

Supplementary Material

***Nicotiana benthamiana* as a transient expression host to produce auxin analogues**

Katharine Davis¹, Danai S. Gkotsi², Duncan R. M. Smith², Rebecca J. M. Goss², Lorenzo Caputi³, Sarah E. O'Connor^{*3}

¹Department of Biochemistry, University of Cambridge, Tennis Court Road, Cambridge, CB2 1QW, UK.

²School of Chemistry, University of St. Andrews, North Haugh, St. Andrews, KY16 9ST, UK.

³Max-Planck Institute for Chemical Ecology, Department of Natural Product Biosynthesis, Hans-Knöll-Straße 8, 07745 Jena, Germany.

*** Correspondence:**

occonnor@ice.mpg.de

1 Supplementary Tables

Table S1. Sequences of the TAA and YUC genes used in this investigation. ^A sequences from TAIR (<https://www.arabidopsis.org>), respective accession numbers for AtTAA1, AtTAR2 and AtYUC6, ^B sequences retrieved from pea seed transcriptome. Genbank accession numbers of the *PsYUC* sequences are the following: *PsYUC1* (MW158556), *PsYUC2* (MW158557), *PsYUC3* (MW158558), *PsYUC4* (MW158559), *PsYUC5* (MW158560), *PsYUC6* (MW158561), *PsYUC7* (MW158562), *PsYUC8* (MW158563).

Gene	Sequence
<i>AtTAA1^A</i>	<p>ATGGTGAAACTGGAGAACTCGAGGAAACCCGAAAAAATTTTGAACAAGAACATCCCC ATGTCCGATTTTCGTGGTCAATCTGGATCATGGTGATCCAACGGCGTACGAAGAATACT GGAGGAAGATGGGTGACAGGTGTACGGTGACGATACGTGGTTGTGATCTCATGAGTTA CTTCAGCGACATGACGAACTTGTGTTGGTTCCTTGAGCCAGAGCTTGAAGATGCGATC AAGGACTTGACGGTGTGTTGGTAACGCTGCGACGGAGGATCGGTACATAGTGTTG GGACCGGTTTCGACGCAGCTTTGTCAAGCCGCCGTCCACGCACTCTTCTACTAGCCAG GAGTCAACCTGTCAGCGTCGTCGCCGCCGCTCCTTTTTACTCCACATATGTGGAGGAGA CGACATATGTTTCGGTTCGGGTATGTACAAGTGGGAAGGAGACGCATGGGGTTTCGACAA AAAGGGTCCGTACATCGAGCTAGTGACGTCACCTAATAACCCTGACGGAACCATCAGA GAGACGGTGGTGAACCGTCCAGACGACGACGAAGCCAAAGTGATCCATGACTTTGCTT ATTACTGGCCCCACTACACTCCCATCACTCGCCGTCAAGACCATGACATCATGCTCTTC ACTTTCTCAAGATCACAGGCCACGCTGGGTCCCCTATTGGGTGGGCATTGGTGAAGG ACAAGGAGGTAGCTAAGAAGATGGTTGAGTATATTATTGTGAACTCGATTGGTGTGTC TAAGGAGTACAGGTTTCGAACAGCTAAGTACTCAACGTTCTAAAGGAGACTTGTAAAG AGCGAGTCCGAGTCTGAGAATTTCTTCAAGTATGGTTCGTGAGATGATGAAGAATCGGT GGGAGAAGCTACGTGAAGTTGTGAAAGAGAGCGATGCTTTCACTTCCCAAGTACCC TGAAGCATTTTGCAACTACTTTGGAAAATCACTCGAATCTTACCCTGCGTTTTCGCTGGC TAGGGACGAAGGAAGAGACGGATCTGGTAAGTGAATTGAGGAGACACAAGGTAATGA GCAGAGCTGGAGAGCGTTGTGGATCTGACAAGAAGCATGTCCGAGTCAGCATGCTTAG TCGTGAAGACGTTTTCAATGTCTTTCTCGAGAGACTCGCCAACATGAAGCTCATTA GCATTGACCTTTAG</p>
<i>AtTAR2^A</i>	<p>ATGGGACAGATTCAGGTTTCTTTCTTGGAGGAATATGTTGGTCCCTCTCGTTGGCCAT CAACTTCAGCTTGATTCTAAAGATTTTGAAGGGTGATAGAGAACGAGGAGATTCATGG GACAGAACAGCGTATGTTAGCATATGGCCCCGTGGTATCCACCACGGCTTCAGAATCTT CTTCGTTGTCTTCAGCATCTTGCAACTATAGCAAGATTGAAGAAGACGATGATAGAAT TATCAATCTCAAATTTGGTGATCCAACGGTGTATGAGAGATATTGGCAGGAAAATGGA GAGGTGACAACAATGGTGATACCTGGATGGCAATCTCTTAGCTATTTTTAGATGAAA ACAACCTCTGTTGGTTTCTTGAGCCAGAGCTTGCCAAAGAGATTGTGAGGGTGCATAA GGTTGTTGGGAATGCTGTAACGCAAGACCGCTTCATTGTTGTTGGCACTGGCTCAACAC AATTGTATCAGGCTGCTCTCTATGCTCTCTCCACATGATGACTCCGGTCCCATAAT GTCGTGTACAGCCACACCCTATTATAGTACTACCCGTTGATTACAGACTGCCCTAAATC AGGTTTATATCGATGGGGTGGAGATGCAAAGACGTACAAAGAAGATGGTCCATACATT GAACTTGTTACATCTCCAAACAACCCTGATGGGTTCTTGAGAGAATCAGTAGTGAACA GTACTGAAGGTATATTGATCCATGATTTGGCTTACTATTGGCCACAGTATACACCGATA ACATCACCAGCTGATCACGATGTTATGCTCTTCACTGCTTCAAAGAGCACTGGCCATGC AGGGATACGGATTGGATGGGCTTTGGTGAAGACAGAGAGACGGCTAGGAAAATGAT AGAGTACATTGAACTCAACACGATTGGGGTTTTCAAAGGACTCACAGCTTAGAGTAGCC AAGGTTCTTAAGGTTGTGTCAGACAGTTGTGGGAATGTAACGGGCAAATCTTTCTTTGA</p>

