

Identification and Characterization of a Set of Monocot BAHD Monolignol Transferases

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One Sentence Summary:

A group of identified BAHD acyltransferases function as feruloyl-CoA monolignol transferases and/or *p*-coumaroyl-CoA monolignol transferases *in vitro* and *in planta*.

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Supplemental Data

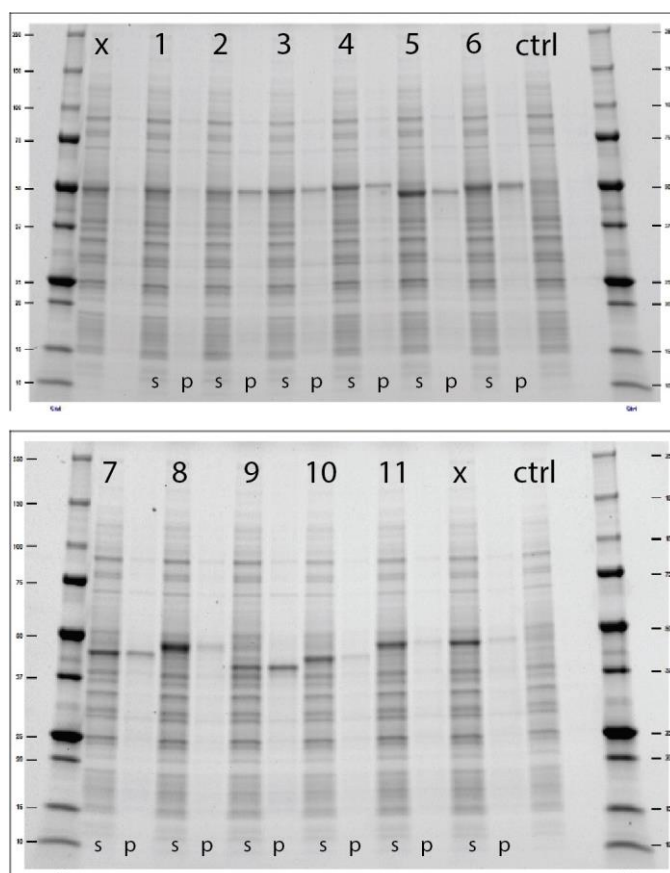
Supplemental Table S1. Cloning and genotyping primers, and full coding sequences for FMT and PMT genes of interest.

Cloning primers	F primer	R primer
<i>AsFMT</i>	5'- ATGACGATCATGGAGGT -3'	5'- CTAGGAAGCGAAAGCAG -3'
<i>OsFMT</i>	5'- ATGGTCGCTGTCACC -3'	5'- CTATATGAAGGCCTTCATCTC -3'
<i>SbFMT</i>	5'- ATGGCGACGACCATC -3'	5'- CTAAAAGAAGGCCTTCATCTC -3'
<i>PvFMT</i>	5'- ATGGTGAACATCACCGTG -3'	5'- CTAAAAGAAGGCCTTCATCTC -3'
<i>ZmFMT</i>	5'- ATGGCGAGCATCACC -3'	5'- CTAAAAGAAGGCCTTCATCTC -3'
<i>SbPMT</i>	5'- ATGGGCACAATCGATGATA -3'	5'- CTATGAGCAGGGCTGG -3'
<i>PvPMT</i>	5'- ATGGGTACCATCGGGT -3'	5'- CTAAGTGGTGGTTCCCG -3'
<i>Adaptor attB</i>	5'-GGGGACAAGTTTGTACAAAAAAGCAGGCTT-3'	5'-GGGGACCACTTTGTACAAGAAAGCTGGGTG-3'
Genotyping primers	F primer	R primer
<i>AsFMT</i>	5'- TGACGATCATGGAGGTTCAA -3'	5'- CGCGAATATTGTGGATGTTG -3'
<i>OsFMT</i>	5'- GGATGTTGCCACCAAAGAGT -3'	5'- GTCATAATCCGGGTCCCTTT -3'
<i>SbFMT</i>	5'- TGCTGAGGGTGTGCTAGTG -3'	5'- TGGTACACCCACCCATAGT -3'
<i>PvFMT</i>	5'- ACGCGATTTCTGAGTTTGCT -3'	5'- CTGGAACCCAAAGGACTTGA -3'
<i>ZmFMT</i>	5'- GCTTGTGGAGGATTTGTGGT -3'	5'- AATGTTTGAACCCGAAGCAC -3'
<i>SbPMT</i>	5'- AGTGGGTTCTACGGCAACTG -3'	5'- GTCCAGTCGGAGACGAAGAG -3'
<i>PvPMT</i>	5'- CCAAGGTCAAGTCCAGCTTC -3'	5'- GAAGCAGTTGCCGTAGAACC -3'
<i>Actin</i>	5'- CCAGAAGGATGCATATGTTGGTGA -3'	5'- GAGGAGCCTCGGTAAGAAGA -3'
Gene sequences		

