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Supporting Information

Importance of Lignin Coniferaldehyde Residues for Plant Properties and Sustainable Uses

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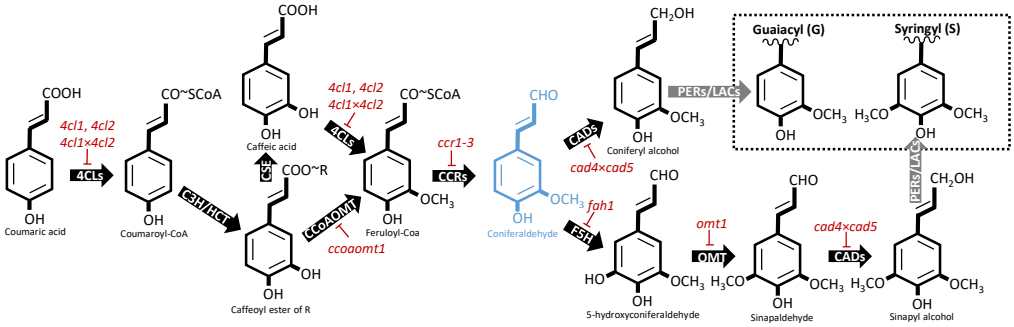

Figure S1. Schematic representation of conventional lignin monomer biosynthesis (black arrows) and polymerization (grey arrows) processes. Note that mutants used in this study are presented in red for 4-COUMARATE:CoA LIGASEs (4CLs), CAFFEOYL-CoA *O*-METHYLTRANSFERASE 1 (CCoAOMT1), CINNAMOYL-COA REDUCTASEs (CCRs), CINNAMYL ALCOHOL DEHYDROGENASEs (CADs), FERULATE-5 HYDROXYLASE (F5H), *O*-METHYLTRANSFERASE (OMT). Other important step in lignin formation include COUMARATE-3-HYDROXYLASE and SHIKIMATE/QUINATE HYDROXYCOUMAROYLTRANSFERASE (C3H/HCT), CAFFEOYL-SHIKIMATE ESTERASE (CSE), PEROXIDASEs (PERs) AND LACCASEs (LACs). Note that coniferaldehyde is indicated in blue.

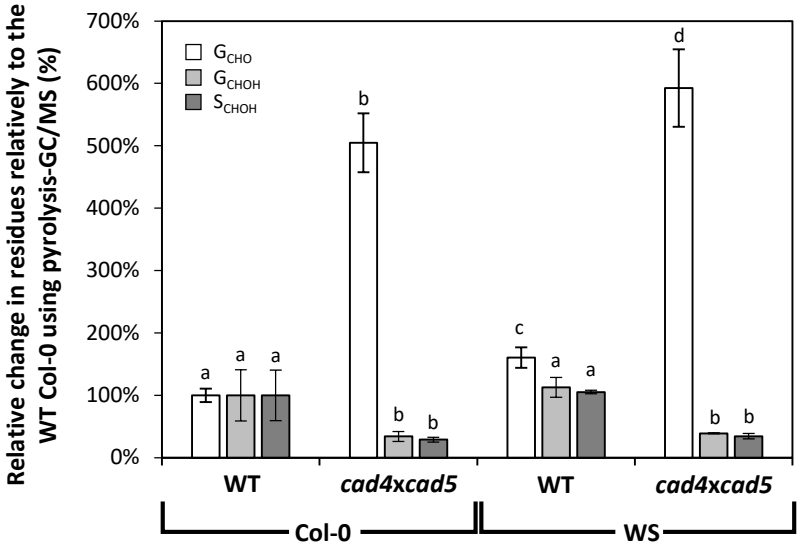

Figure S2. Influence of natural diversity on the proportion of coniferaldehyde (G_{CHO}), coniferyl alcohol (G_{CHOH}) and sinapyl alcohol (S_{CHOH}) in lignin of *Arabidopsis* stem tissues using pyrolysis-GC/MS. Data is expressed as a percentage of wild-type (WT) plants of the Columbia 0 (Col-0) background for each residue compared to Wassilewskija (WS) and/or *cad4*x*cad5* mutations (n = 3 independent biological replicates per genotype). Different letters for each residue category indicate significant differences using one-way ANOVA with Tukey test.