	CCATAGTTATGATGCTATGTATGAGAGGTGGAACTATTGAAACAAGCAGCAAAGGAT ACTAAACGTTTCAGTGTTCCTGATTTTCGTCTCTCAACGTTGCAATTTCTTTGGCAGGGTC TTTGAGCCACAACCAGCATTGTCATGGTTAAGTGTGAAGAAGGGATAGTGGATTGTG AGAAGTTTCTTAGAGAGGAGAAGAAGATTCTAACTAAAAGTGGAAAGTACTTCGGAG ATGAGCTAAGTAATGTGAGGATAAGCATGTTGGATAGAGATACTAACTTTAATATTT CCTTCACAGGATTACATCTTCTTTAATTCAACTTTGTAA
<i>PsYUC1^B</i>	ATGGATCCTTTCAAACA AAAACCTAAGTCTTTATTCATTCATGGACCTATCATTGTAGG TGCTGGTCCTTCTGGTATAGCAGTTGCTGCTTGTATCAGAACAAGGTGTTCCGAGTC TTATTCTTGAGAGAAGTGACTGTATAGCTTCCCTTTGGCAAAATAGAACCTATGACCGT TTGAAACTTCATTTACCTAAACATTTTTGTGAGCTTCCCTTTGATGAGTTTTCTCAAGAT TTTCTATGTATCCTACCAAACATCAGTTCATTTCTTACATGGAATCCTATGCTGATCA GTTTGGTATTTCGTCTAGGTTCAATCAAACCTGTTGTTACTGCTGAGTTTGATCCAAGT CGGAAATTTGGAATGTTAAAACACTAGATGGTTTTTCAGTATTCTTCACCTGGCTTGT GTTGCTACCGGTGAAAATGCTGAACCTGTTATTCCTAAGATTCATGGTATGGAACATTT TCATGGTCCTGTTGTTTCATACTTGTGACTATAAATCTGGTTCTCAATACAAAAACAAGA AGGTTTTGGTCATTGGTTGCGGTAATTCTGGTATGGAAGTTAGCTTGGATCTTTGTAGA CACAATGCTCTACCTCACTTGGTTGCTAGAAACACAGTACACATGCTTCCAAGAGATA TCTTTGGGTTCTCAACATTTGGAGTAGCTATGACATTAACAATGGCTTCCATTA AAA TTAGTAGACAAGTTCCTCTTATTAGTTTCAAGCTTCTTCTTAGGAAACACCAATCACTA TGGTATCAAAAGGCCTAAAACCTGGTCCTATAGAGCTTAAGCTTGCAACAGGAAAAACT CCTGTA CTTGATGTTGGTCAAATGCTCAAATTAATCCGGTAACATTAAGGTGATGGA AGGTGTGAAGGAGATAACAAGGAATGGTGCAAAATTTATGGATGGACAAGAAAAGGA ATTTGAAGCAATAATCTTAGCAACAGGTTACAAGAGCAATGTGCCTAGTTGGCTTAAG GGAAGTGATTTTTCTAAAGATGGAATGCCGAAAACACCCTTTCCTCATGGATGGA AAGGAGAGCAAGGATTGTATACGGTAGGGTTCACGAGAAGAGGTCTACATGGAACAT ATTTTGATGCTATCAAAATATCTGAAGATATTACAAGTCAATGGA AAAACAGTTAAGAG CAAGAGTTGTAGTGATTACATATCATAAACCTTATTAGTACTACTCTTAATAATG TTTAG
<i>PsYUC2^B</i>	ATGGAGA ACTTGTTTCGCCTAGTTGATAACCAACAAGACTCAATCTCACCTCGTTGCAT TTGGGTTAACGGTCCTATAATCGTAGGAGCAGGACCATCAGGTTTAGCAGCAGCGGCA TGTCTCAAACAAAAAACATTCATCCATAATTCTCGAAAGATCCAATGCATAGCTT CATTATGGCAACTCAAACCTACGATCGGTTACGTCTCCACCTGCCAAAACAATTCTGC GAACACTACCCTTCATGGAATTTCCATCGAATTTCCCAACATACCCTTCAAAGCAACAGTT CATTAAGTACCTGGAGAATTACGCGGAAACGTTCCATATTCGTCCGAAATTC AATGAG ACAGTGAAAAATGCCGAATTCGATAGTAAAATCGGTTGCTGGAAGTTGAAGTGTCAA GTAGTTTTAAAGGCGATGTTACGACGGAGTATGTTTGTGCGTGGTTGATCGTCGCGACC GGAGAGAATGCCGAGGCTGTTGTGCCTGATATTGAAGGTGCAGATGAGTTTGAAGGAG TTATAAGACATACAAGTTTGTATAAAAAGTGGTGAAGAGTTTAGAGGGAAGAGAGTTTT GGTTGTTGGGTGTGGAAATTTCTGGTATGGAAGTTTGTGGATCTTTGTAACCATGATG CTACTCCTTCTCTGGTCGTTAGAGATTCAGTACACGTTCTACCACGAGAGATGCTAGGA AAATCAACTTTTGGGTTGTCCATGTGGTACTAAAGTGGTTTCCATTGAGACTTGTGCA TCGTTTCTTGCTGTTAGTGTCATGGCTTTTGTCTGGTGACACTTCTCAACTGGTTTGG TCGTCTACTTTGGGTCCCCTTCAACTCAAAAACCTCACGGGAAAAACTCCTGTCCTAG ATGTGGGTACCCTTGCCAAGATTAAGCTGGACACATTAAGGTAAGGCCAAGCATAAAA GAAGTTAAAACGTCATACAGTGAATTTGTAGATGGAAGATCAGAGAATTTTGATGGC ATCATATTGGCAACTGGTTACAAAAGCAATGTACCCTATTGGCTCAAGGAAGAGGATA TGTTTTCTATGAAAGATGGATTCCCTATGAAGCCATTTCCAATGGATGGA AAGGTAA AAATGGACTCTATGCAATAGGTTTTACAAAAGAGGACTATTAGGTGCATCAATGGAT GCAAAAAGAATAGCTAATGACATTGAACAATGTTTAAAAGCTGAGGCAAAAACATGGA TCA
<i>PsYUC3^B</i>	ATGCTCATGAACTACTTAAAGGAACTAGAATGCAAAAATGGTACATGATCATCAAAAAG AAGGACAAAATGGTAACTTCAATATTGGTTCAAGGACCAATTATAGTAGGAGCTGGTC CATCAGGATTAGCAGCAGCAGCATGTCTTAAACAAAAAGGAATTC AAAGCTTAATCCT TGAAAGAGCAAATTTAGCTTCAATGTGGCAACTCAAAACCTATGATAGATTAAG