<p><i>AsFMT</i> XM_017385232.1</p>	<p>ATGACGATCATGGAGGTTCAAGTTGTATCTAAGAAGATGGTAAAGCCATCAGTTCGGACTCTGACCACCACAAGACTT GCAAATTTGACGGCATTTCGATCAGATTGCTCCTCCGGATCAAGTTCCTATTACTTCTACAACAGCAGCAACATCCA CAATATTCGCGAGCAATTGGTAAAATCCTTGTCCGAAACTCTAACCAAGTTTTATCCATTAGCTGGAAGATTTGTTCAA GATGGTTTCTATGTGCGATTGTAATGATGAAGGGTCTTGTACGTAGAAGCTGAAGTTAACATTCCGCTAAACGAATTC TCGGACAAGCAAAAGAAAAATATACAACCTTATCAATGATCTTGTTCGGAAAAAAACTTCAAGGATATTCATTATG AAAATCCAATAGTGGGATTACAGATGAGTTATTTCAAGTGTGGTGGACTTGTATTTGCATGTATCTTTCCGATGTTGTA GCTGATGGATATACAGCAGCAGCATTCACTAAAAGAGTGGTCTAACAACAACCAATGGCATCAATTTGGCGATCAACTA GTTTCTTCTTCCGATTAACCTCGAATTGGCAACTCTAGTCCCAGCTAGAGATTTATCGACGGTGGATCAAAACCCAGCCGT GATGCCACCATCAAAGATCAAGGAAACCAAGGTTGTCAACAAGGAGGTTTCTGTTTCGATGAAAATGCGATATCAGCTTT CAAAGACCATGTCATCAAATCCGAAAGCGTTAACCGGCTACACGGGTGGAAGTTGTGACATCTGTGTTATGGAAGGC TCTGATCAACCAGTCTAAGCTTCCAAGTTCTACACTATATTTTCACCTCAACTTTAGAGGGAAACAGGCATCAACACC CCACCGCTAGATAATCATTTTTCGCTTTCGGAAACTTTTACACTCAGGTTCTACAAGTTTCAAGGGGGGAAATCAAA CAAAACAGGATTTGGAATTGCATGAATTGGTCAAGTTGTTGAGAGGAAAGTTGCGTAACACTCTGAAGAATTGCTCCG AAATTAACACTGCGGATGGGCTGTTCTTGAAGCAGCTAGTAATTTCAATATTACAGGAAGATTTGGAGGACGAAC AAGTGGATGTTCCGATTTTACAACGTTGTGTAGGATGCTTTGTTGTAAGACTGAGTTTGGGTGGGAAACCCAGCCGT GGTTACCATTCCAGAGATGCATTTGGAGATAGTGTCTTTTGGACACTAAATGTGGGACTGGTATTGAGGCATTAGTG AGCATGGATGAAGCAGATATGCTTCAGTTTGAAGTTGATCCCACCATCTCTGCTTTCGCTTCTAG</p>
<p><i>OsFMT</i> XM_015785190.2</p>	<p>ATGGTCGCTGTACCCTGATGAGGAAGTCCCGAACTTCGTCGGGCCGTCTCCTCCGACGCCGCCGGCCGAGATCACG ACGACGCTCGAGCTGTCTCCATCGACCGCTGCCGGGCTGCGCCACAACGTGCGGTCCCTGCACGTGTCCGCCGCC ACAAGAACAGCGGGCCCGTCTGTCGACGGTGATAGCAGGAGGCGGCCGCCGTGATCCGCGCGGCGCTCGCCGGGCG CTGGCGGACTACCCGGCGTTCGCGGGCCGATTCGTCGGCTCCCTGCTGGCCGGCAGCAGCCTCGCTCCGCTGCACGCT AGGGCGGTGGTTCGTGGAGGCGCCGCGGACTGCGCCTCGACAGTGAACGGCTCGAGTACCCGCTCATGATCT CCGAGGAGGCTGCTGCCTGCCCGGAGGACGGCTGACCTACCAGTATCCAGTTCATGATGCAGGTGATGATGAAT TCACTTGTGGAGGATTTATCTTGGGCCCTGTGGCAGTCCACACCCTTGTGATGGACTTGGAGCAGCACAATTCATCAC TGCAGTAGCTGAATTGGCCGTGGCATGGACAAGCTCAGGGTGGCTCCCGTGTGGGATCGCTCGCTGATACCGAACCC ACCTAAGCTCCCTCCTGGGCCACCACCATCGTTCAGTCCCTTGGTTTTTCAGCATTCTCCACAGATGTCACCTCTGACC GTATAGCTCACGTGAAGGCTGAGTACTCCAGACCTTTGGCCAGTATTGTTCCACCTTTGATGTTGCTACTGCTAAGGTT TGGCAGGCGAGGACACGGGCCGTGGGTACAAAGATCCGGAGATCCAGTCCATGTGTGTTTCTTTGCAAAACCGCGTCA TGCTCACGAGTTCTCCAAAAGATGGGGCTACTATGGCAACTGCTTTTATCCAGTACTGTGACAGCAATAGCTG AGGATGTTGCCACCAAGAGTTGCTTGTGATCAAGATAAATCCGGATGGAAAGGCGAGGCTCCCATGGAGTTT CAAAGTGGGCTTCAGGGGATGTGAAAGTTGATCCCTACGCATTGACATTTGAACACAATGTGCTTTTTGTGTCTGATTG GACGAGGTTAGGATCTTCGAGGTAGACTATGGGTGGGGTACACCTAATCACATCATACCATTCACTTATGCAGACTAC ATGGCAGTCCGAGTGTGTTGGTCTCCACCAATGCCAAAGAAAGGGACCCGATTATGACACAGTGTGTGGAGAACAAG TGTATCAAGGATTTCAAGATGAGATGAAGGCCTTCATATAG</p>
<p><i>SbFMT</i> XM_002441921.2</p>	<p>ATGGCGACGACCATCATCACGGTGACAAGGAAATCCAGTCGTTTCGTCGTGCCGTGCTGTCGTCGCCGCGGGTGGCGA CGACGGCCGAAGCGTGGAGCTGTCCGCCATCGACCGCTGCGCGGGTTCGCCACACCGTTCGCGGTCCCTGCACGTGT TCCGCGCAAGCGGACGACGACGACGCCCGCCGCGCTGCTGCCAGCAGGAGGCTGCGGAGGTTGATCCGGGCA GCGCTGTCCCGCTCTGGTGGACTACCGTCCGTTCCGCCGCTGCTGTCGCGCTGCTGACGCGGGGAGGCGTGGC TCGAGTGCACCGACGAGGGCGCCTGGTTCGTGGAGGCGCTGCTGACTGCAGCTCGATGACGTGAACGGCCTCGACG ACTACCGCTCATGGTCTCCGAGGAAGAGCTGCTGCCGGCCCCAGAGGAAGGTTGTGACCCTACCAGTATCCCATGAT GATGCAGGTCACGGAATTTCTTGTGGAGGATTTGTTGGTGGGGTGGTCCGAGTCCACACCCTTGCAGATGGGCTCGGT GCAGCTCAATTCATCAATGCAATTTCCGAGTTTGGCCGTGGACTAGATAAACTTACAATAGCACCTGTGTGGGCTCGGT CGTTAATACCAAAACCCACCTAAGCTGCCTCCTGCGCCGCCACCATCTTTGAGTCCCTTTGGGTTCAAACATTTTGT GATGTTACTTTTGACAATATTGCACATGTCAAGACTGAGTACTTTCAAGCCAATGGACAATACTGCTCATACCTCATG TTGCTATGGCAAGTTTGGCAAGCTAGGACACGGGACTCAAGTACAATCCAGATGTCAAGGTGCTGTTTGGCTTCT TGCCAACACTCGCCACCTCCTCACACGGGAGCTTCCAACGATGGGGGCTTCTATGGAAAATTGCTTCTATCCGGTGACT GTAACAGCAACTGCTGAGGGTGTGCTAGTGGAGGATTGCATGATGTGATTAGGATGATACGGGATGGGAAGGCTAGG CTGCCCTTGGAGTTTGGCAAATGGTCCATGGGTGATGTGAAGGTAGACCCATATCAACTGACATTCAAGCACAATGTT TGTTTGTGCTGATTGGACGAGGCTTGGATTCTTTGAGGTTGACTATGGGTGGGGTGTACCAACCATATCATACCTTT ACTTATGCAGACTACATGGCTGTAGCAGTTCTTGGGGCTCCACCTACTACAGTGAAGAACAAGGGGACTCGAATAATG ACACAGTCCGTGGAGGAAAGCATCTCATGGAATTCAGGATGAGATGAAGGCCTTCTTTAG</p>
<p><i>PvFMT</i> Pavir.3KG495300</p>	<p>ATGGTGAACATCACCGTGACAAGGAAATCCAGTCTTTCGTCGTGCCGGCGTCTCCGACGGCCGCTCGCCGAGACG ACGCTCGAGCTATCGGCGATCGACCGCTGCCGGGCTCCGCCACACGGTGCAGTGCCTGACGCTGTCCGCAACAAG AAGGAGTCCGCCGAGGCGCCGGTGCAGCAGCAGATGCTGCCAGCAGGCGGGGAGGTTGATCCGCGCGGCGCT GTCCCGCGCGCTGGTGGATTACCGCCCTTCCCGGCCGCTTCTGTCGGCTCGGTCGCCGCCGGGGAGACCTGCGTCGAG TGCACCGACGACGGCGCGTGGTTCGTGGAGGCCGTCGCCGACTGCAGTCTCGAGGGCGTGAATGGCCTCGACTACCCG CTCATGGTCTCCGAGGAAGAGCTGCTGCCCGCTCCAGAGGAAGGCGTTGACCCTACAAGTATTCCGATCATGATGCAG GTTACAGAATTTGCATGCGGAGGATTTGTGGTTGGGCTGGTAGACATCCACTTTGCTGACGGGCTCGGCGCCGCC AATTCATCAACGCGATTTCTGAGTTTGTCTGGGATGGAAAGCCACCGTAGCAGCCGATGGGCTCGGGCTTTAAT ACCAAAACCCACCAACTGCTTCCCGGGGCCACCACCGTCTTCAAGTCTTTGGGTTCCAGCACTTCCCGGATGTG ACCTCTGACCGGATTGCTACGTCAAGACCCAGTACCATCAGGCCACTGGACAGTACTGCTCCACCTTTGATGTCGCCA TTGCCAAGGTTTGGCAGGCAAGAACCAAGGCAATCAAGTACAGCTTGGAGTCCAAGTTCATGTCTGCTTCTTCGCCAA CACCCGCCACCTCCTCACCCAGGTGCTGCCCAAGAATGGGGGATTCTATGGCAACTGCTTCTACCCAGTTTCTGTGACG GCCACTGCTGAGGATGTTGCTACTGCAGGGTGGTGGTGTGATGATGATCAGGATGATAAGGAATGGGAAGGCCAGGCTTCCC CTGGAGTTTTCCAAGTGGGCGACAGGGGATGTGAGTGTGGATCCATACCAGTTGACATTTGAGCACAACGTTGTTG TGTCTGATTGGACGAGACTTGGGTTCTCCGAGGTTGACTATGGGTGGGGTGCACCGGATCATATCGTCCATTACCTA</p>

