Article:

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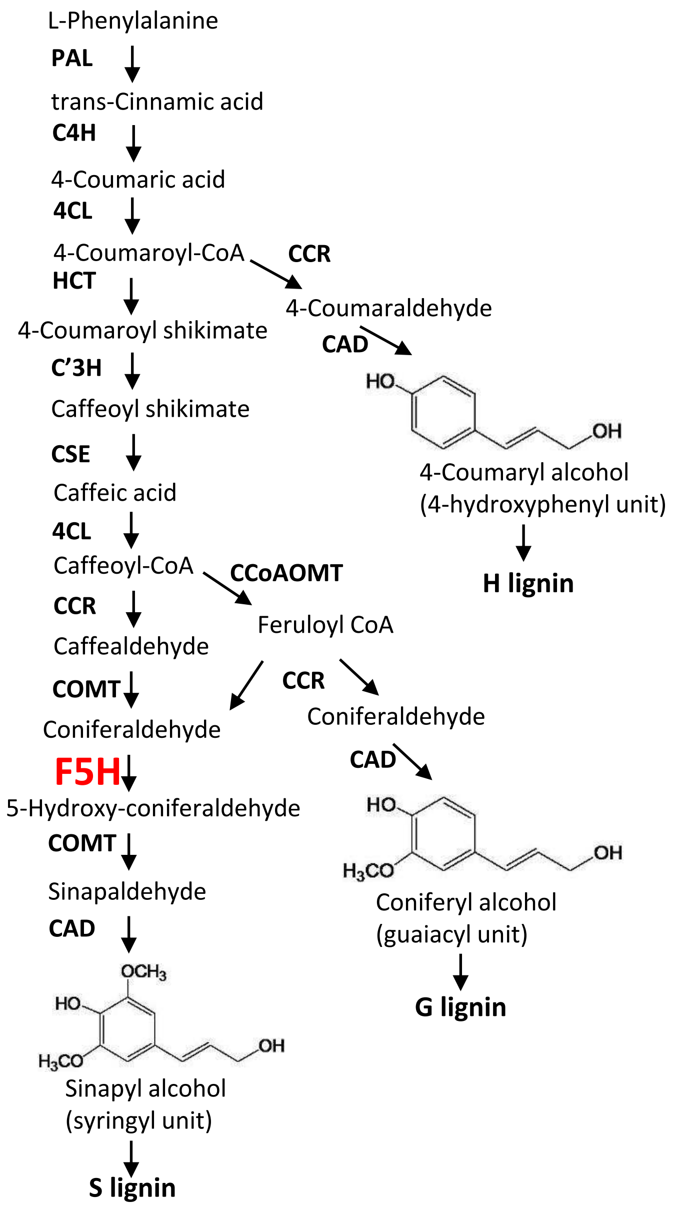

Fig. S1. The monolognol biosynthetic pathway. Enzymes are L-phenylalanine ammonia-lyase (PAL), cinnamic acid 4-hydroxylase (C4H), 4-coumarate Coenzyme A ligase (4CL), coumaroylshikimate 3′-hydroxylase (C3′H), hydroxycinnamoyl-CoA shikimate/quinate hydroxycinnamoyltransferase (HCT), caffeoylshikimate esterase (CSE), caffeic acid/5-hydroxyconiferaldehyde 3-*O*-methyltransferase (COMT), caffeoyl Coenzyme A 3-*O*-methyltransferase (CCoAOMT), ferulate/coniferaldehyde 5-hydroxylase (F5H), cinnamoyl Coenzyme A reductase (CCR) and cinnamyl alcohol dehydrogenase (CAD).

