Thermal and Structural Analysis of Softwood Lignin from a Pressurized Hot Water Extraction Biorefinery Process and Their Modified Derivatives

Supporting data

Content:

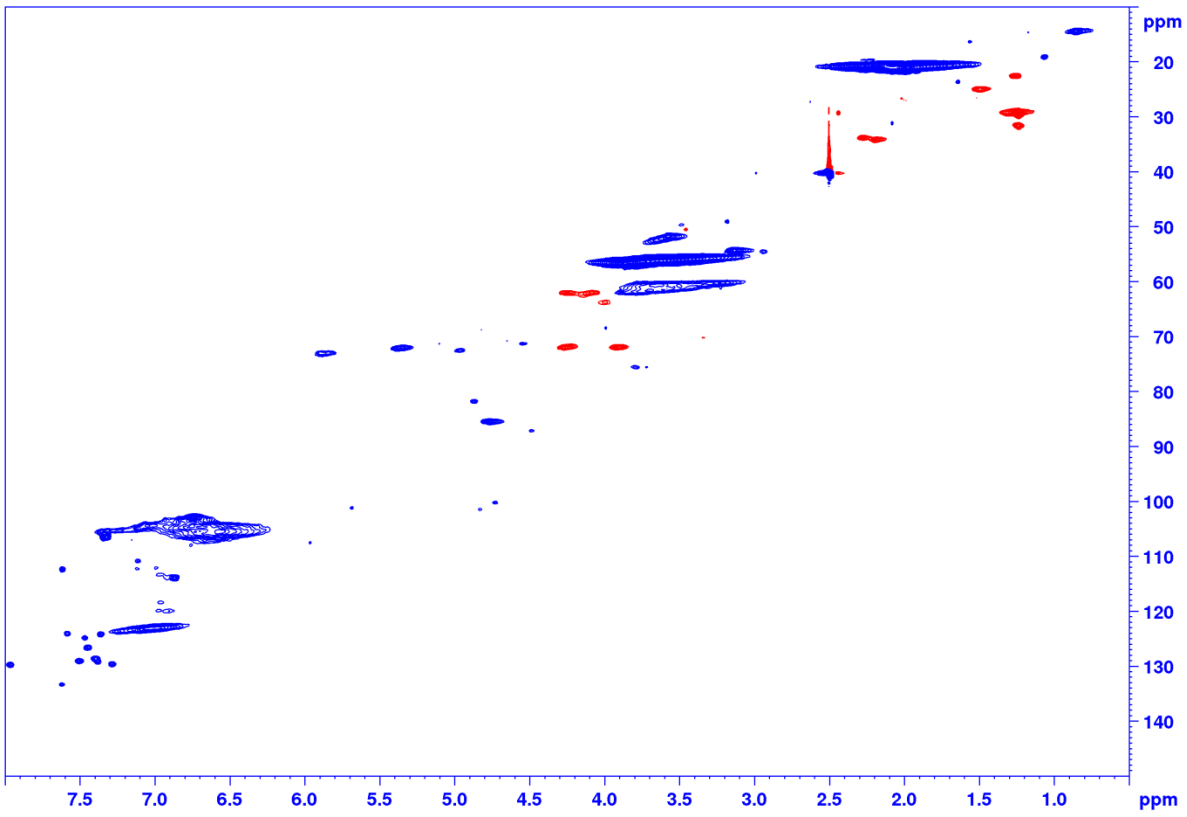

Figure S1. Multiplicity edited HSQC of acetylated birch lignin

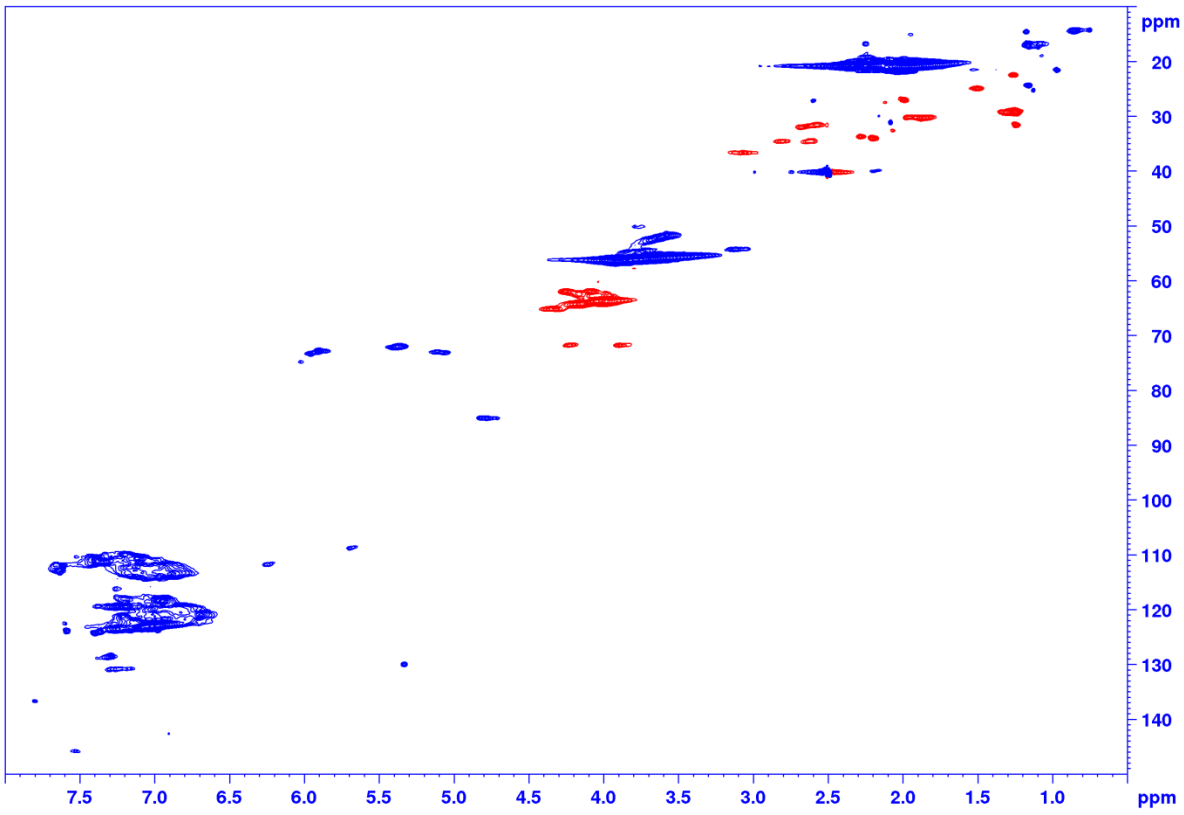