	<p>CTTCATCTCCAAAACAATTTTGTCAATTACCTCTTATGCCATTCCAAAAGGGTTACC ATCATATCCAACAAGCAACAATTTTATCTTACTTAAAAGCCTATGCTAATCACTTTG ATATTAATCCTATTTTGGTAAACAAGTTGTGAATGCTGAATTTGATCTTACTTGTGGA GTTTGGAGAGTGAAGACTCAAGAAATTATTATGAAAAAGTGTATTGTTATTGAGTATG TTTGTCAATGGTTGATTGTTGCTAGTGGTGA AAAATGCTGAGGAA GTTATGCCATCAATT GAAGGGATGGAACAATTTCAAGGACCTATTTTGCATACTAGTTTGTATAAAAAGTGGAA GCATGTTTTGTGGGAAGAATGTTTTGGTGGTGGGGTGTGGAAATTCAGGCATGGAGGT GTGTTTAGATCTTTGCAACCATAATGCTCATCCTTCCTTAGTTGTTAGAGATACGGTAC ATATCTTGCCACAACAATATTTGGAAAATCAACTTTTGGTTTATCTATGTGGTTACTT AAATGGTCTCAGTACATTTTGTGGATCAATTTTACTTCTAATGTCATATTTCATACTT GGTGACACATCTCAATATGGAATTCAAAGGCCAAAAATGGTCCTTTAGAGCTTAAGA ATTTGTATGGAAAAACACCAAGTTTTAGATGTTGGGACAGTAGCTCAAATCAAACCTGG CAAATTAAGGTCTGCAAAGGAATTAACGACTAGCACATAATGCAGTGGAGTTTGT GATGGAAAAGTAGAGAACTTTGATGCAATCATTTTAGCTACTGGTTACAAAAGCAATG TGCCCTCTGGTTAAAGGGAAAGTGACATGTTTAGTGAGAAAAGATGGTTTTCCAAGGAA ACCATTCCCAAATGGATGGAAAGGTGAAAAAGGATTATATGCTGTTGGTTTCCACAAA CGTGGCTTACTTGGTTCATCTATTGATGCAAAGAGAATTGCTGAAGATATTGAACATA GCTGGAAAGCTCTTAAGGCCAAGCCACTTGCA</p>
<i>PsYUC4^B</i>	<p>ATGAAAAACAAAACCATGGAAATCCAAATGCCAGTTGTGATTGTAGGTGCTGGGCCTG CTGGGTTAGCAACCTCTGCATGCTCAACAACTTTCAATCCAAAACATTGTACTAGAA AGAGATGACTGTCATTCTCTCTTTGGAGGAAAAGAACCTATGATCGTTTGAAACTTCA CTTAGGTAAGGCTTTTGTAACTACCTCACATGCCATTTTCTCTGATCTCCAGTGT TATCCCTAGGGTTGATTTCTTCGGTATTTGGATGATTATGTGAGTACTTTAAGATCTT CATCCGCTACAACCGGTATGTCCACGAAGCTTCTTCGATGTCAAGACCGGAAAATGG AGGTTTGTGTGATGGATAGTGTCTGTAATGTTGGTGAAGTTTATGTTGCTGATTATT AGTGGTTGCTTCCGGAGAGAGCTGTGATGCTTATATTCGAAGATAACCGGCTTTGAT AAGTTTGAAGGTGAATTTCTTCATTGCACCAAGTATCAGAATGGAAGCCTTTTTATGA TAAGAATGTGTTGTTGTTGGTAGTGAAATCTGGTATGGAGATTGGTTATGATCTCT CTACTTGGGGTGCAAATACCTCCATGGTTATAAGAAAGTCCGGTACATTTTTTAATAAAA GAAATGGTGTACATTGGAATGTCTTTGCTGAAATATGTAAGTGTGAAAATGTGGACA AGCTTATGTTGGTTATGAGCAAATTGTTGTATGGAGATTTGTCTAAGTATGGCTTGATT AGGCCAAAGGAAGGACCCTTTGCATTGAAATGAAAGGGTGGTCGGACTCCTACAGTTG ATGTCGGTACCATCAAACACATCAAAGAAGGAAAAATAAAGGTACTCTGAAATTTTCA AAGCATAAAAAACGGCAAGACCATTGAATTTGTAGATGGAAAAACTGGTCAATTTGAC GTCATAATCTTTGCTACGGGATACAGAACCAATGTGCACAAGTGGCTTAAGGATTACA AAGATTTGTTTAAATGAAAATGGAATGCCAAAACCTGCTTATCCAAATCACTGGAAAGG AGAGAATGGAATCTACTGTGTTGGATTCTCAAAAAGGGGATTACAAGGCATTA ACTAT GATGCTCAGAAAGTAGCAAGGGATATCAGTGTCACTATCAATGCAAGGAAGAAGATA CTTACAGCTGATGAGGCCAATGATGCTCAAATCAAGCTATTAGAT</p>
<i>PsYUC5^B</i>	<p>ATGGAGAATTTGTTTCGTCTTGCTGATCACGAAGATTTTATCTCACGCCGTTGCATTTG GGTCAATGGACCTGTGATCATTGGCGCAGGTCCATCTGGCCTAGCAACGGCGGCATGT CTTAGAGAACAAGGAGTACCATTCTTGTGTCGAAAGAGCTGATTGCATAGCATCAC TTTGGCAAAGAAGAACCTATGACAGGTTGAAACTTAACTCCAAAACAATTCTGTCA ACTCCCTAACCTTCCATTCCCTGATGATTTCCCTGAATACCTTCAAAGAAACAGTTCA TAAACTACCTTGAACCTATGCTAACAATTTGAAATCAAGCCGCAATTC AACCAGTG TGTTCAATCTGCTAAGTATGATGAAACCAGTGGATTATGGAGGGTGA AAAACCAATGAA GTTGAGTATAATTTGCAGGTGGCTTGTGTTGCTACCGGCGAAAATGCTGAGTGTGTTAT TCCTGAAATTGAAGGACTTTCTGAGTTCAAAGGTAAAGTTGTTTATGCTTGTGATTACA AGTCAGGCGAAAATTTCAAAGGAAAGAAAGTTCTCGTTGTTGGTTGTGGAAATTCAGG ATTGGACATCTCACTTGTGATCTTAGCAACCACCATGCTTTACCTTCTATGGTTGTTTCTGTA GCTCGGTTTATGTTTACCTTCAATGGGTCTTTGCAGCTGAAGAACACAGAAGGAAA AATACCTGTTTTGAATATTGGTACCTTGGAGAAAATTAGATCTGGAGATATAAAAGTT GTCCCTGGAATCAAGAAGTTTAAACAAAACGGCGAAGTCCAGCTTGTTAATGGCGAAA</p>