Fig. S2. Lignin contents and compositions of wild-type and F5H-modified Arabidopsis plants as determined by thioacidolysis

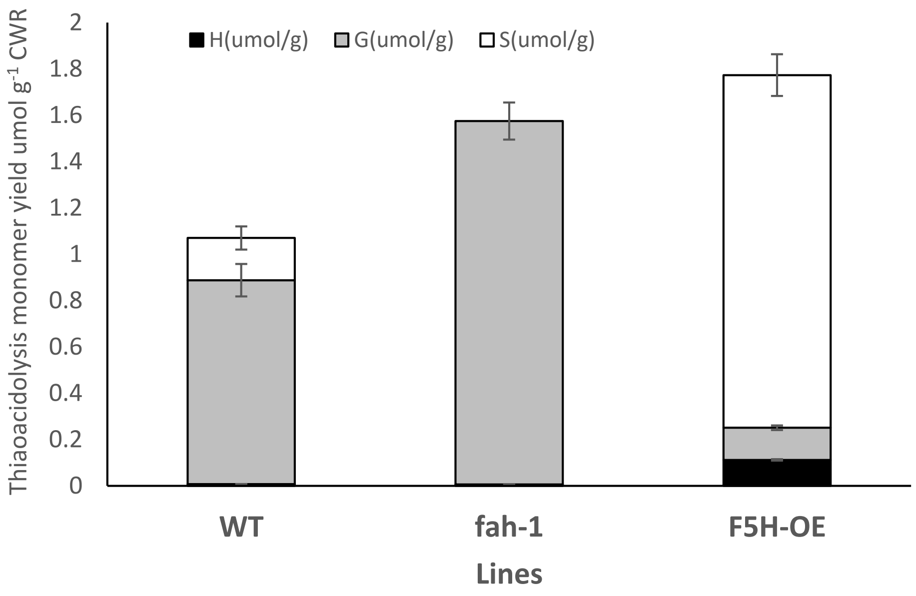

Fig. S3. Staining and fluorescence of vascular tissues of Arabidopsis plants with different lignin monomer compositions.
(a) Light microscopy without staining
(b) Light microscopy with Mäule staining
(b) UV autofluorescence.
Cross sections (100 µm thickness) of wild type, (WT) F5H-OE and *fah-1* mutant were taken from the inflorescence stem at the third internode, counting from the bottom after flowering. Plants were two months old at harvest time. Figure shows representative pictures of one of five biological replicates of each genotype. Size bars are 100 µm.

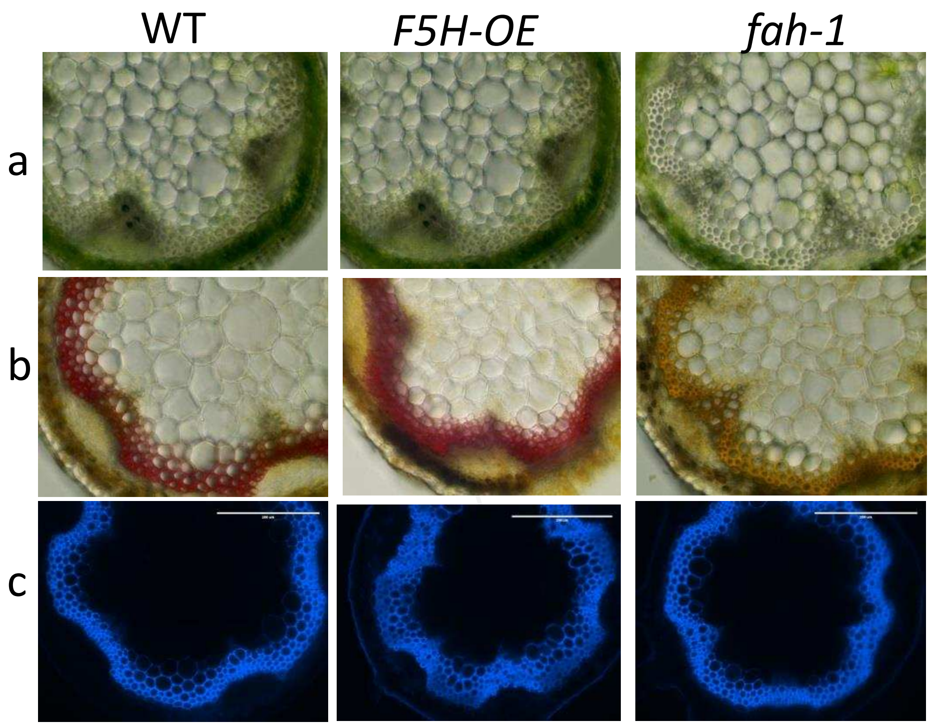

Fig. S4. Heat map analysis comparing the most highly induced genes in the two Arabidopsis lines with different lignin compositions as compared to wild type. Data are taken from Dataset S1.