Figure S2. Multiplicity edited HSQC of acetylated pine lignin

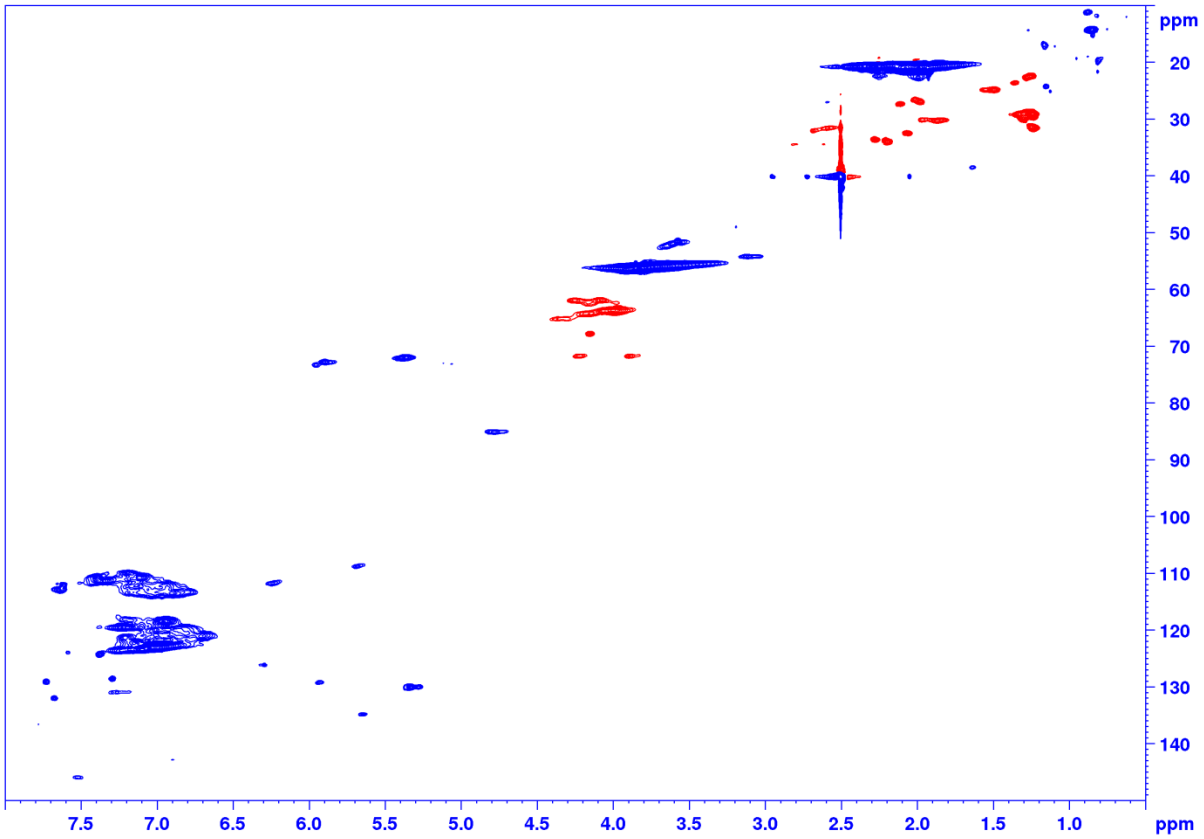

Figure S3. Multiplicity edited HSQC of acetylated spruce lignin

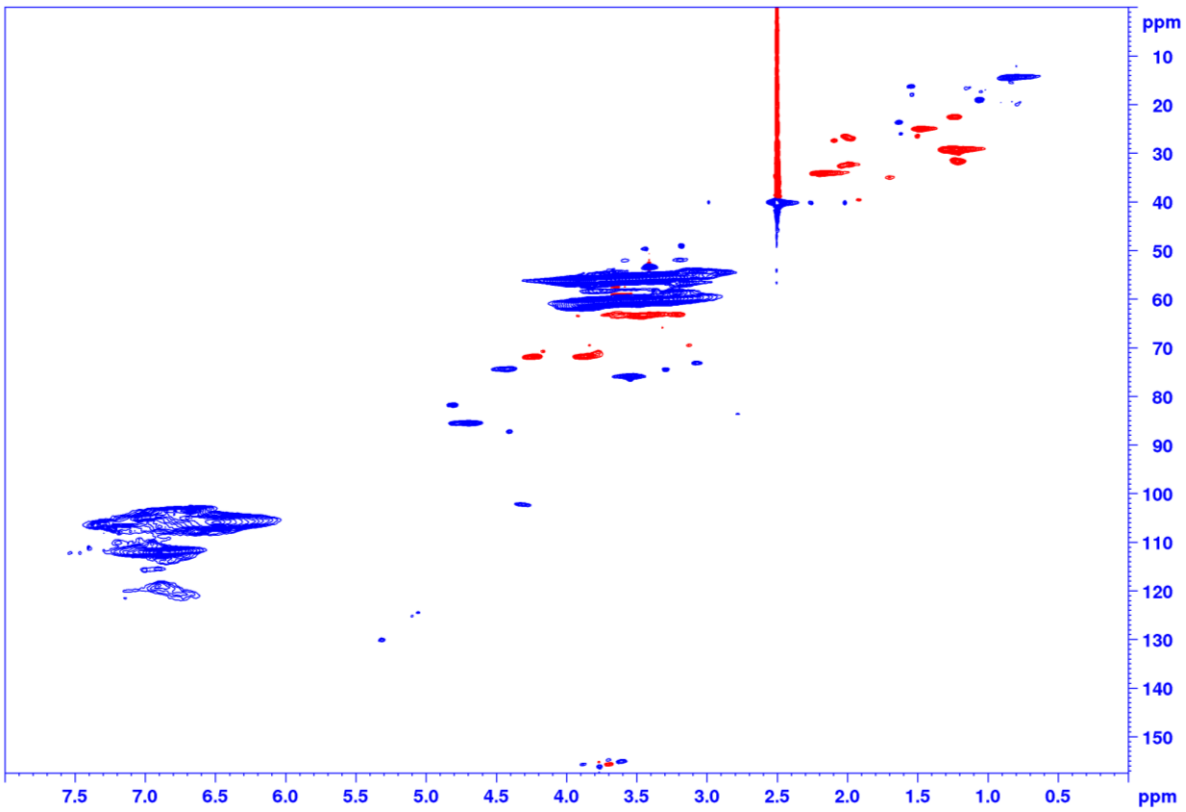

Figure S4. Multiplicity edited HSQC of partially methylated birch lignin