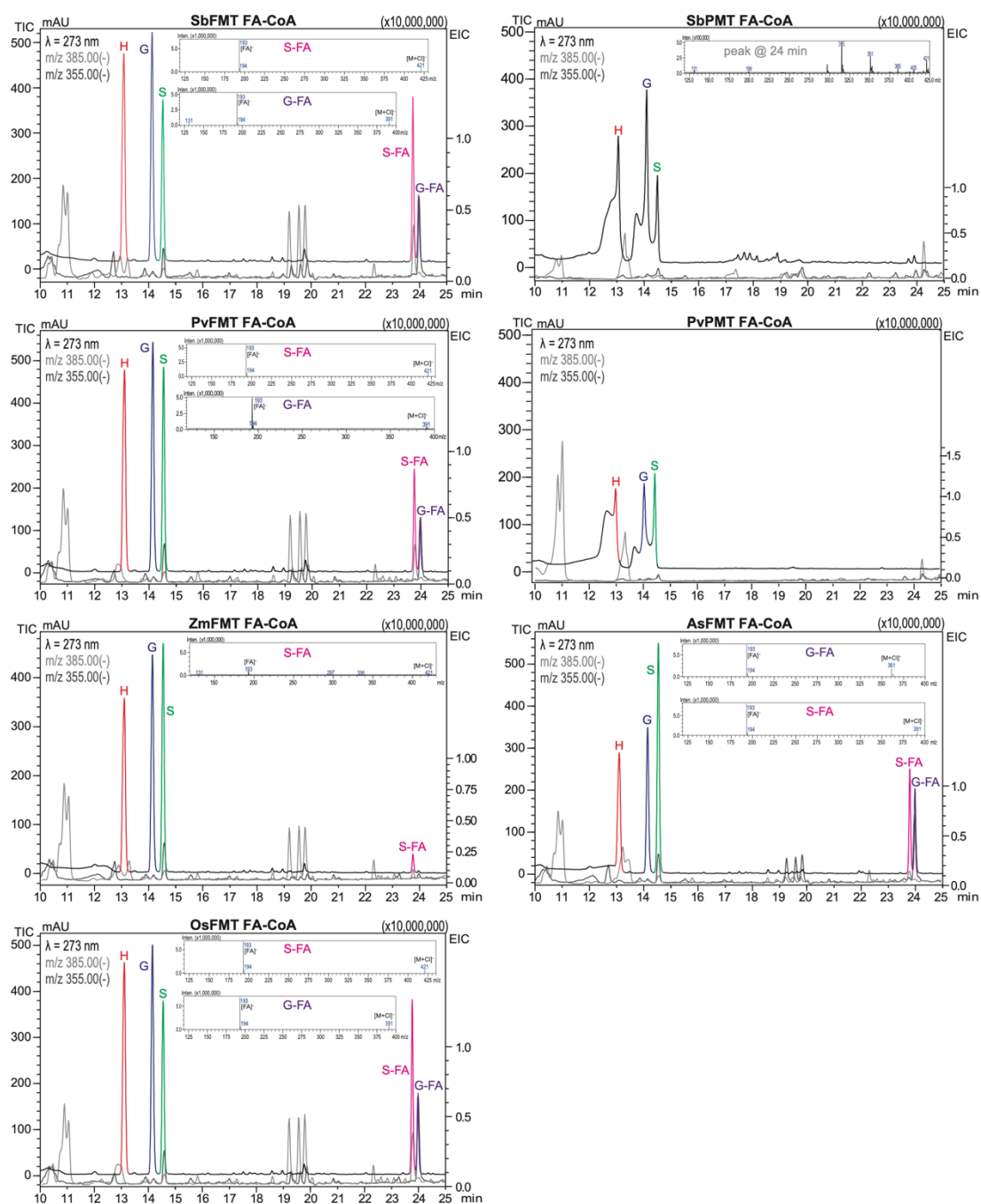
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<i>ZmFMT</i> Zm00001d035246_T001	ATGGCGAGCATCACCGTGACAAGGAAATCCCAATCCTTCGTCTGCCATCGTCCACGCCAACTCCGACGACCGAGACGCTCGAGTTGTGCGCCATCGACCGCGTTCCAGGCCTGCGCCACACGGTGCATCCCTGCACGTGTTCCGCCGCAAGGACGCCGCCCTCCGCCGCCACTACGATGCTGCTGCCCGGGCAGGCCGGCCGAGGTGATCCGCGCGGCGCTGTCCCGCGCTGGTGGACTACCGCCCGTTCCGCCGGCCGTTTCGTGCGCTCACTGTACGCCGGGGAGGGCAGCGTTGAGTGCACCGACGACGGTGCCTGCTGAGCGCTGCACAGATTGCAGCCTCGAGGACGTGAACGGCCTCGACTACCGCTTATGGTCTCCGAGGAAGAGCTGCTGCCGGCTCCAGAGGAAGGTGTTGACCCAACCAAGTATTCCGATTATGATGCAGGTCACGGAA TTTGCTTGTGGAGGATTTGTGGTGGGGCTAGTCGCAGTGCACACCCTTGCTGACGGGCTCGGTGCAGCTCAATTCATCAATGCAATTTCTGAGTTTGGCCGTGGAGTAGTTAAACCTACAATAGCACCTATATGGGCACGGGAGTTAATACCAAACCCACCTAAAATGCCTCCTGGGCCACCACCATCCTTCGAGTGTTCGGGTTCAAACATTTTGTATGGATGTGGCAGTTAAC AATATTGCACATGTCAAGAGTGAATACTTTCAAACCAATGGACACTATTGCTCTACATTTGATGTTGCCATTGCCAAGG TTTGGCAAGCTAGGACAAGGGCAATCAAGTACGAACCAAAATTTCAAGGTGCATGTTTGGCTTCTTTGCCAACACTCGCCA CCTCTCACACTGTGCTACCCAAGGTTGGTGGCTTATGAAATTTGCTTCTATCCAGTGCATGTCACAGCAACTGCTG AGGTAGTTGCTAGTTCAAGATTGCTTGTGATGATTAGTATGATAAGGATGGGAAGTAGGCTTCCCTTTAGAGTTTTC CAGATGTTCCACGGGCAATGTGAAAGTAGACCCATATCAACTAACATTCGAAGCACAATGTTCTATTTGTGTCGGATTGG ACACGGCTTGGATTCTTTGAAGTTGACTATGGGTGGGGTGTACCAAACCATATCCTCCCTTTCACCTATGCAGACTACAT GGCTGTAGCAGTTCTTGGAGCTCCACCGTCTATGAAGAAGGGGACTCGAATAATGACACAATGTGTGAGGAGGAGCA TCTCGTGGACTTCAAGGCCGAGATGAAAGCCTTCTTTTAG
<i>BdFMT</i> XP_003575887.1	ATGGCAGAAATCTGCACCGTGAACAGGAAGTCCCAGTCTTCGTCAAGCCGGCCGCCAACGCCAACGCCTCAGACGCCGCCGCTGCTGGAGCTGTCGGCCATCGACCGCTGCCGGGCTGCGCCACACCGTGCCTCTCTCCACGTCTTCC GCCCGCCCGCAGCGGCACGGCGCCGCTGCACAGCGCCGCGGAGGTGATCCGCGCCGCTGGCCCGCGCTCG TGGAGTACCCCGCTTCGCGCGGCTCGTCTGCGCGCTCCGGCTCGACTGCGCGCTGGCTGTCACCGCGACG GAGCGTGGTTGCTTGAAGCGGCCGCGGCTGTAACCTGGAGGACGTGAACGAGCTGGACTACCCTCTCGTGGTCTGCG AGGAGGAGTGTCTCCACCGCCCTGAGGGAGAGCTGGATCCTACAAGCATTCCGGTCAATGATGCAGGTGACCGAAT TCAGCTGCGGAGGATTTGTGGTGGGCTGGTAGCAGTCCACACCTTCGCAGACGGGCTCGGCGCGGCCAATTCATCA ACGCCATCGCCGAATTCGCCCGTGGCTAAACAGGCCACAGTGAATCCCATATGGGCCGAGCCACAATCCCAACC CGCCAAATTCCTCCCGGCCACCACCATCCTTCCAATCCTTCGGCTTCCAGCATTTCCGCCAGGACATCCGTCCAGAC GCATCGCCACGCCAAAGCCGAGTACCTCAAGGCCACGGCACCCACTGCTCGCCTTCGACGTGCGCGTGGCCAAG GTCTGGCAGGCCGAACCCGGGCGTAAGGTACGGCCAGAGGCCAGGTGCAGGTCTGCTTCTCGCCAACACGAGG CACCTTCTCGGAGAGCTTCTCCCGAAGGTTTCTACGGCAACTGCTTCTTCCCGTCAACCGTGAAGGCCAGAGCTGGGG ATGTTGCCGGCAGCAAGGATTTACTTGGTATTATCCGGATGATCAGGGACGGGAAGGCCAGGCTGCCTTTGGAGTTCCG CGATTGGGCGTCAAGTTTAGGAGGAGGAGGGGCTGGGGATAAGATGAAGTTTGTGCAGGATGATCCTTATGAGCTGAG GTTTGAGCATAATGTGTTGTTTGTGTGCGGATTGGACGAGGCTTGGGTTCTTGGAGGTGGACTATGGCTGGGGCGTGCCT AGCCATGTTATACCTTTCAATTATGCGGACTACATGGCGGTGCGGTTGCTCGGTGCTCCGCCGGCGCCGGTGAAGGGGA CTCGGGTCATGACGCAGTGCCTGGAGGAGAATCTTAAGGAGTTCAAGGATGAGATGGAAGGCTCCTTTTAG
<i>SbPMT</i> XM_002439193.2	ATGGGCACAATCGATGATACCCCGGGTTAATCCCGTGCAGGAGGACGAAACAGTTCGTTGGTGGCGCGTGCCTGCGCG ACGCCGAGGACGATGCTGCGCTGTCGGTATCGACCGCTGGCGGGTGCGCCACCTGGTGCAGGCTGCTGACCGTG TTCGCCGGCGGCGAGAACAAGAAGCAGGCGCGCCGCCGGCGAAGTCCCTGCGGGAGGCGCTGGGAAAGGCGCTGGT GGACTACTACCCGTTCCGCGGGCGGTTTCGTGGAGGAAGACGGGGAGGTCCGGGTGGCGTGCACCGGCGAGGGCGCT GTTTCGTGGAGGCCGCCCGCGCTGCTCCCTGGAGGAGTCCGGCACCTGGACCACCCATGCTCATCCCAAGGAGG AGCTGCTGCCGGAGCCGGCGCCCGGCTCAACCCGCTCGACATGCCGCTCATGATGCAGGTGACGGAGTTCACGTGCG GCGGCTTCGTGGTGGGTTAATCTCCGTCCACACCATCGCCGACGGTCTAGGCGCCGGGACGTTCATCAACGCGGTGGC GGACTACGCCGTCGGCGGCCACCAGCGCGCTCACAGACCCCGCATCCCGATCAGGCGCGGACGTGAT CCGGACCCGCCAAGATGCCGGCGCCCGCCGCTCGACTGCTGGACTGCTACTTACACGACGACCTGAG CCCGGACACATCGCCAAGGTCAAGTCCAGCTACCTCGAGTCCACGGGGCAGCGCTGCTCGGCGTTCGACGTGTGCGT GGCGCGCACCTGGCAGGCCCGCTCCGCGCGCTCCGCTCCCGGACGCCCGCGCCCGTCCACGTCTGCTTCTTCGCC AACACCCGCCACCTGCTCCCGGCGACGGCGGGCGCCGGCGAGTGGGTTCTACGGCAACTGCTTCTACACCGTCAAG GCGACGCGGCCAGCGCGAGGTGGCGGGCGCCGACATCGTGCAGCTGCTGCGGCCATCCGGGACGCCAAGGCGAG GCTCGCCCGGACTTCGCGAGGTGGGCGGGCGGGTTTGTATCGGGACCCCTACGAGCTACCTTACCTACGACTCC CTCTTCGTTCCGACTGGACGAGGTAGGTTCTCGAGGCTGACTATGGCTGGGGCAGCCGACGCGACGTGCTGCCGT TCTCGTACCACCCGTTATGGCCGTCGCCGTCATCGGGGCGCCGCGCTTAAGCCCGCGCACGCATCATGACCAT GTGCGTCCAGGAGCAGCACCTGCCTGAGTTCAGGAGCAGATGAACAGCCCTGCTCATAG
<i>PvPMT</i> XM_039943249.1	ATGGGTACCATCGGGTTCGGGTGACGAGGACGAGCAGGTGCTGGTGGCGCCGCTCGTGGCGACGCCGAGGAGACG CTGCACCTGTGCGTATCGACCGCTGGCGGGGCTGCGGCACCTGGTGCAGTGCCTGCACGTGTTCCGACGGCCGCCG GCGGAGGCGCGGTGAGGACGCCGGCGGAGACGCTGCGGGCGGCGCTGGGGAAGGCGCTGGTGGACTATTACCCGCT GGCGGGGCGGTTTCGTGGAGGAGGACGGGGAGGTGCGGGTGGCGTGCACGGCGGGGGGCGCCTGGTTCGTGGAGGCGG CGGCGGCGTGCACCTGGAGGAGGTGAAGCACCCTGGACCACCCATGGTCAATCCCAAGGAGGACCTGCTGCCGGAGC CGCGCCGACGTCACCCCTCGACATGCCCTCATGATGCAGGTGACGAGTTCGCTGCGGCGGCTTCGTTGGTGG GCCTCATCTCCGTGCACACCATCGCCGACGGCTGCGGCGCGGAGTTCATCAACGCGGTGGCGGACTACGCGCGTGCCTCCCGAGGCCCCGCTGCTCCCGTCTGGGCGCGGACGTCATCCCGGCGCCGTCAGGATCGTGTCCCGGCCGCG GCGGTTGCACCTCCTGGACCTCCGCTACTTACCGTGGACCTCAGCCGGAGCACATCGCCAAGGTCAAGTCCAGTTC TTCGAGGCGACGGGGCAGCGCTGCTCGGCGTTCGACGTGTGCGTGCACAGACCTGGCAGTCCCGCTCCGCGCGCTC CGGCTGGACGGCGACGCCGGCGCGGCCATCCACGTGTGCTTCTTCGCAACACGCGCACCTCCTGCCGACGCTG GCGCCCGGGTTCACGGCAACTGCTTCTACACCGTGAAGGCGACGCGGCCCTGCGGCGAGGTGGCGGGCGGGCGGTG TGAGGAGTGGTGCAGCCATCCGGGACGCCAAGGCGCGGCTGGGCGGGACTTCGCGCGGTGGGCGGGCGGGGTT CGAGCGCGACCCCTACGAGCTACCTTACGACTACGCTCTTCGTTCCGACTGGACGCGGCTGGGGTCTCTGGAG

