

Supplementary Material: Efficient Lignin Fractionation from Scots Pine (*Pinus Sylvestris*) Using Ammonium-based Protic Ionic Liquid: Process Optimization and Characterization of Recovered Lignin

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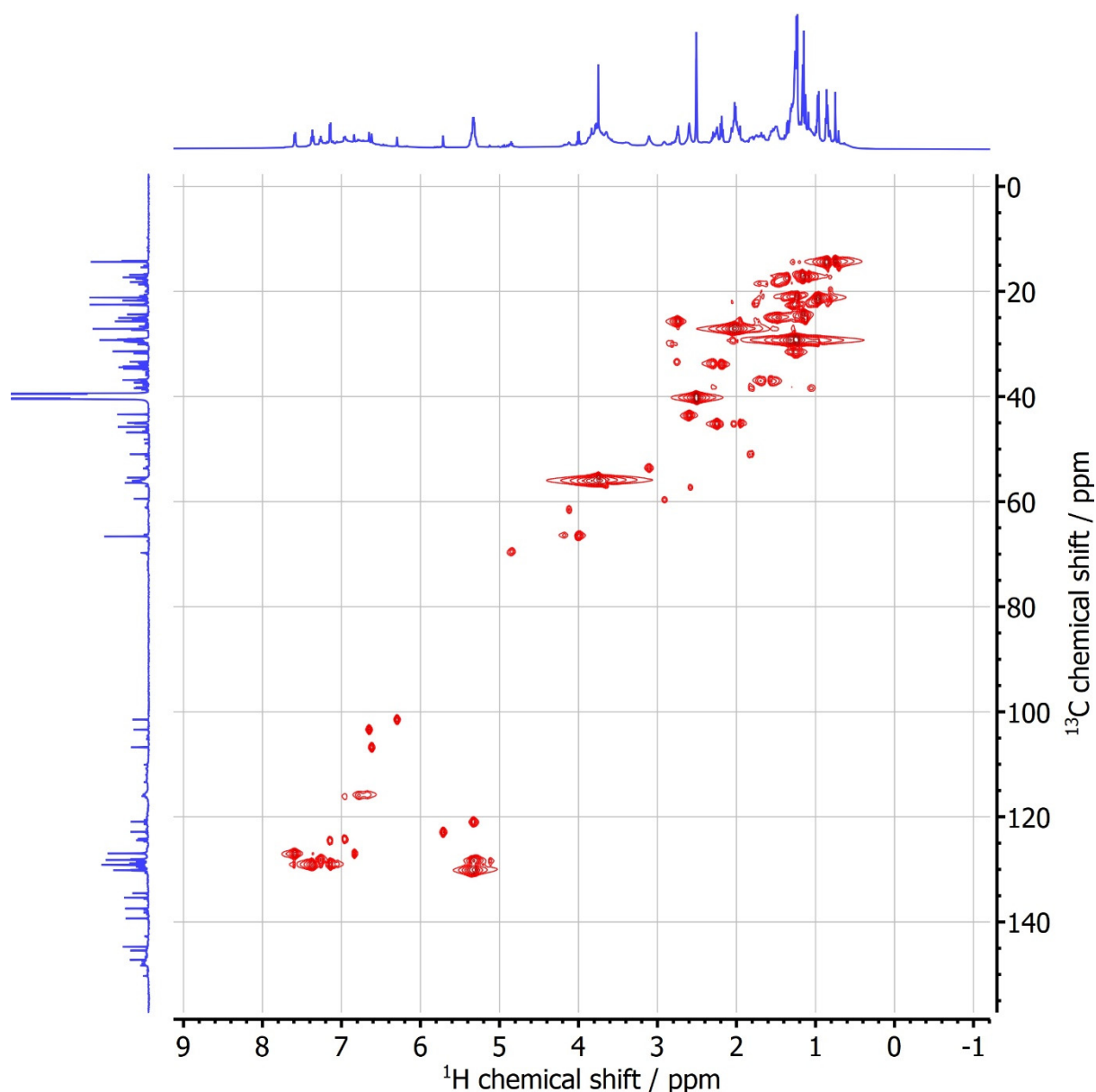


Figure S1. HSQC NMR of $[\text{N11H}(2\text{OH})][\text{LAC}]$ extracted lignin from pine wood biomass.