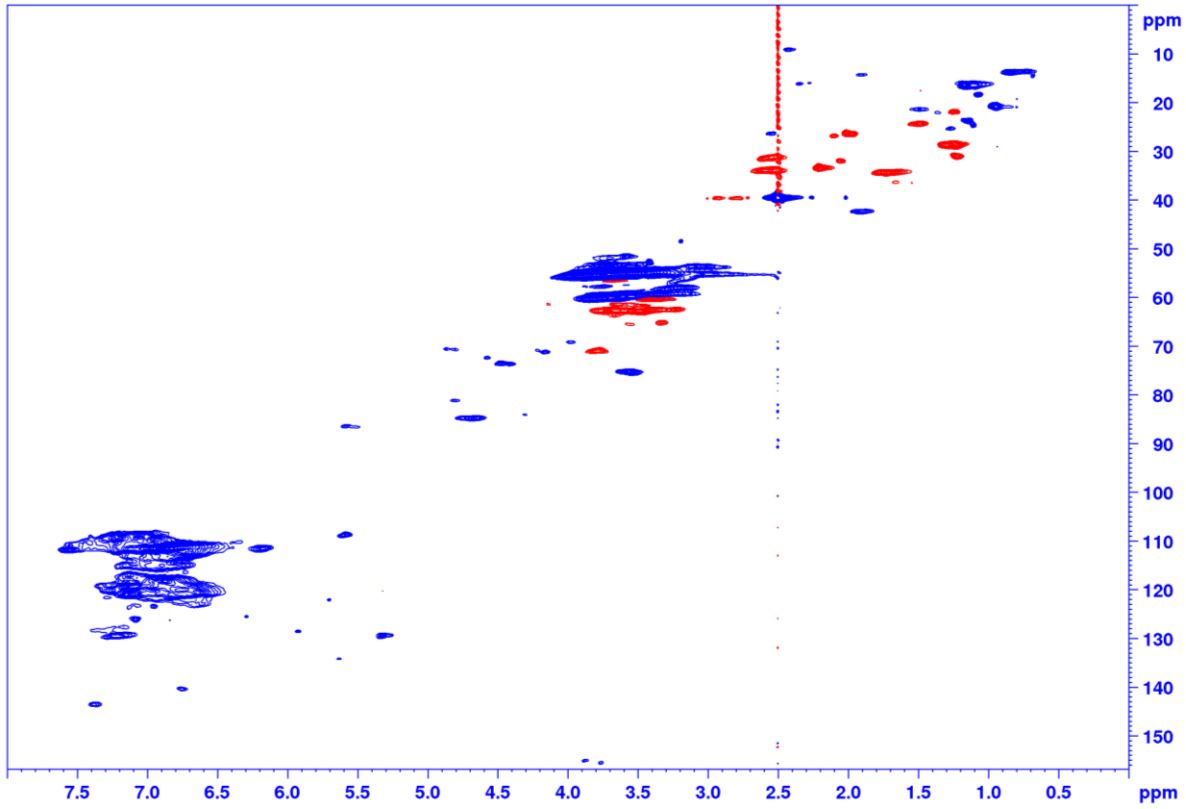

Figure S5. Multiplicity edited HSQC of partially methylated pine lignin

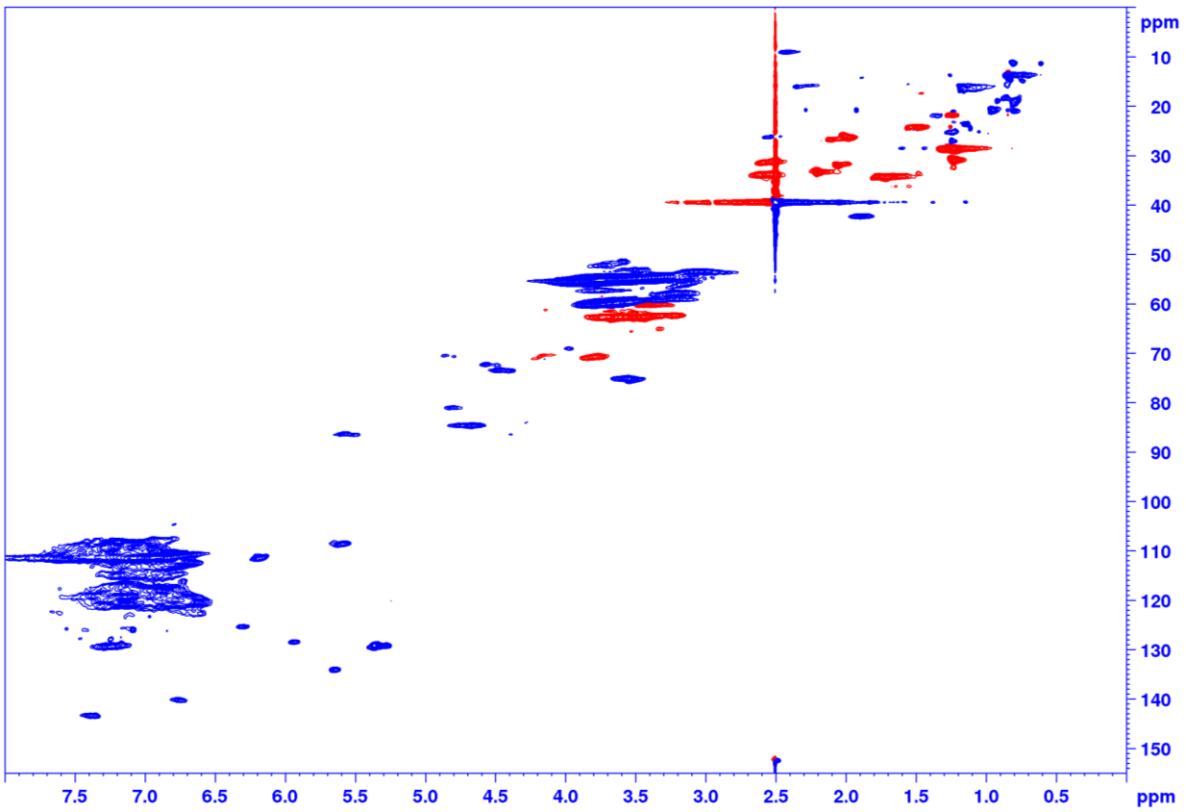

Figure S6. Multiplicity edited HSQC of partially methylated spruce lignin

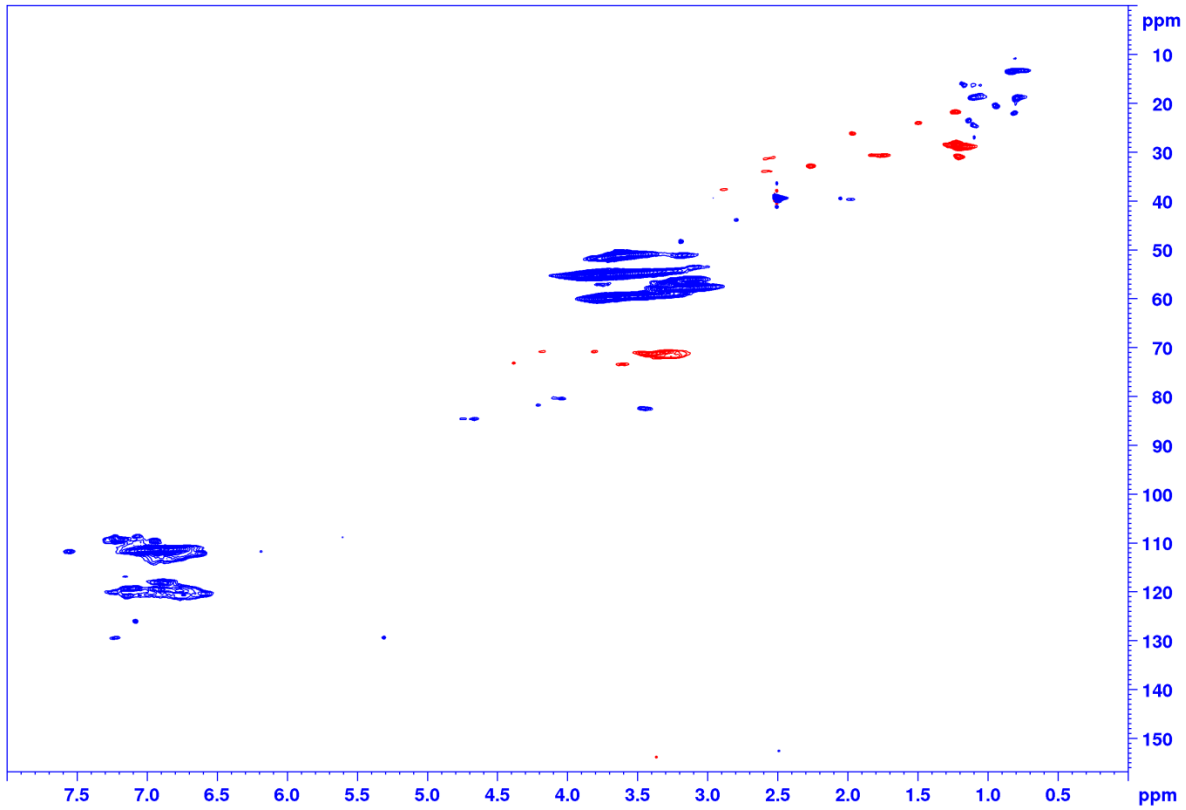

