

Supplementary material

Manipulation of lignin metabolism by plant densities and its relationship with lodging resistance in wheat

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Discussion

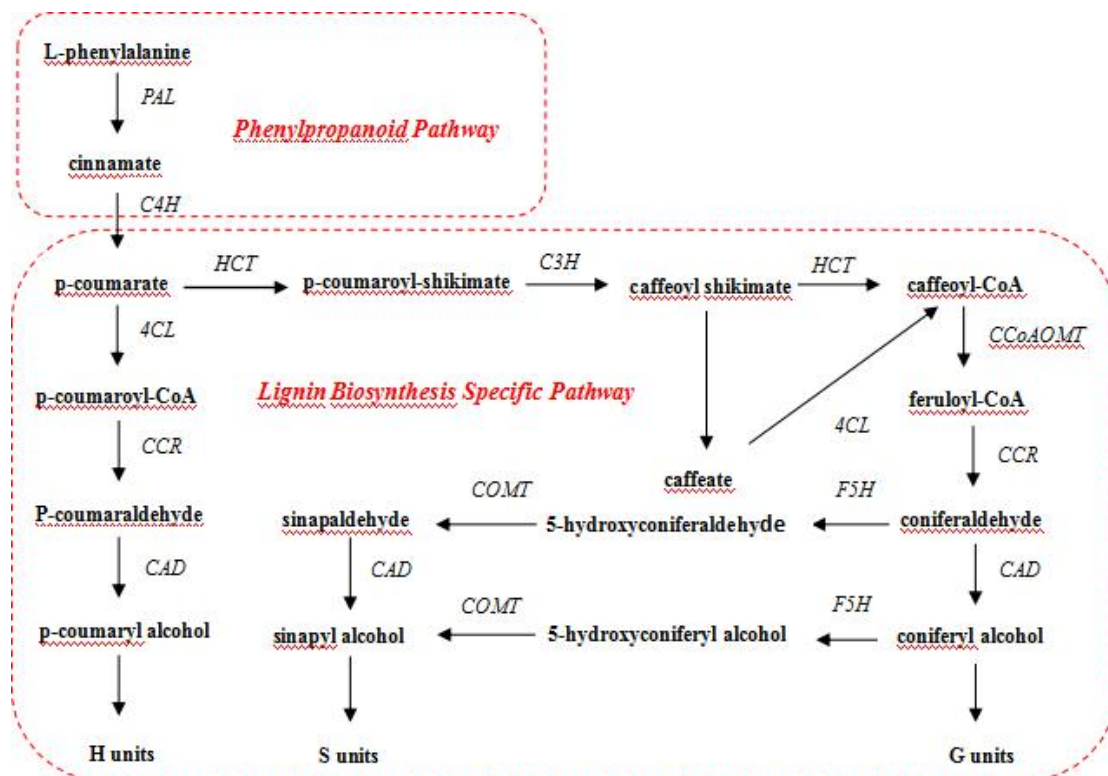


Fig. S1 Pathways for the biosynthesis of lignin monolignols. PAL, phenylalanine ammonia-lyase; C4H, cinnamate 4-hydroxylase; 4CL, 4-coumarate:CoA ligase; HCT, *p*-hydroxycinnamoyl-CoA shikimate/quinic acid hydroxycinnamoyl transferase; CCoAOMT, caffeoyl CoA *o*-methyl transferase; CCR, cinnamoyl CoA reductase; F5H, ferulic acid/coniferaldehyde/coniferyl alcohol 5-hydroxylase; COMT, caffeic acid 3-*o*-methyltransferase; CAD, cinnamyl alcohol dehydrogenase; H, *p*-hydroxyphenyl; G, guaiacyl; S, syringyl.

Methods

| | Time (min) | Flow (mL/min) | %A (water) | %B (acetonitrile) | Total runing time (min) |
|---|------------|------------------|---------------|----------------------|----------------------------|
| 1 | Initial | 0.500 | 95.0 | 5.0 | Initial |
| 2 | 0.50 | 0.500 | 95.0 | 5.0 | 6 |
| 3 | 3.00 | 0.500 | 75.0 | 25.0 | 6 |
| 4 | 3.50 | 0.500 | 10.0 | 90.0 | 6 |
| 5 | 4.00 | 0.500 | 10.0 | 90.0 | 6 |
| 6 | 4.10 | 0.500 | 95.0 | 5.0 | 6 |
| 7 | 6.00 | 0.500 | 95.0 | 5.0 | 6 |