	AGATTGATGTTGATGCAGTTGTTCTTGCTACCGGTTATAGGAGCAATGTTCCCTTCTTG CTTCAGGAAGGTGAATTTTTCTCGAAAAACGGATACCCGAAAGATGCCATTTCCACATG GATGGAAAGGAAATTCAGGACTATATGCTGTAGGGTTCACAAAGATAGGGCTTTTTGG TGCTTCATATGATGCTGTTAAAATTGCACAAGATATTGGAAATGTTTGAAACATGAG ACTAAACAGAAGAAACAACGCTTGTC
<i>PsYUC6^B</i>	ATGCAGGTAGCACCGGTGATAATAATCGGAGCCGGAACCTCCGGCATAGCCACGGCA GCTTCTTTAACAAAACAATCCATACCATTATCATTCTCGAAAGAGAAAACTGTTTTGC TTCTCTATGGCAAAACTACACCTATGATCGTCTTCATCTTCATCTAAGAAAGCAAATTT GCGAGTTACCATATTTTCCATTTCCATCTTCTTATCCCTAACTACGTACCAAAAAAGCAG TTCATACAGTATCTAGACAGCTATGTTAAAAACTTCAACATCGATCCTTTATAACAACAG AAAGGTTGTGTTAGCGGAGTATTTTGAGGATGATGAGAAATGGAGGGTGTGAGGCTGAG AATAGAAGTTCGGTGAAGTTGAAGAATATTCTGGAAGGTTCTTGGTGGTGGCTAGTG GCGAAACGGCTGAGCCTCGTGTACCGGAAGTTTTAGGGTGGAGAGTTTCAATGGGAA AGTGATGCATTCGACTGGGTATAAAAAATGGGAGAGAGTTTAAAGATAAACATGTTCTT GTTGTTGGTTCTGGGAATTCTGGTATGGAGATTTCTTTAGATTTGGCTAATTTTGGTGCC AAACCTTCTATCATTGTTAGAAGTCCGGTTCATTTTCTTTCAAGGGATATGATGTATTA TGCTGGTGTGTTGATGAGTTATCTGTACTAAGCACAGTGGAGAACTAGTTGTGATAG TTAGCAGAATTGTGTATGGAGATCTGAGTAAATATGGTATACCTTCCCTAGTGAGGGT CCTTTCATATGAAGAATAAGTATGGAAAATTTCTATAATTGATTTGGGAACGGTTAA GAAAATCAAATCTGGAGAGATACAGGTGTTGGGAGCTGAAATAGAGAGTATAAGAGG TAATCAAGTGTGTTCCGTGATGGAAAATCCTACCCATTTGACTCCATTATATTCTGTA CAGGCTTCAGCAGATCAACTCAAAAATGGCTTAAGGGAGGTGATGATCTTTTGAATGA GGATGGTTTTCCAAAGCCTGGTTTACCATACAATTGGAAGGGTAAGAATGGTTTGTAC TGCGTTGGATTGTCAAGGAGGGGGTTTTATGGAGCTAACCTTGATGCTCAAAATGTAG CAAATGATATTGCCTTGTTAGTTCTCAAGACGAAAGAAAA
<i>PsYUC7^B</i>	ATGCAAGAATTCACAGTTGTAATTGTTGGTGGTGGTCCTTCTGGCCTAGCAATTTACAGC TTTACTAATACAAAACCTCAATCTCTCACACTATACTCGAAAAAGAAGATTGTAATGCTT CTCTTTGGAGGAAAAATGCTTACGATCGTCTAAACCTCCATTTAGCTAGTGAGTTTTGC TCTTTACCTCTCGTGCCGCATCCACCTCAGGCCAACATACCTAACCAAGATCAATT TCTCCAATACATAGATGAATATGTCGATCATTTTGACATAAAACCTCGTTATTATCGTG TCGTTGAGTCCGCTAACTACGATAATGTTCAAAACAAATGGGTTGTTGAAGCCAAAAA CACCTTAGAAGGTACCTTGAAGTTTATGGGGCAAAGTTTCTAGTCATTGCCTCTGGCG AAAATAGTGAAGTTTTATTCCCAATGTTTCATGGATTAGGGAAATTTGAAGGAGAGGT GGTACTACTCAAGTACTACAAATCTGGTTCAAAATACAAATCAAAGATGTTTTGGTT GTTGGCTGTGGTAACTCAGGAATGGAGATTGCATATGATCTCCATAACTGGGGTGCTA ACACTTCCATTGTCATTGCAAAATCCGCTTCATGCTTACCAGAGATATGATTTCGTATA GGGATGCGTTTTGGTGCAATATTTTCTGTTTATATTGCTGATACAATCATTACAATTCT AGCAAAGTTAAAATATGGTGATCTGTCAAAATACGGGATTCATCGTCTAAAGATGGA CCTTTATATCTCAAAAACAGTACAGGAAAATCTGCAGTTATTGACGTAGGAACCATTG AAAAGATTATGGAAGGATCCATAAAGGTCGTTCTTTCAGGTATCAAGAAAATCGAGAA GAAGAATGTTATCTTTGAAAACAATATGGAGAAAGAGTTTATGATGCCATTGTTTTGCTA CCGGCTACAAAAGCGTAGCTAATGAATGGCTAAAGGATTACAAATATGCGCTTAATGA GAAAGGGTCCCTAAAAATCCTTTTCCGAAACATTGGAAGGGAGATCATGGATTGTAC TGTGCAGGACTAGCAAGGAAAGGTTTGTGTTGGAGTCAAAAAGGATGCTGAGGCAATTG CAGAAGACATCAACCGAACTCTTAAGTTGGAGAAT
<i>PsYUC8^B</i>	ATGAAGAAAGAGAATCAAACAGTGATCATTGTTGGAGCAGGCCCTTCTGGTCTCTCTG TAGCAGCATCCTTAACAAACCAATCCATTCTTACATAATCCTCGAAAGAGAAAACTG TTTTGCGTCTCTATGGAAAAAATATGCATACGACCGTCTTCATCTTCACCTCAAAAAGC AATTTTGTGAGCTTCCACATAAGCCATTTCCACCTTCTTTCCATCATAACATTCCTAAGG AAAAGTTTTTGCAGTATTTAGAAGACTATGTATCTCACTTCAAGATCAATCCTGTGTAT CAGAGGACAGTGGAGTATGCGGAGTTTGTGAAAGGCTGTGAGAAATGGAAGGTGAAG GCTGTGAATAAGGATTCCGGCGAAGTTGAGGAATACGATGGAAGGTTTTTGGTTGTGG