Figure S7. Multiplicity edited HSQC of fully methylated pine lignin

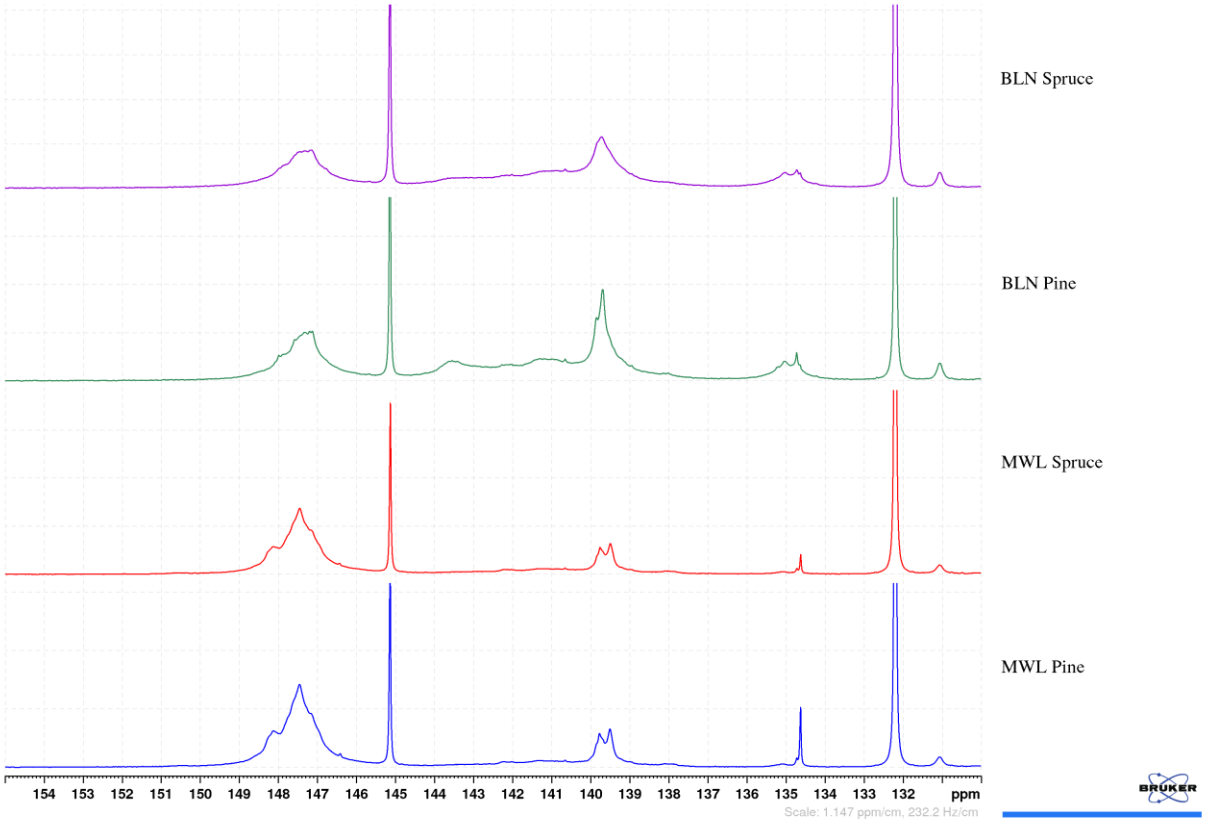

Figure S8. ^{31}P NMR of BLN spruce, BLN pine, MWL spruce and MWL pine

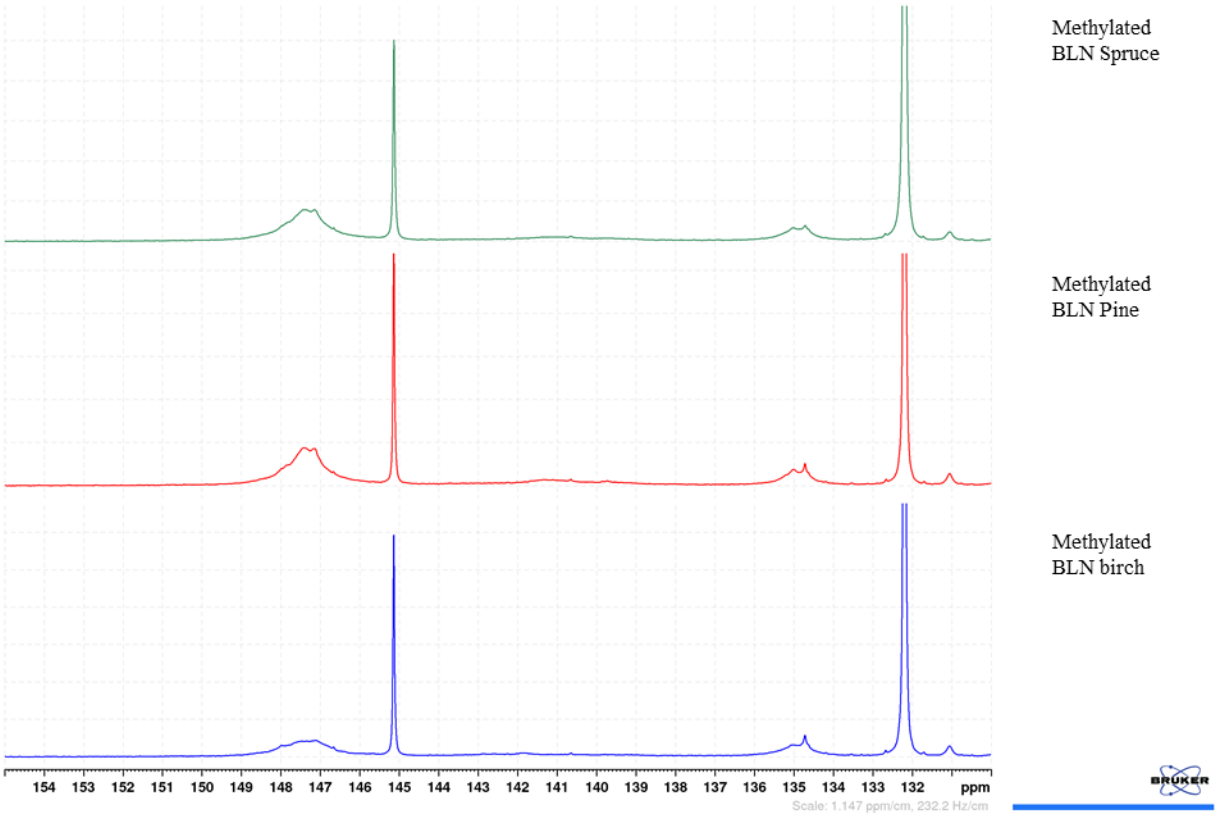

Figure S9. ^{31}P NMR of the lignin with methylated phenolic hydroxyl groups birch, spruce and pine