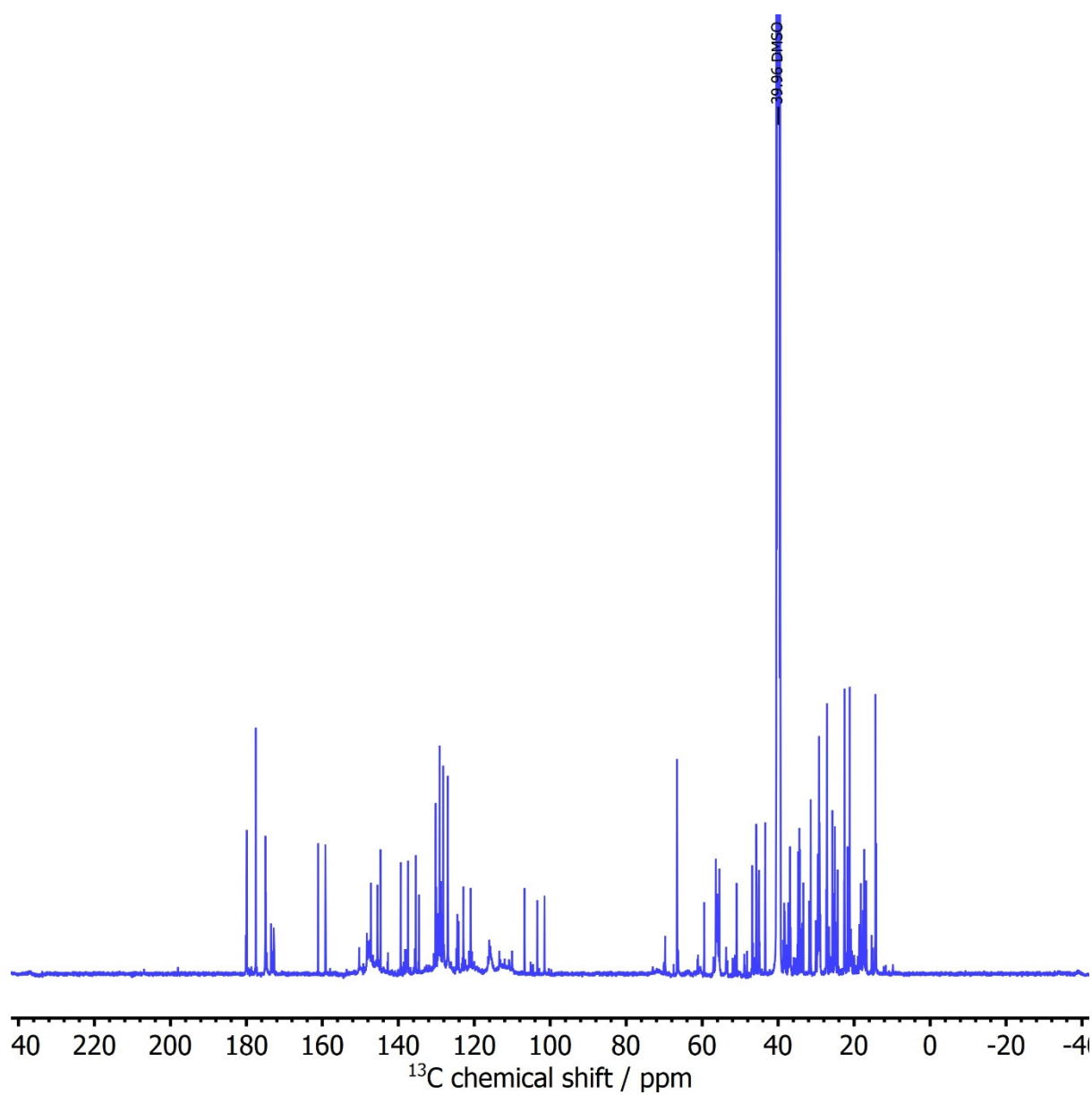


Figure S2. ^{13}C NMR of $[\text{N11H}(2\text{OH})][\text{LAC}]$ extracted lignin from pine wood biomass.