Table S1 Chromatographic gradient conditions for the analysis of lignin monomers.

| Compound name | Parent (m/z) | Daughter (m/z) | Dwell (s) | Cone (V) | Collision (V) |
|---------------------|-----------------|-------------------|--------------|-------------|------------------|
| Hydroxybenzaldehyde | 120.9681 | 92.1073 | 0.050 | 10 | 20 |
| Vanillin | 150.9681 | 92.0630 | 0.050 | 25 | 22 |
| Vanillin | 150.9681 | 136.0282 | 0.050 | 25 | 15 |
| Syringaldehyde | 180.9622 | 151.0684 | 0.050 | 10 | 20 |
| Syringaldehyde | 180.9622 | 166.0246 | 0.050 | 10 | 12 |

Table S2 Optimized mass spectra conditions.

| Gene | Forward (5'→3') | Reverse (5'→3') | GenBank No. |
|----------------|--------------------------------|---------------------------------|-------------|
| <i>TaPAL</i> | <i>AGAGCACGGTGAAGAACACGGTA</i> | <i>ACACATACTCCCTGTCCAGAACTC</i> | JQ005112.1 |
| <i>Ta4CL</i> | <i>GATCGAAGGCTCCGAAATCA</i> | <i>GACCTTGTGGATCCTCTTGTAG</i> | KF442977.1 |
| <i>TaCAD</i> | <i>GCAAGTCCTCCCAAATCCAC</i> | <i>CCTGTTTTCTGAGGGTGTATCT</i> | GU563724.1 |
| <i>TaCCR</i> | <i>CCCAACAAGGTGCTCTGACG</i> | <i>CCTGTTTTCTGAGGGTGTATCT</i> | DQ449508.1 |
| <i>TaCOMT</i> | <i>TAACGAAGGGATGAAGAACC</i> | <i>GAAGTTGATGCCTTTTATGGT</i> | EF413031.1 |
| β -actin | <i>CCTTCGTTTGGACCTTGCTG</i> | <i>AGCTGCTCCTAGCCGTTTCC</i> | AB181991.1 |

Table S3 Gene names and primer sequences used for Quantitative Real-time PCR.

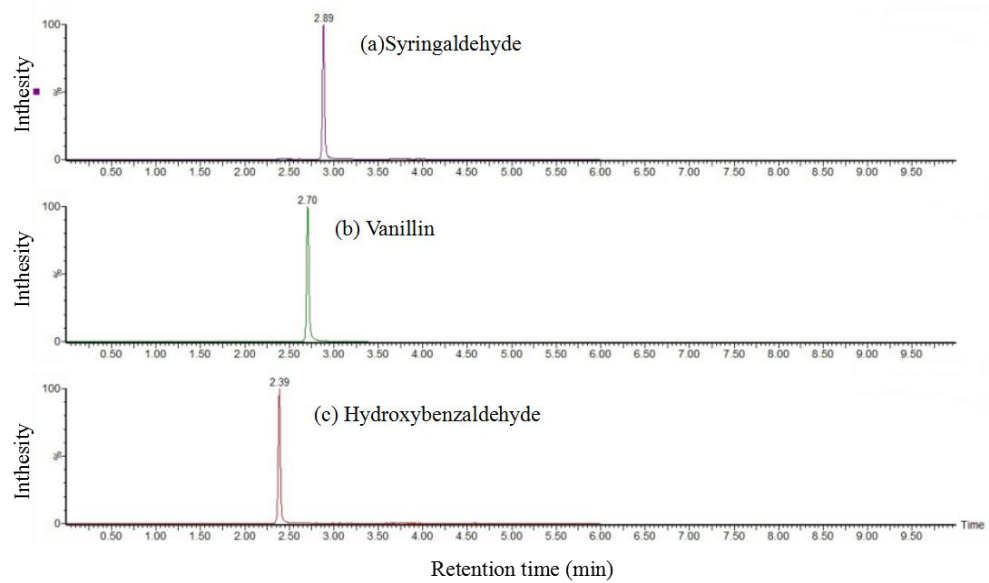


Fig. S2 UPLC-MS/MS analysis of lignin monomers by nitrobenzene oxidation. Total ion chromatograms of lignin monomers. (a), syringaldehyde; (b), vanillin; (c), hydroxybenzaldehyde.