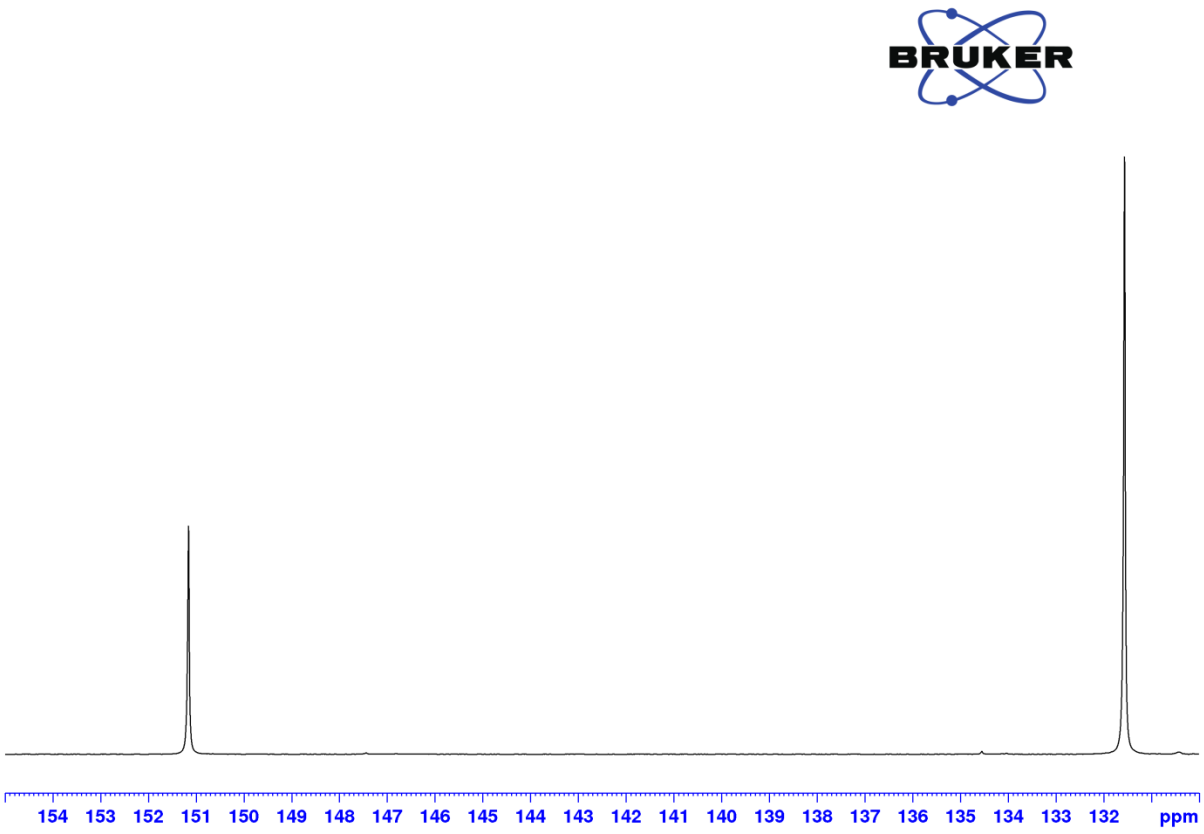

Figure S10. ^{31}P NMR of pine lignin fully methylated

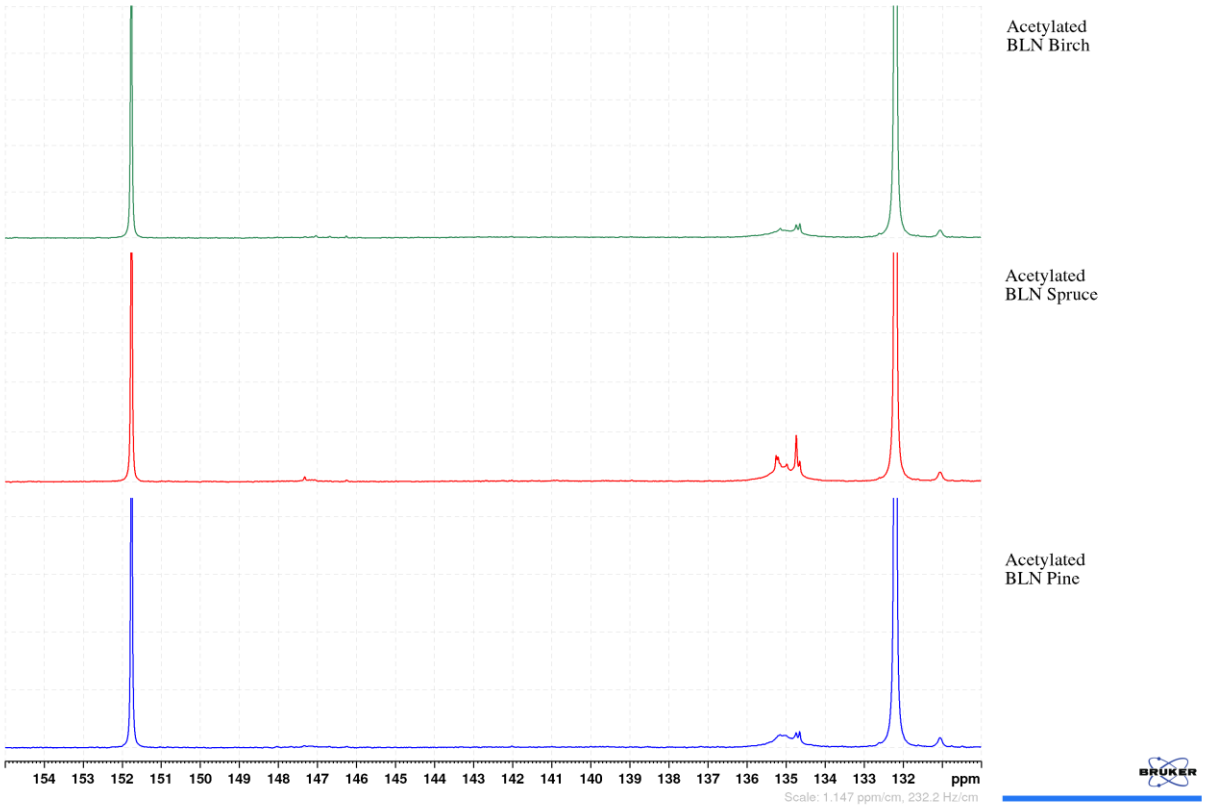

Figure S11. ^{31}P NMR of the acetylated lignin birch, spruce and pine