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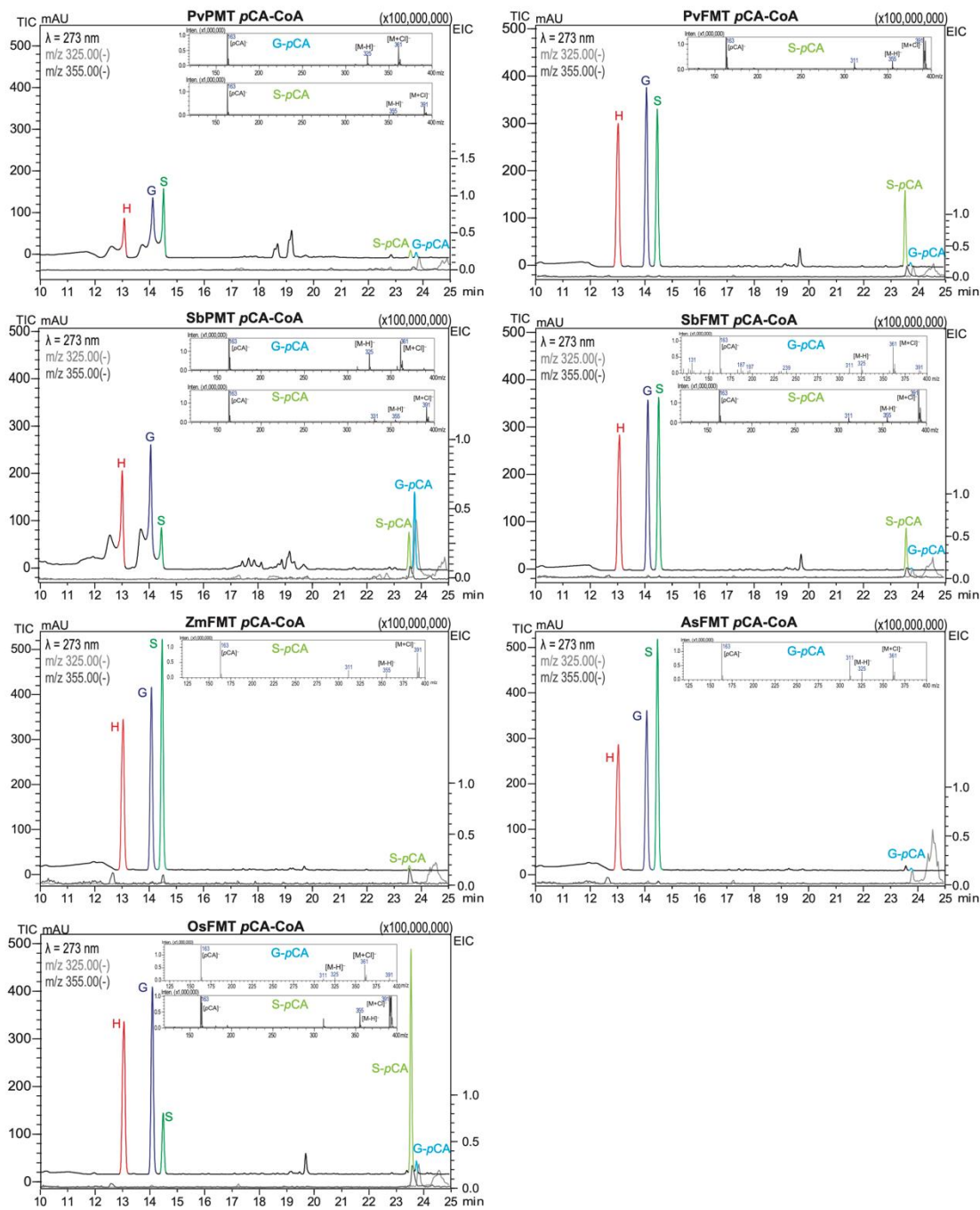