	<p>CTAGTGGTGAAACTAGTGACCCTTTGTACCTGAGATTGAAGGGTTGAAGAGTTTTGGT GGGAAGGTGATTCAATTCAACCAGGTTAAGAATGGGAAAGAGTTTAAAGATGAACAT GTTCTTGTGTTGGGTCTGGGAATTCTGGTATGGAATGTCATTGGATCCTTATCAACCA TGGTGCTAAAACCTCAATCCTCGTTCGAAGCCCGGTTTCATATATTGTCAAAGGAATGC TGAATTTAGGCTTATTTATGATGAAGTATTTGTCAATGAAGATAGTGGATTCAATTAATG GTGATGCTTAGTAAACTGGTTTATGGTGAATGACTAATTATGGAGTTGGTAGGCCTAA TGAGGGACCTTTTTACATGAAAGTTAAGTACGGCAAGTATCCAGTTGTTAATGTTGGA ACCTATCAGAAAATTAATCTAAAGAGTTAAAGGTGTTGCCAACGGAGATAGAATGCT TAAGTGGCAATAATGTGTTGTTCAAGAATGGTGAATTGCATACTTTTGACTCTATTATT TTCTGCACTGGTTTTCAAGAGATCGACACATAAGTGGCTTAAGGGAGATGATTATCTTTT GAGTGATGATGGTATTCCGAAGCAAAGTTACCTTTTCATTGGAAGGGAAAGAATGGT TTGTATTGTGTTGGATTATCAAGGAGAGGCTTATATGGAGCTGCTCAAGATGCTGAAA ATGTAGCAAATGATGTTAGATCCATCATGCAAGAAATCATA</p>
<i>AtYUC6^A</i>	<p>ATGGATTTCTGTTGGAAGAGAGAGATGGAAGGTAAACTAGCACATGACCACCGCGGC ATGACGTCACCGCGTCGTATCTGCGTCGTCACCGGTCCGGTGATCGTAGGCGCCGGAC CGTCCGGACTAGCCACGGCAGCATGTTTAAAGAGAGAGGTATCACGTCCGTACTION AGAGAGATCAAACCTGTATAGCATCACTATGGCAGCTCAAGACTTATGACCGTCTTCAT CTTCACCTTCCATAACAATTCTGTGAACTTCCGATTATACCTTCCCCGGAGATTTCCCT ACCTACCCGACGAAGCAACAGTTCATCGAGTACCTTGAGGACTACGCTCGGAGGTTTG ACATAAAGCCGGAGTTTAAACCAAACGGTTGAGTCGGCTGCGTTTGATGAAAACCTTG GATGTGGCGCGTGACTAGCGTGGGAGAAGAAGGCACGACGGAGTATGTTTGTGCGGTG GTTAGTGGCGGCGACGGGGGAGAATGCGGAGCCGGTGGTACCTAGGTTTGAGGGGAT GGATAAGTTTGCAGCCGCCGGGGTAGTTAAGCACACGTGTCATTATAAAACCGGTGGA GATTCGCCGGAAAAAGGGTTCCTGTCGTCGGATGTGGAAACTCCGGTATGGAGGTTT GTTTGGATCTCTGCAACTTCGGTGCTCAGCCTTCTCTCGTTGTCAGAGACGCTGTGCAC GTCCTACCACGAGAGATGTTGGGTACTTCAACTTTTGGGCTGTCCATGTTCTTACTGAA ATGGCTGCCCATCCGGCTTGTGACCGTTTCTTTTGGTTGTTTCCCGGTTTCATCCTCGG GGATACTACCTTTTAGGTCTTAACAGGCCCGGTTAGGTCCACTCGAGCTCAAAAAT ATCTCCGGTAAACTCCGGTTCCTCGACGTTGGCACGCTAGCCAAAATCAAAACCGGAG ACATTAAGGTGTGTTTCGGGGATAAGAAGGTTAAAACGACATGAAGTTGAGTTCGATAA CGGAAAAACAGAGAGATTTGACGCCATTATATTAGCAACTGGCTACAAAAGCAACGT ACCTCTTGGCTAAAGGAGAATAAAAATGTTTAGTAAGAAAAGATGGATTTCCAATACAA GAGTTCCTGAGGGATGGAGAGGGGAATGTGGGCTATACGCGGTCCGATTACAAAA CGTGGGATTAGTGGAGCATCAATGGATGCAAAGAGAATAGCTGAAGACATACACAAG TGTTGAAACAAGACGAGCAACTGCAATGCAAATTGGGGAAAAGAATGAAAAGGAAA TTTAGTGAGAGTGATTGTGGTGGGAATTGA</p>

Table S2. Sequences of forward and reverse primers for each of the TAR and YUC genes featured in this report. Underlined sequences are the cloning overhangs.