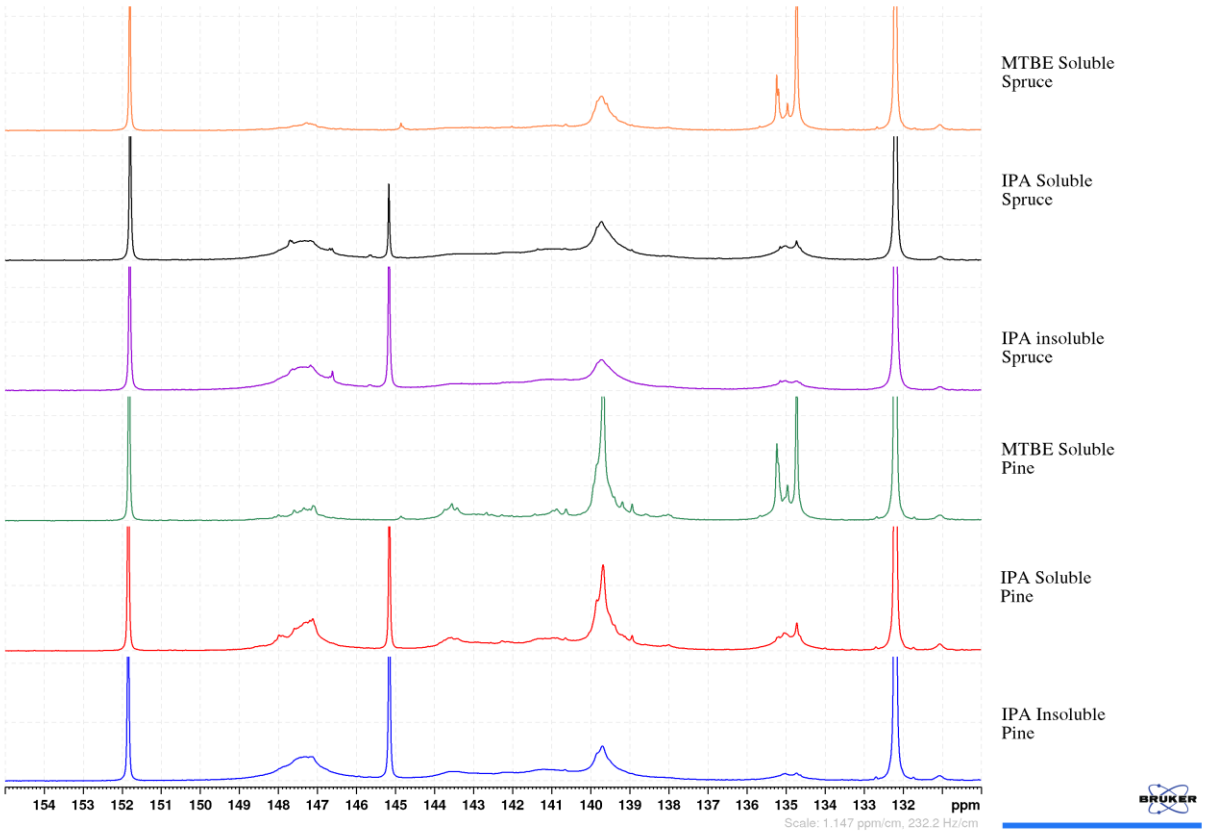

Figure S12. ^{31}P NMR of the different lignin fractions: birch, MTBE soluble spruce, IPA soluble spruce, IPA insoluble spruce, MTBE soluble pine, IPA soluble pine and IPA insoluble pine