Lane	Description	Accession #	Predicted Size (Da)	# Trp	ug/rxn	µg/µL	µM	% Solubility	Projected soluble yield/mL extract
1	Angelica FMT	AHL24755	49974	4	10.7	0.43	8.6	87%	2.3
2	Corn FMT	GRMZM2G130728_P01	48020	6	13.7	0.55	11.4	45%	1.0
3	Sorghum FMT	Sb08g005680.1	48638	6	15.5	0.62	12.7	67%	1.7
4	Switchgrass FMT	Pavir.Ca02673.1	47638	6	10.8	0.43	9.1	74%	1.8
5	Rice FMT	LOC_Os05g19910.1	47652	6	14.8	0.59	12.4	74%	2.9
6	Brachypodium FMT	Bradi4g06067.1	48050	6	15.3	0.61	12.8	67%	3.1
7	Corn PMT	GRMZM2G028104_P01	47335	6	14.8	0.59	12.5	69%	2.9
8	Brachypodium PMT	Bradi2g36910.1	49434	7	15.1	0.60	12.2	87%	3.6
9	Switchgrass PMT	Pavir.J00672.1	46849	6	13.1	0.52	11.2	45%	1.3
10	Sorghum PMT	Sb09g002910.1	47500	6	9.2	0.37	7.7	92%	2.2
11	Rice PMT	LOC_Os01g18744	47170	7	10.2	0.41	8.7	93%	2.0