Gene	Forward primer	Reverse primer
<i>AtTAA1</i>	<u>AAGTTCTGTTTCAGGGCCCCGGT</u> GAAAC TGGAGAACTCG AGGA	<u>ATGGTCTAGAAAGCTTTA</u> AAGGTCAATGC TTTTAATGAGCTTCA
<i>AtTAR2</i>	<u>AAGTTCTGTTTCAGGGCCCCGG</u> GACAG ATTCCGAGGTTT CTTTCT	<u>ATGGTCTAGAAAGCTTTA</u> CAAAGTTGAAT TAAAGGAAGATGTAATC
<i>PsYUC1</i>	<u>AAGTTCTGTTTCAGGGCCCCG</u> GATCCTT TCAAACAAAAACCT	<u>ATGGTCTAGAAAGCTTTA</u> AACATTATTA GAGTAGTAGTCTAATAAGG
<i>PsYUC2</i>	<u>AAGTTCTGTTTCAGGGCCCCG</u> GAGAACT TGTTTCGCCTAGTTG	<u>ATGGTCTAGAAAGCTTTA</u> TGATCCATGTTT TGCTCAGCTTTTAAAC
<i>PsYUC3</i>	<u>AAGTTCTGTTTCAGGGCCCCG</u> CTCATGA ACTACTTAAAGGAACTAG	<u>ATGGTCTAGAAAGCTTTA</u> TGCAAGTGGCT TGGC
<i>PsYUC4</i>	<u>AAGTTCTGTTTCAGGGCCCCG</u> AAAAACA AAACCATGGAAATC	<u>ATGGTCTAGAAAGCTTTA</u> ATCTAATAGCT TGATTTGAGCA
<i>PsYUC5</i>	<u>AAGTTCTGTTTCAGGGCCCCG</u> GAGAATT TGTTTCGTCTTGC	<u>ATGGTCTAGAAAGCTTTA</u> TGACAAGCGTT GTTTCTTCT
<i>PsYUC6</i>	<u>AAGTTCTGTTTCAGGGCCCCG</u> CAGGTAG CACCGGTGATA	<u>ATGGTCTAGAAAGCTTTA</u> TTTCTTTCGTC TTGAGGAAC
<i>PsYUC7</i>	<u>AAGTTCTGTTTCAGGGCCCCG</u> CAAGAAT TCACAGTTGTAATTGT	<u>ATGGTCTAGAAAGCTTTA</u> ATTCTCCA AAGAGTTTCG
<i>PsYUC8</i>	<u>AAGTTCTGTTTCAGGGCCCCG</u> AAGAAAG AGAATCAAACAGTGAT	<u>ATGGTCTAGAAAGCTTTA</u> TATGATTTCTTG CATGATGGA
<i>AtYUC6</i>	<u>AAGTTCTGTTTCAGGGCCCCG</u> ATTCT GTTGGAAGAGAGATGG	<u>ATGGTCTAGAAAGCTTTA</u> GATTTTTTTTAC TTGCTCGTCTTGTTTC

Table S3. MRM transitions, collision energy (CE) and retention times of compounds identified in metabolite extractions during this investigation.

Compound	MRM transition	CE (eV)	Retention time (min)
IAA	176.1 > 130.1	18	3.61
4-Cl-Trp	239.2 > 222.2	12	2.70
5-Cl-Trp	239.2 > 222.2	12	2.73
6-Cl-Trp	239.2 > 222.2	12	2.77
7-Cl-Trp	239.2 > 222.2	12	2.69
4-Cl-IAA	210.1 > 164.1	18	4.21
5-Cl-IAA	210.1 > 164.1	18	4.55
6-Cl-IAA	210.1 > 164.1	18	4.59
7-Cl-IAA	210.1 > 164.1	18	4.50
1-CH ₃ -Trp	190.1 > 144.1	18	2.58
5-CH ₃ -Trp	190.1 > 144.1	18	2.48
6-CH ₃ -Trp	190.1 > 144.1	18	2.48
5-CH ₃ O-Trp	235.2 > 218.2	10	2.05
5-CH ₃ O-IAA	190.0 > 158.0	10	4.82
5-OH-Trp	221.2 > 204.2	10	1.30
5-Br-Trp	283.0 > 266.0	18	2.82
6-Br-Trp	283.0 > 266.0	18	2.86

7-Br-Trp	283.0 > 266.0	18	2.75
5-Br-IAA	255.0 > 209.0	18	4.70
6-Br-IAA	255.0 > 209.0	18	4.74
7-Br-IAA	255.0 > 209.0	18	4.62

2 Supplementary Figures

Figure S1. UPLC chromatograms in MRM mode of free IAA in *N. benthamiana* leaves following infiltration with *AtTARs* and *PsYUC7*.

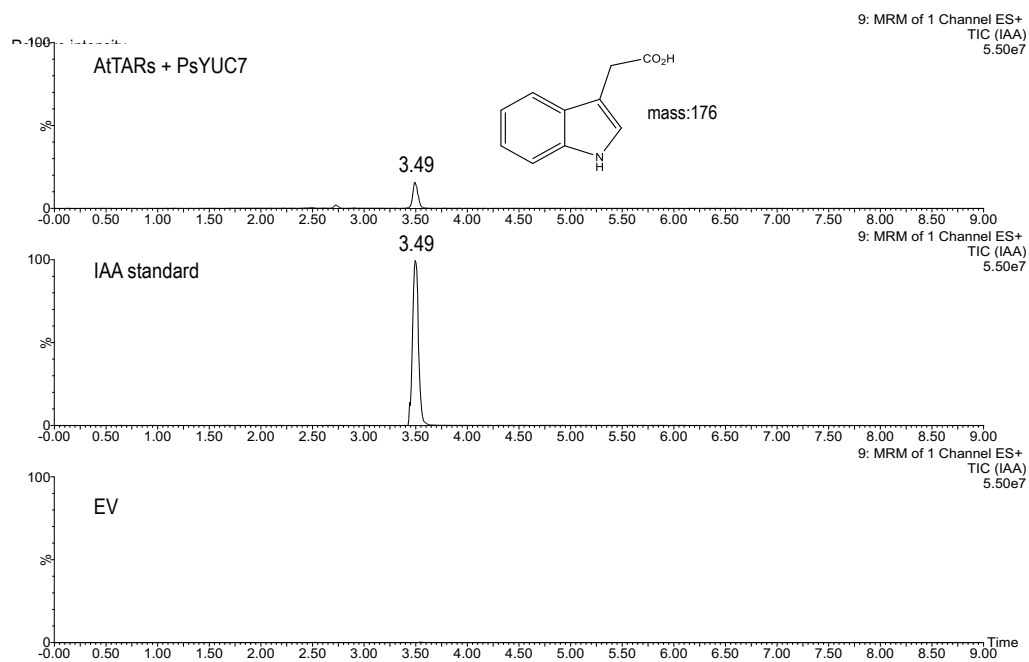


Figure S2. *N. benthamiana* plant following *Agrobacterium*-mediated infiltration with *AtTAA1*, *AtTAR2* and *PsYUC7*. The transformed leaf is exhibiting a curled phenotype, characteristic of auxin over-production.



Figure S3. UPLC chromatograms in MRM mode of Cl-trp production in *N. benthamiana* following infiltration with the bacterial halogenase, A) RebH, B) PrnA, C) ThdH, D) PyrH with the partner reductase, RebF. In each case, upper panel: MRM trace of Cl-IAA from the harvested leaf extract, middle panel: MRM trace of the relevant Cl-IAA standard for each halogenase, bottom panel: empty vector (EV) negative control.