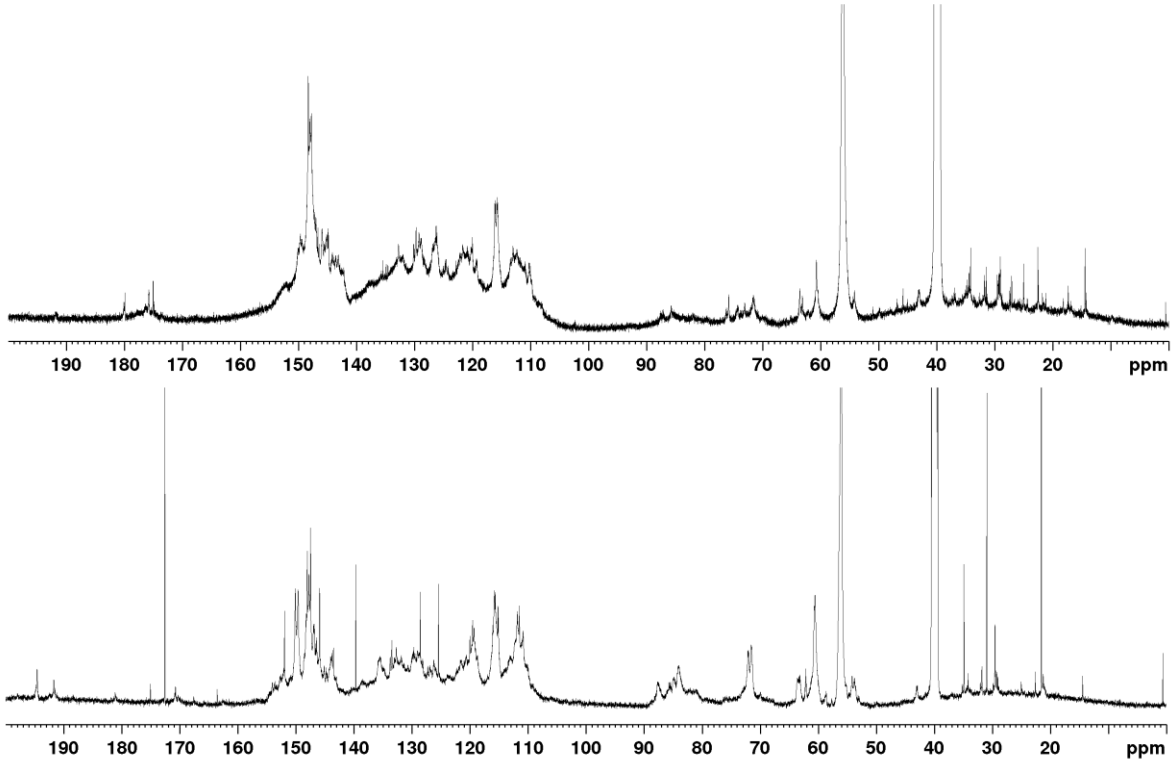

Figure S13. ^{13}C NMR of pine, BLN (top), MWL (down)

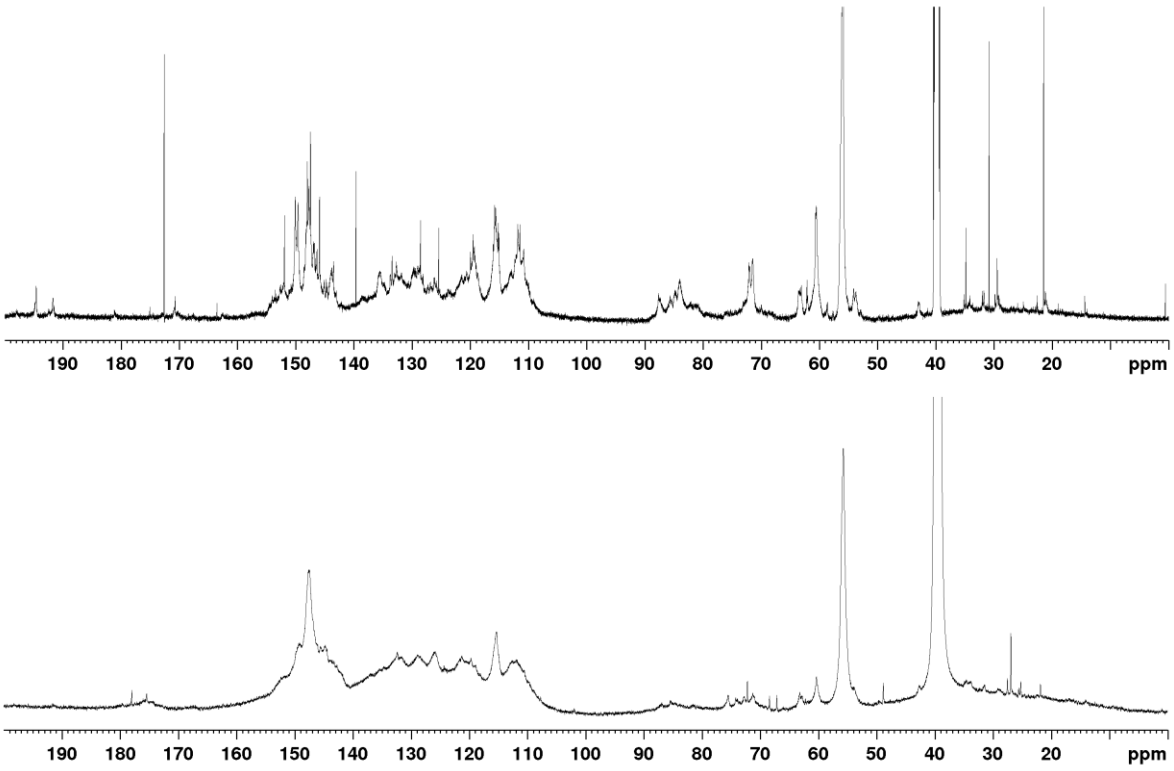

Figure S14. ^{13}C NMR of spruce, BLN (top), MWL (down)