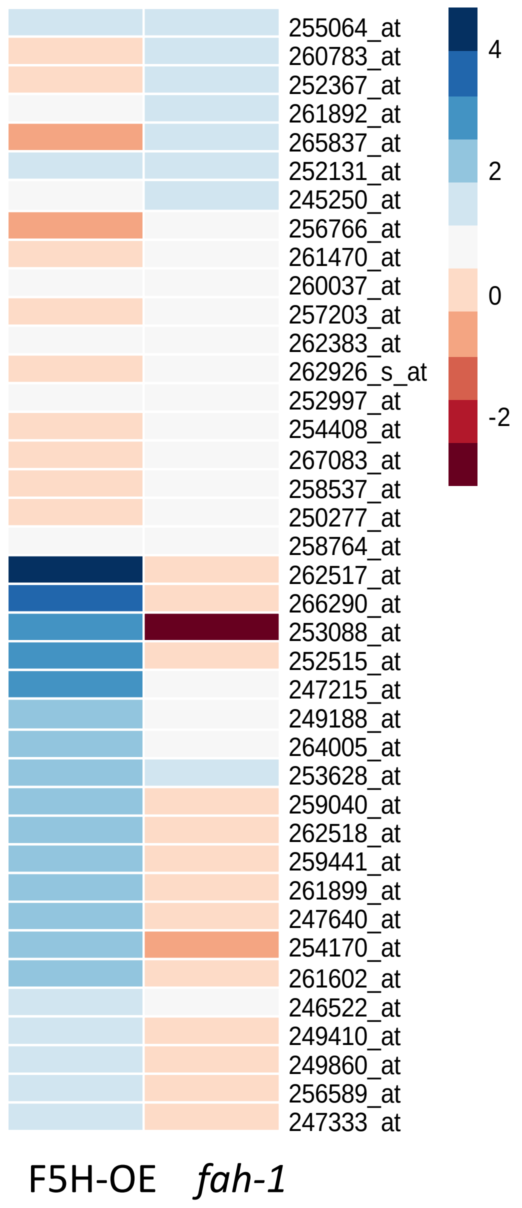

Fig. S5. Epitope detection chromatography (EDC) of cell wall polysaccharides from water extracts from WT, F5H-OE and *fah-1* plants. LM19, LM20 (Homogalacturonan HG); LM5, LM6-M, INRA-RU1 (Rhamnogalacturonan RGI); LM25, LM11, LM28 (Hemicelluloses); LM2, LM21 (AGP and heteromannans). Details of antibodies are given in Table S3.