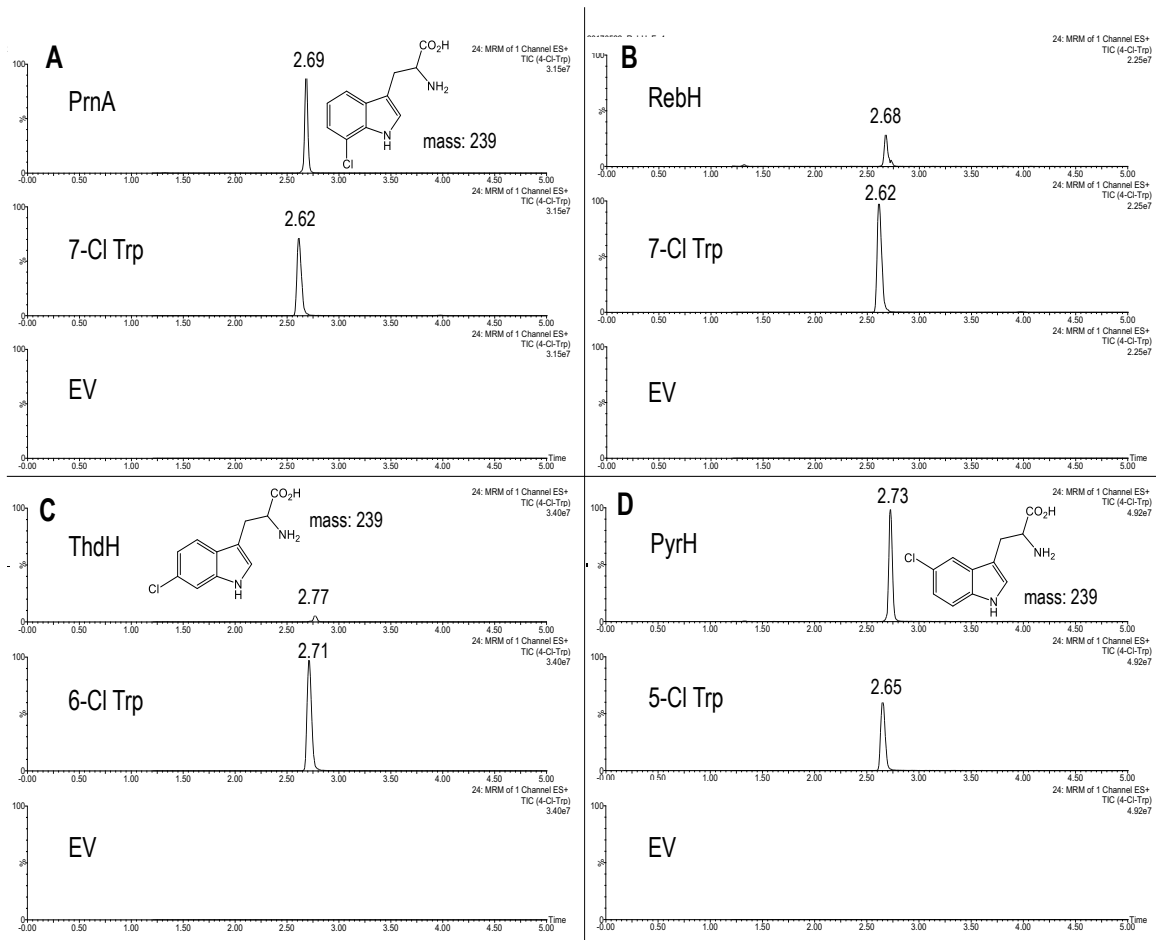


Figure S4. UPLC chromatograms in MRM mode of Cl-IAA from *N. benthamiana* leaves infiltrated with *AtTARs*, *PsYUC7* and one of four bacterial halogenase genes; A) RebH, B) PrnA, C) ThdH, D) PyrH with the partner reductase, RebF. In each case, upper panel: MRM trace of Cl-IAA from the harvested leaf extract, middle panel: MRM trace of the relevant Cl-IAA standard for each halogenase, bottom panel: empty vector (EV) negative control.