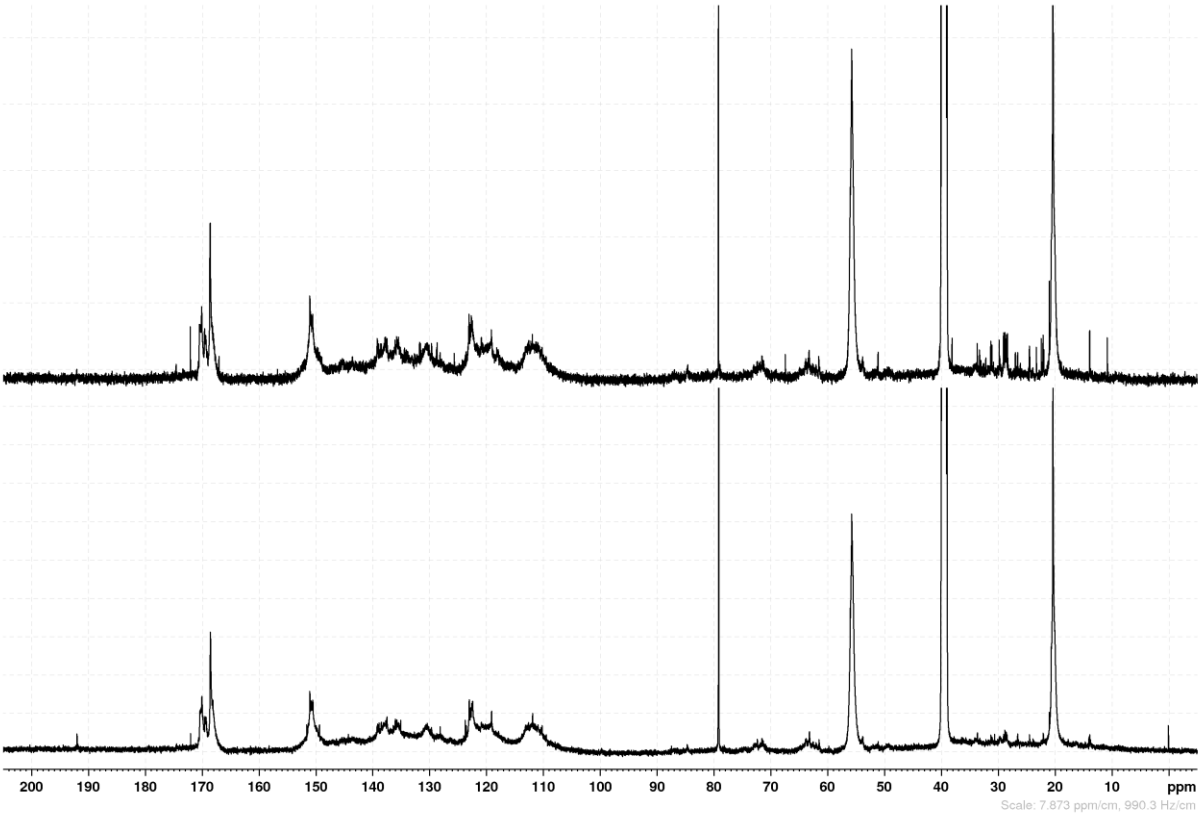

Figure S15. ^{13}C NMR of acetylated BLN lignin spruce (top) and pine (down)

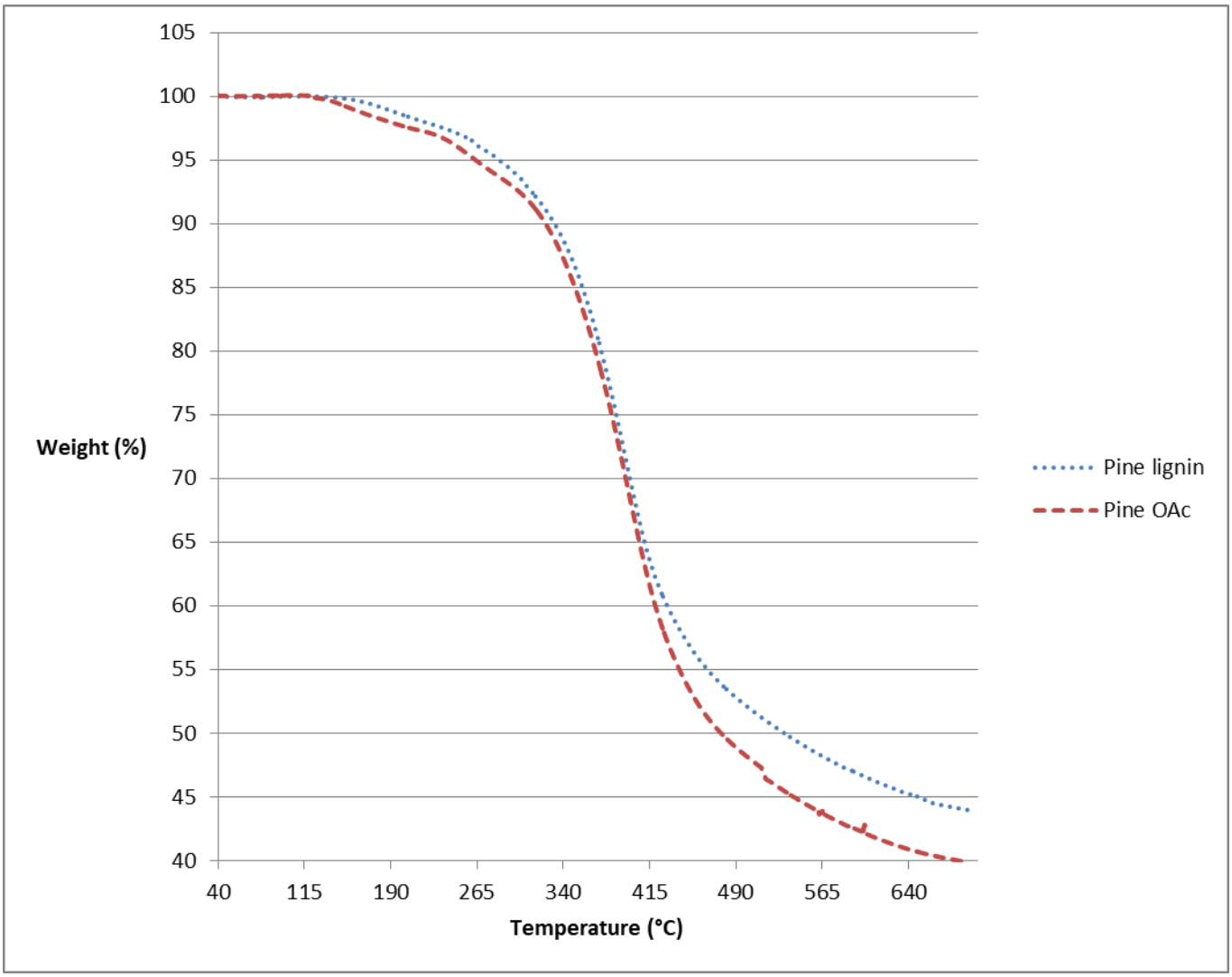

Figure S16. TGA of pine lignin and acetylated pine lignin after extensive drying