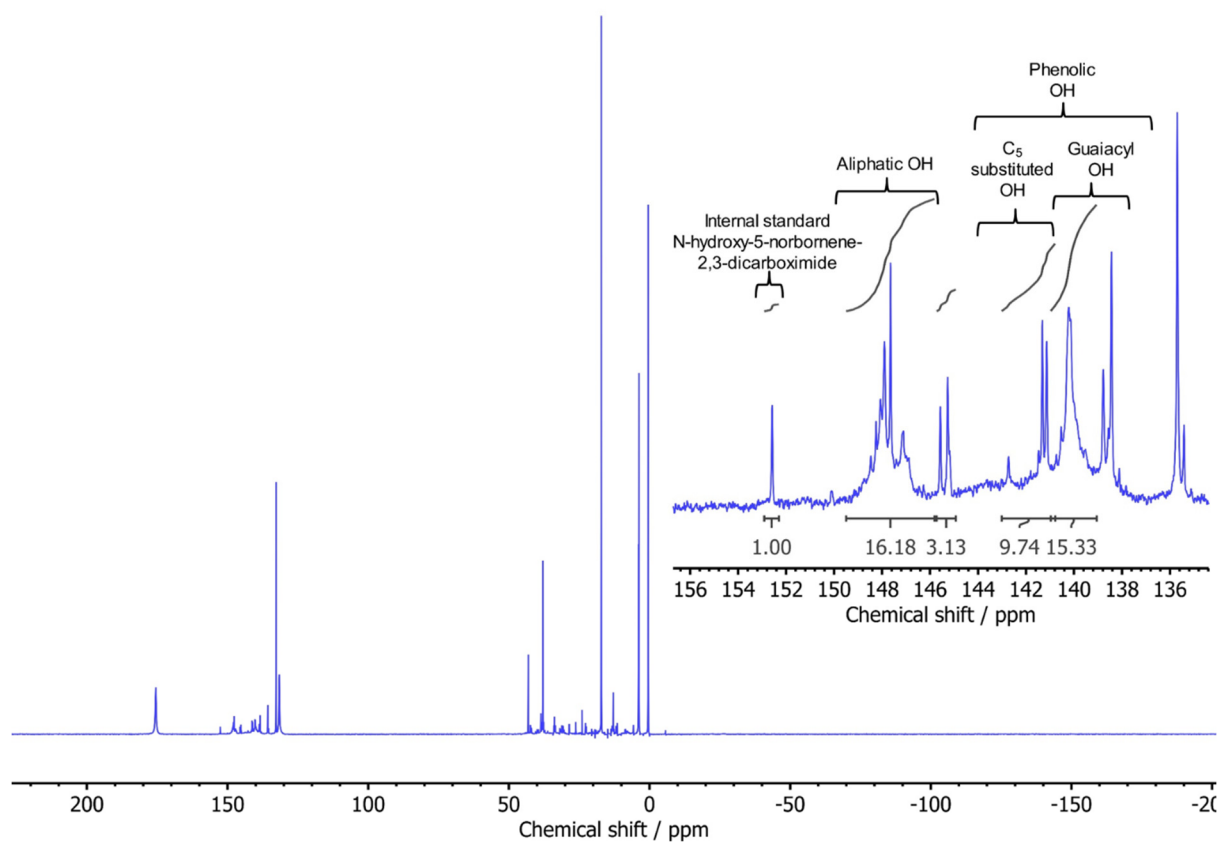


Figure S3. ^{31}P NMR spectrum of the pine wood lignin phosphorylated with 2-chloro-4,4,5,5-tetramethyl-1,3,2-dioxaphospholane (Cl-TMDP) using endo-N-hydroxy-5-norbornene-2,3-dicarboximide as internal standard.