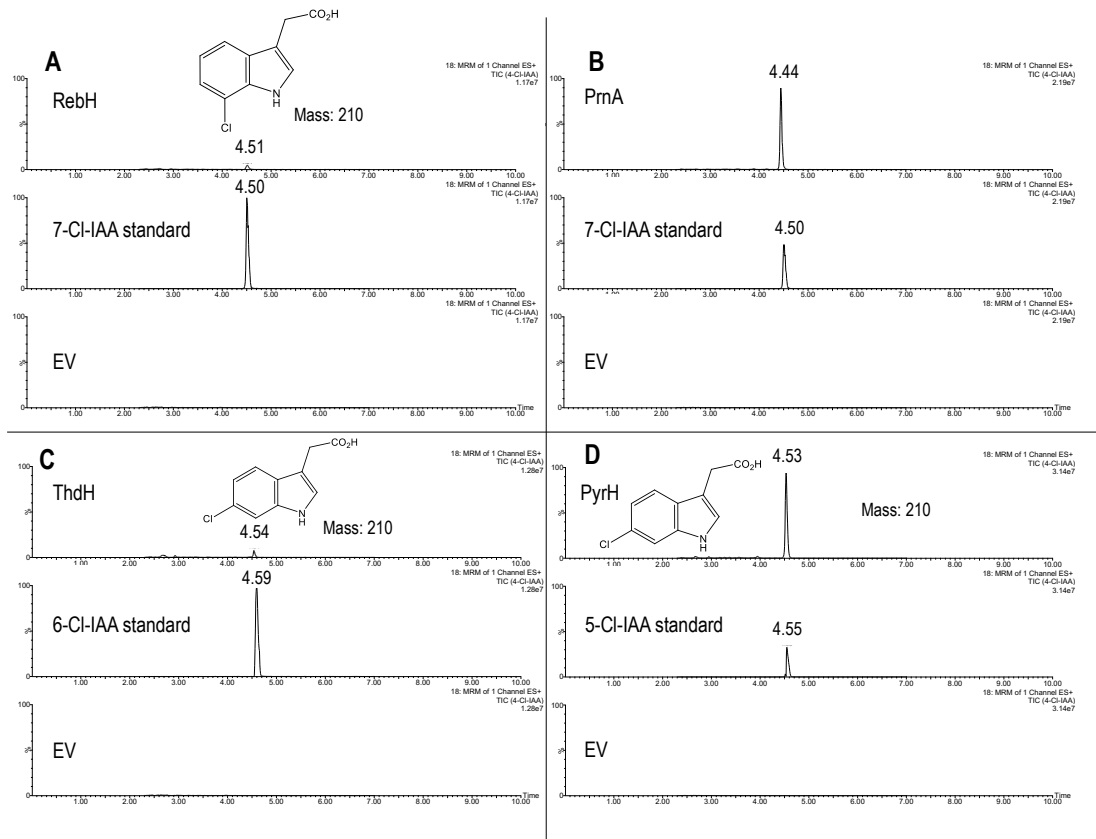


Figure S5. UPLC chromatograms in MRM mode of Br-IAA production following infiltration of *AtTARs*, *PsYUC7* and a halogenase gene, A) *PrnA*, B) *PyrH*, with *RebF* in KBr buffer. In each case, the top panel: MRM trace of Br-IAA from leaf tissue. Middle panel: trace of Br trp from leaf tissue. Bottom panel: MRM trace of a 7-Br-trp standard.

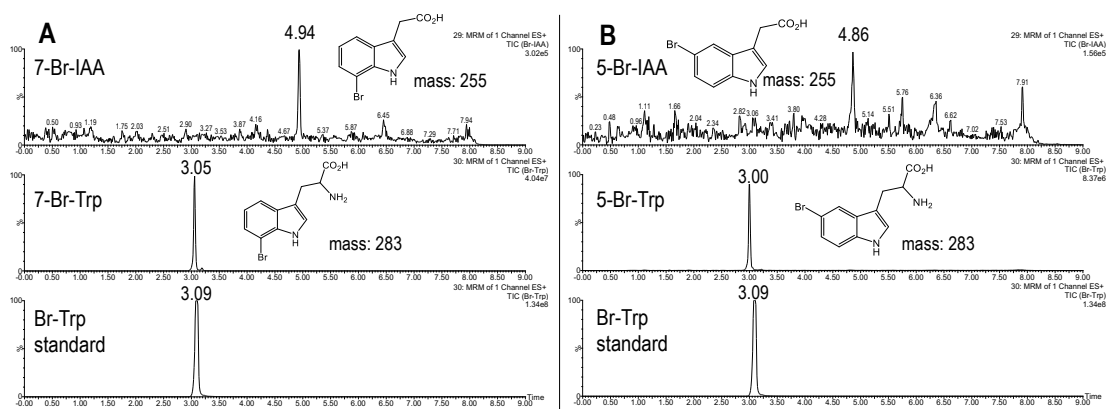


Figure S6. UPLC chromatograms in MRM mode of X-IAA production by *N. benthamiana* leaves following infiltration with X-trp. In each case A, B, C, D, the first panel: MRM trace of the X-IAA product, second panel: MRM trace of the infiltrated substrate. For C and D, third panel: MRM trace of the X-IAA product standard. 6-Br-IAA and 6-CH₃-IAA standards were unavailable.

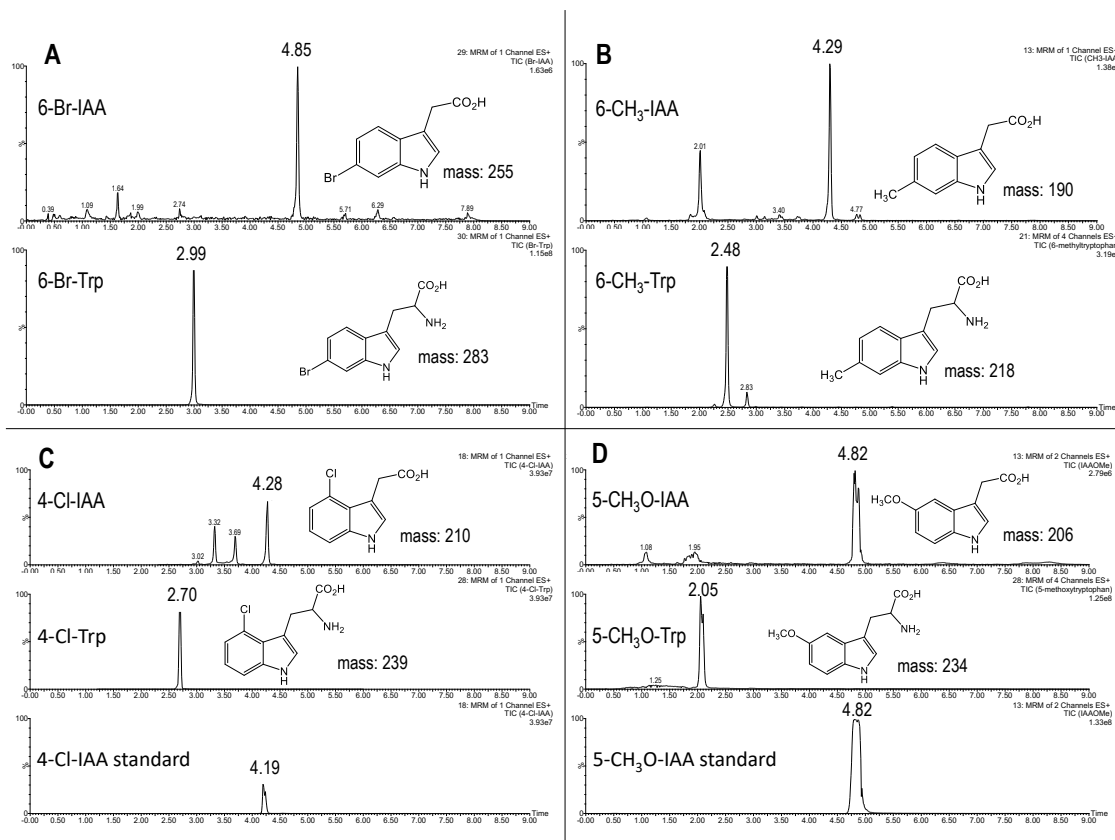


Figure S7. Cl-IAA production in *N. benthamiana* leaves from infiltration of *AtTARs*, *PsYUC7* and bacterial halogenases in the presence of RebF, in KBr buffer. Bars represent mean \pm SEM, n = 4.