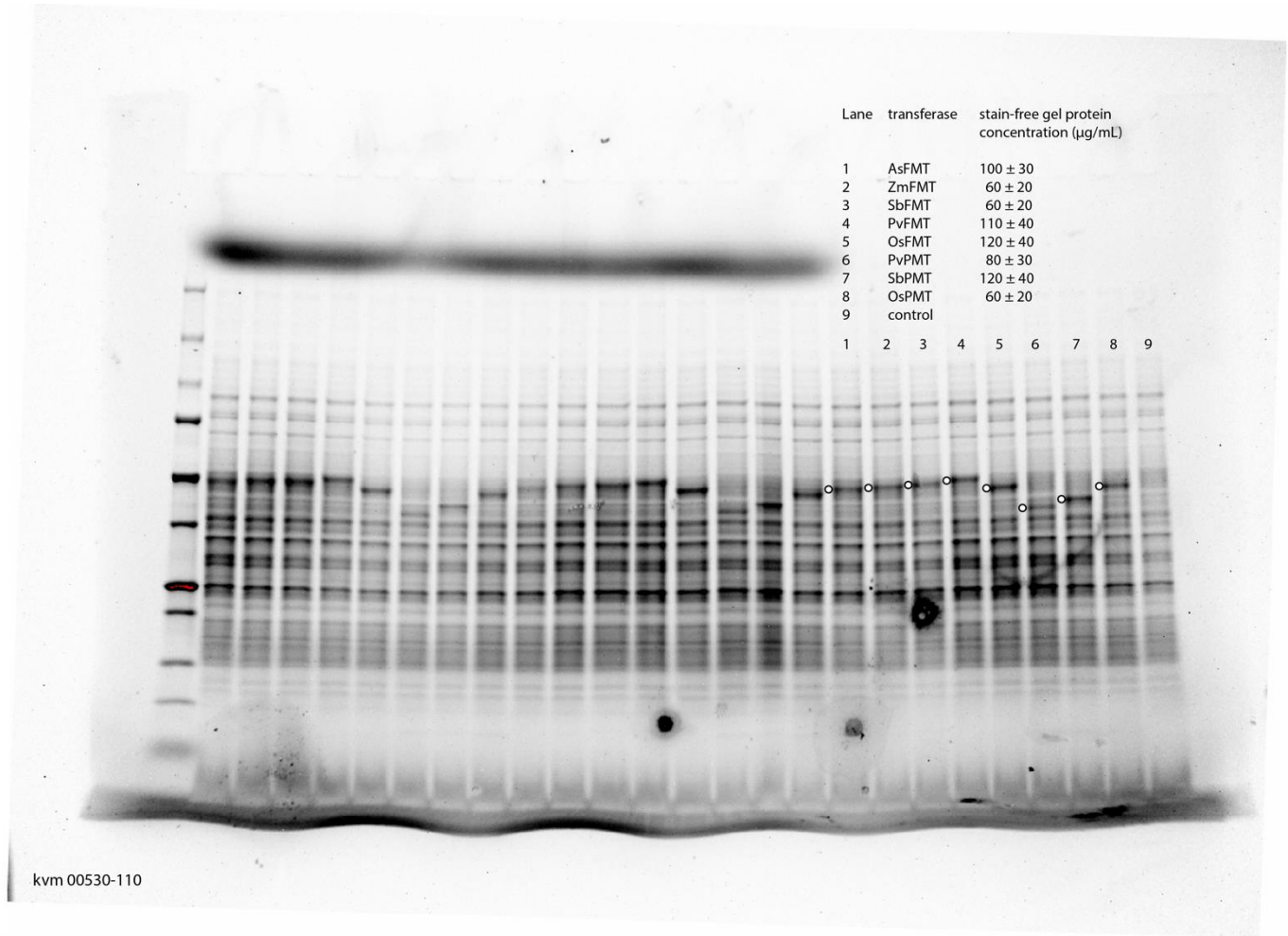
Supplemental Figure S1. Denaturing gels showing cell-free protein synthesis of acyltransferases and analysis of translation results. Content in gel lanes indicated in the table; “x” is not part of this study; “ctrl” is a control lane lacking acyltransferase mRNA. The # of Trp is used as a parameter in BioRad Stain-Free™ quantitative analysis. The percentage solubility is determined by comparing analysis result for soluble (s) and precipitate (p) lanes. Projected yield of soluble acyltransferase per mL of translation reaction indicated.