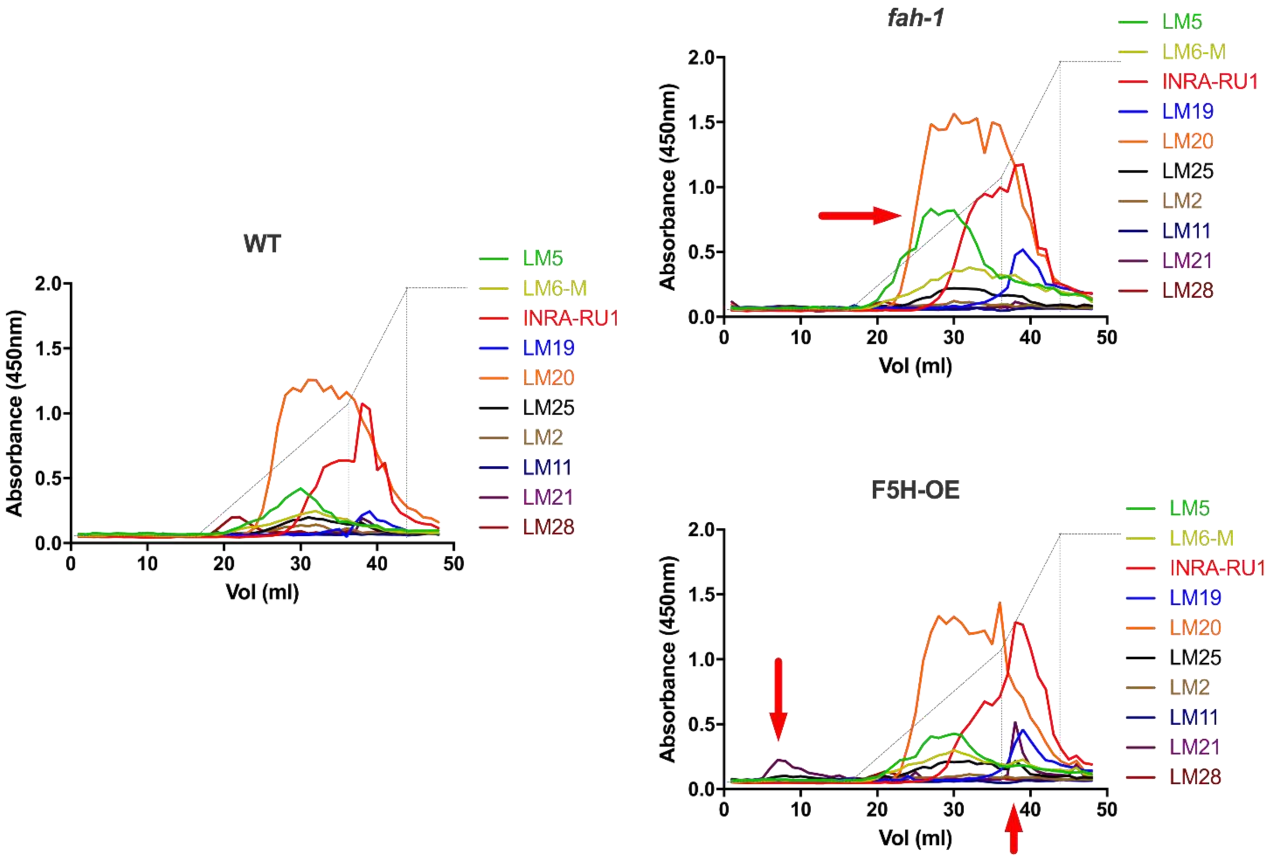

Table S1. Gene-specific primers used for qRT-PCR

Primer	Forward	Reverse
AtPP2A-F	AGATCGCTCGGAACTTGGAAA	ACATCCTCACCAAAACTCAAATCA
AtBT-F	TGGGAACTCTGCTCATATCT	GAAAGGAATGAGGTTCACTG
AtCYP81D11	TTAAGCCGGAGAGGTTTGAGAA	CCAATCCCAAATGGCATCA
AtPCC1	CTTCATCAGGGCCGTACACAA	ACCCACCACCGCATCTCTAG
AtLURP1	TACGCCGGCGATTCTGA	GCCTCGCATCGTTTGCTTT

Table S2. qPCR analysis of the ability of cell wall-released elicitors from F5H-OE pants to induce GST and PROPEP3 genes. Elicitors were prepared from the AIR of cell walls and were added directly to Arabidopsis cell cultures. Polygalacturonic acid (PGA) was also tested. The transcript analysis was performed with RNA from suspension cells harvested after 12 h of incubation at 25ºC in the dark. mRNA levels were first calculated relative to AtPP2A, and data then expressed as fold change with respect to the water-treated control. Results are for two biological replicates, each with means ± SE from three analytical replicates.

Elicitor origin	**Genes**		
	At2g29490 *GST*	At1g17180 *GST*	At5g64905 *PROPEP3*
WT1	0.79 ± 0.02	0.66 ± 0.01	0.96 ± 0.01
WT2	0.86 ± 0.05	0.86 ± 0.02	0.78 ± 0.05
F5H-OE-1/1	0.78 ± 0.03	0.78 ± 0.03	3.30 ± 0.02
F5H-OE-1/2	0.94 ± 0.01	0.86 ± 0.01	3.10 ± 0.04
PGA	0.99 ± 0.05	0.85 ± 0.05	0.97 ± 0.01

Table S3. Monoclonal antibodies used in this study and their specificity against cell wall oligosaccharide domains. All antibodies are rat hybridomas, except INRA-RU1 that is a mouse hybridoma mAb.

