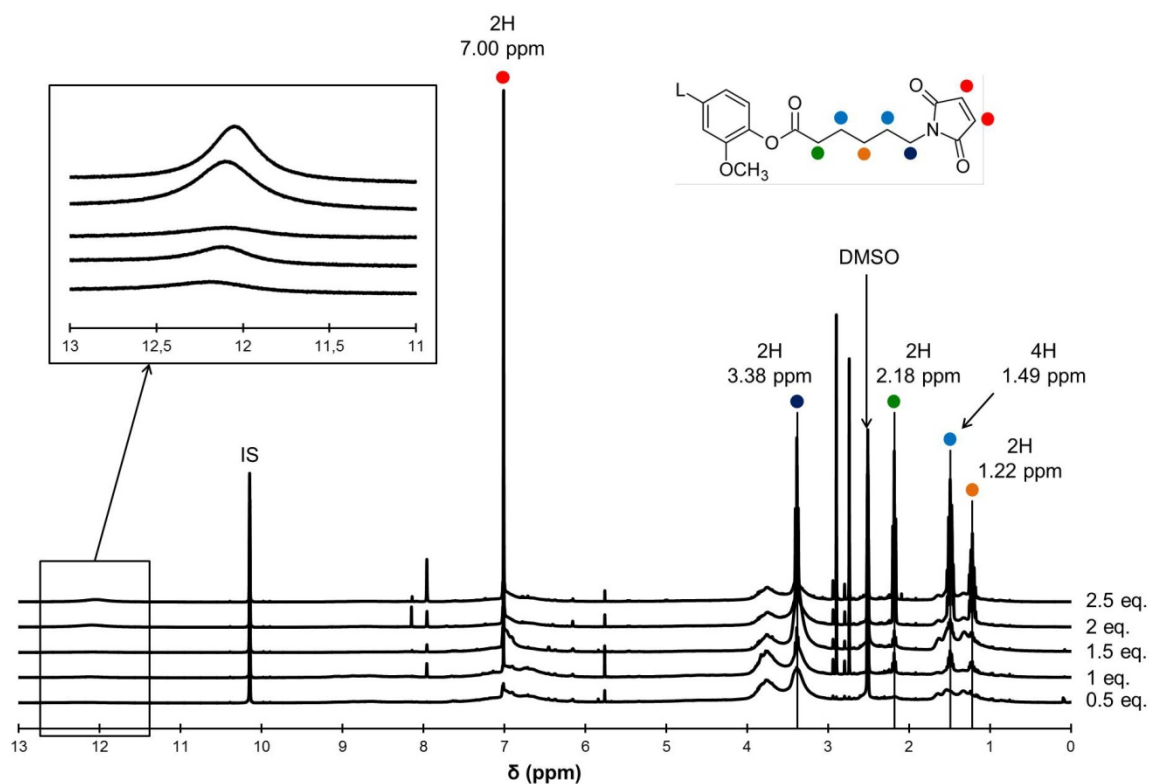


Figure S6. ^1H NMR spectra of the lignins functionalized with 0 to 2.5 eq. 6-MHA, with the assignments of the newly introduced H atoms. The inset shows the detail of the carboxylic acid H atom region.

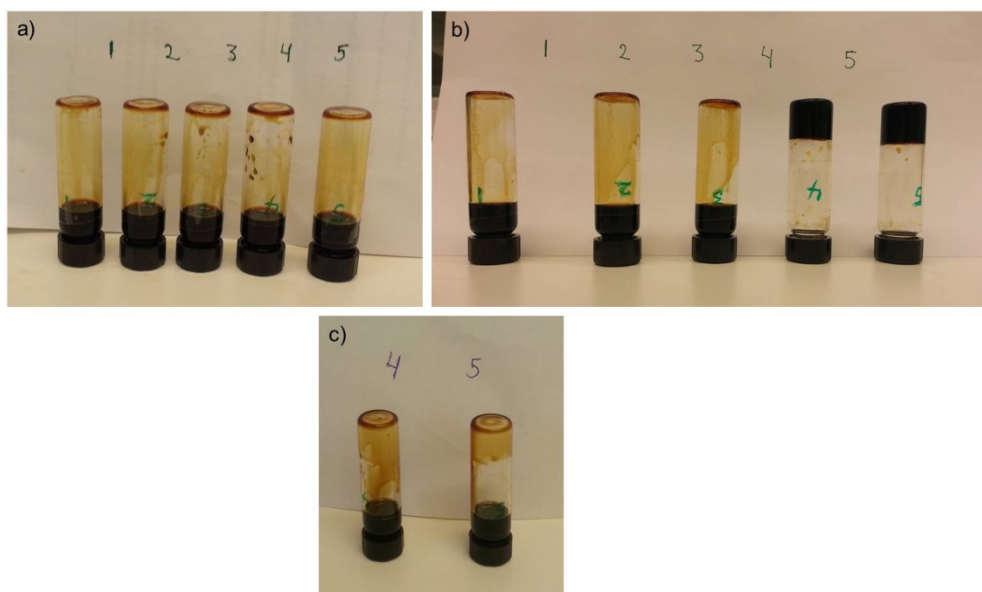


Figure S7. Lignin solutions in DMSO (15% w/w): initial solutions (a), after 36h at 70 °C (b) and after 6h at 120 °C (c). 1 = Control_KL, 2 = Control_FGE, 3 = Control_MHA, 4 = FGE_MHA_1:2, 5 = FGE_MHA_1:1 (see Table 3 for the detailed composition of the solutions).