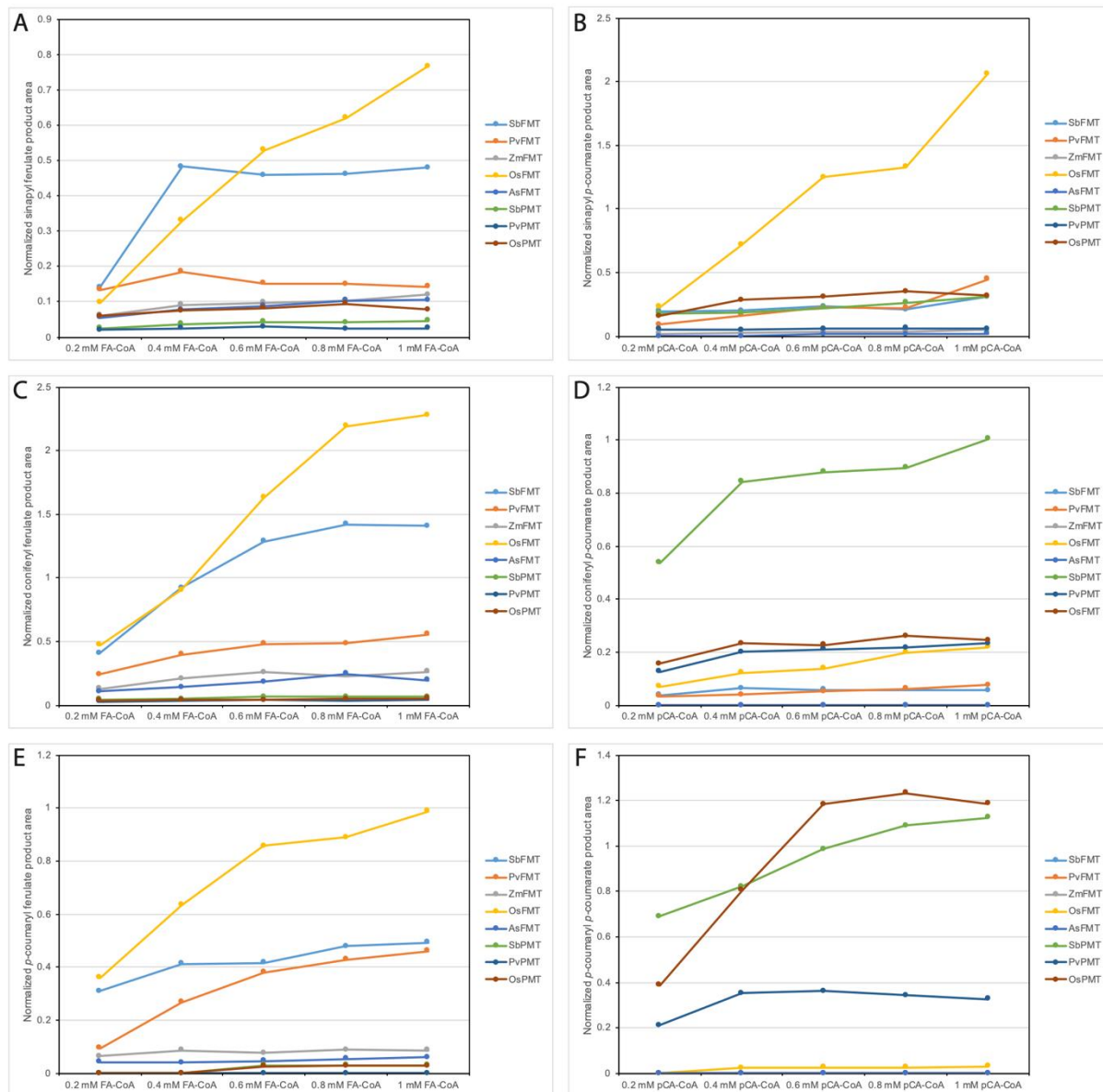
Supplemental Figure S2. Individual enzyme assays with three monolignol acceptors (*p*-coumaryl alcohol (H), coniferyl alcohol (G), and sinapyl alcohol (S)) and feruloyl-CoA as a donor. Sinapyl ferulate (S-FA; pink) and coniferyl ferulate (G-FA; purple) product formation observed in the total ion chromatograms (TIC, left axis) was confirmed by extracted ion chromatograms (EIC, right axis) at *m/z* 385 for S-FA and *m/z* 355 for G-FA. Additional support for S-FA and G-FA identities was acquired by MS product scans for each product peak, as shown in the inset of each chromatogram. Specifically, the minor peak observed at elution time of ~24 min in the SbPMT FA-CoA chromatography does not have the proper MS product scan to be a product of the acyltransferase reaction.