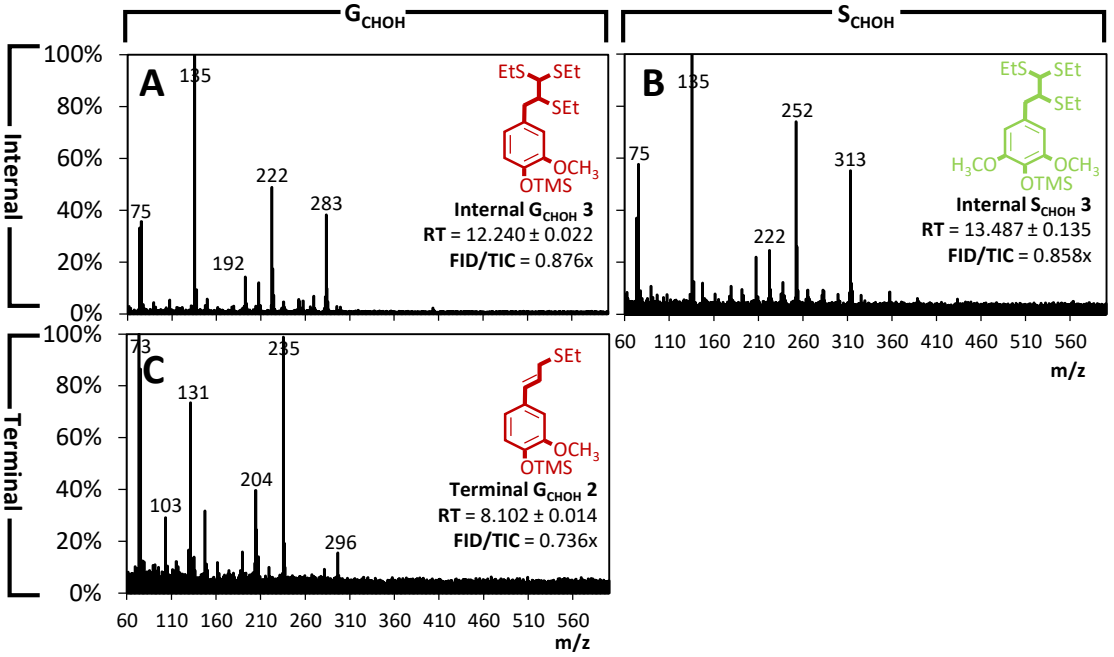

Figure S3. Diagnostic thioacidolysed compounds deriving from terminal and internal residues of coniferyl alcohol (G_{CHOH}) and sinapyl alcohol (S_{CHOH}) in cell walls of stem tissues. Characteristics of diagnostic compound are presented for internal (A-B) and terminal (C) residues of G_{CHOH} (A,C) and S_{CHOH} (B) by their m/z[40-45], retention time (RT in min) and FID/TIC ratio.

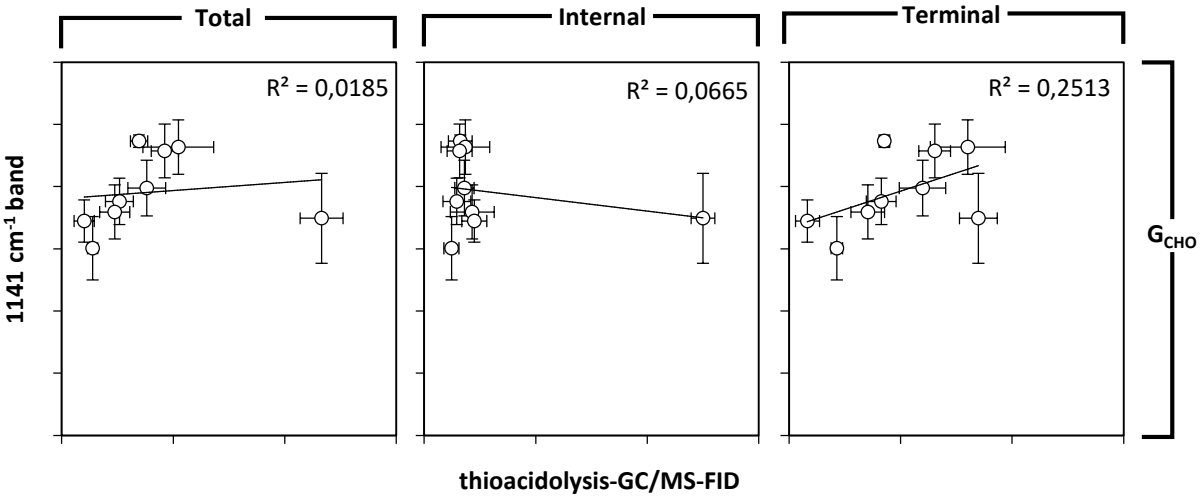

Figure S4. Linear correlation analyses between the 1141 cm^{-1} Raman band height and thioacidolysis-GC/MS-FID for coniferaldehyde (G_{CHO}) residues connected by ether C-O-C linkages at different position with the lignin polymers of stem tissues in a set of *Arabidopsis* with modified lignins.