Antibody	**Specificity**	**Epitope Description**	**References**
PECTIN PROBES			
LM18	HG	un-esterified and partially methyl-esterified HG	Verhertbruggen et al 2009 Carb Res 344, 1858-1862
LM19	HG	un-esterified homogalacturonan	Verhertbruggen et al 2009 Carb Res 344, 1858-1862
LM20	HG	methyl-esterified HG	Verhertbruggen et al 2009 Carb Res 344, 1858-1862
LM7	HG	partially methyl-esterified HG, non-blockwise pattern	Willats et al 2001, J Biol Chem 276; Clausen et al 2003 Carb Res 338, 1797-1800
LM8	Xylogalacturonan	Xylogalacturonan	Willats et al 2004 Planta 218, 673-681
INRA-RU1	RGI	unbranched backbone of RGI	Ralet et al 2010 Planta 231, 1373-1383
LM5	Galactan	1-4- β-D-galactan	Jones et al 1997 Plant Physiol 113, 1405-1412; Andersen et al 2016 Carb Res 436, 36-40
LM6	Arabinan	1-5-α-L-arabinan	Willats et al 1998 Carb Res 308, 149-152
LM6-M	Arabinan	1-5-α-L-arabinan	*manuscript in preparation*
LM13	Arabinan	1-5-α-L-arabinan (linear)	Moller et al 2008 Glycoconjugate J 25, 37-48; Verhertbruggen et al 2009 Plant J 59, 413-425
LM16	Arabinan	processed arabinan/RGI	Verhertbruggen et al 2009 Plant J 59, 413-425
LM9	Galactan	feruloylated 1-4- β-ᴅ-galactan	Clausen et al 2004 Planta 219, 1036-1041
HEMICELLULOSE PROBES			
LM15	Xyloglucan	Xyloglucan, low galactosylation	Marcus et al 2008 BMC Plant Biol 8, 60
LM24	Xyloglucan	galactosylated xyloglucan, XLLG motif preference	Pedersen et al 2012 J Biol Chem 287, 39429-39438
LM25	Xyloglucan	galactosylated xyloglucan, XLLG, XXLG and XXXG motifs	Pedersen et al 2012 J Biol Chem 287, 39429-39438
LM21	Heteromannan	β-linked heteromannan	Marcus et al 2010 Plant J 64, 191-203
LM22	Heteromannan	β-linked heteromannan	Marcus et al 2010 Plant J 64, 191-204
LM10	Xylan	1-4- β-ᴅ-xylan	McCartney et al 2005 J Histochem Cytochem 53, 543-546
LM11	Xylan	1-4- β-ᴅ-xylan / arabinoxylan	McCartney et al 2005 J Histochem Cytochem 53, 543-547
LM28	Glucuronoxylan	glucuronoxylan	Cornuault et al 2015 Planta 242, 1321-1334
GLYCOPROTEINS PROBES			
JIM13	AGP	uronosyl containing epitope	Knox et al 1991 Plant J 1, 317-326; Yates et al 1996 Glycobiol 6, 131-139
LM2	AGP	Beta-linked glucuronosyl	Smallwood et al 1996 Planta 198, 452-459; Yates et al 1996 Glycobiol 6, 131-139
LM1	Extensin	not known	Smallwood et al 1995 Planta 196, 510-522
OTHER PROBES			
LM12	Feruloylated polymers	not known	Pedersen et al 2012 J Biol Chem 287, 39429-39438

LM23	Xylosyl residues	non-acetylated xylosyl residues	Manabe et al 2011 Plant Physiol 155, 1068-1078; Pedersen et al 2012 J Biol Chem 287, 39429-39438; Torode et al 2015 Planta PlosONE 10, e0118366

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