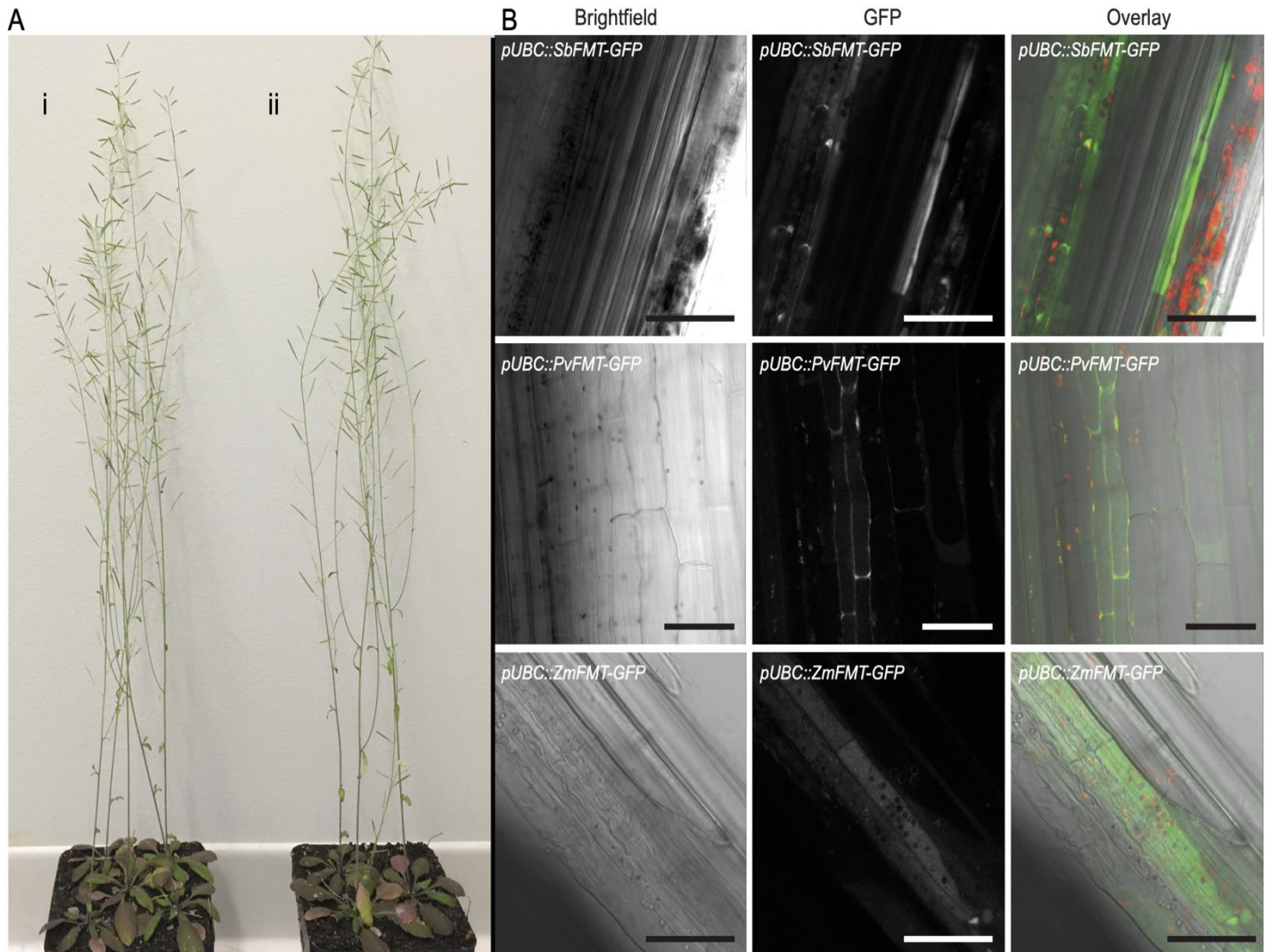
Supplemental Figure S3. Individual enzyme assays with three monolignol acceptors (*p*-coumaryl alcohol (H), coniferyl alcohol (G), and sinapyl alcohol (S)) and *p*-coumaroyl-CoA as a donor. Sinapyl *p*-coumarate (*S*-*p*CA; light green) and coniferyl *p*-coumarate (*G*-*p*CA; light blue) product formation observed in the total ion chromatograms (TIC, left axis) was confirmed by extracted ion chromatograms (EIC, right axis) at *m/z* 355 for *S*-*p*CA and *m/z* 325 for *G*-*p*CA. Additional support for *S*-*p*CA and *G*-*p*CA identities was acquired by MS product scans for each product peak, as shown in the inset of each chromatogram.



Supplemental Figure S4. BioRad Stain-Free™ denaturing gel analyses of acyltransferases translation reactions used to produce enzyme needed carry out activity measurements. Acyltransferase protein bands are marked by a white circle at the left of the gel lane. The embedded table shows the protein concentration for the marked band as determined by the stain-free analysis. Lane 9 is a control showing wheat germ extract with no added acyltransferase mRNA.



Supplemental Figure S5. Enzyme activity for the FMT and PMT enzymes. Enzymes were fed varying concentrations of CoA thioester and 1 mM sinapyl alcohol, conferyl alcohol, or *p*-coumaryl alcohol, and the reactions were stopped after one hour. The resulting monolignol conjugate peak area was normalized to the peak area of the internal standard for sinapyl ferulate (S-FA) (A), sinapyl *p*-coumarate (S-*p*CA) (B), conferyl ferulate (G-FA) (C), conferyl *p*-coumarate (G-*p*CA) (D), *p*-coumaryl ferulate (H-FA) (E), and *p*-coumaryl *p*-coumarate (H-*p*CA) (F).



Supplemental Figure S6. Growth and localization of acyltransferase transgenic lines. (A) Examples of wild-type (i) and an FMT or PMT plant (ii) demonstrate that the presence of the transgenes does not impact normal plant growth. (B) Examples of GFP localization in transgenic lines. The FMT and PMT enzymes are localized in the cytosol. Scale bars are 50 μm .