Supplemental Tables

Supplemental Table S1. Summary of fresh weight and amounts of aroma *β*-primeverosides in young leaves and mature leaves of *C.sinensis.*

	aroma glycosides (μg g^{-1} fresh weight)		total amounts of aroma glycosides (μg)	
	young leaves	mature leaves	young leaves (FW 0.192 ± 0.016 g)	mature leaves (FW 0.808± 0.057 g)
benzyl-glc	0.46 ± 0.022	0.044 ±0.01	0.088 ± 0.008	0.036 ± 0.008
2PE-glc	0.22 ± 0.010	0.098 ±0.03	0.042 ± 0.004	0.079 ± 0.025
hexenyl-glc	0.65 ± 0.030	0.609 ±0.11	0.125 ± 0.012	0.493 ± 0.096
linalyl-glc	n.d.	n.d.	nd	nd
geranyl-glc	0.092 ± 0.015	0.101 ±0.01	0.018 ± 0.003	0.081 ± 0.010
benzyl-pri	1.75 ± 0.082	2.031 ±0.20	0.336 ± 0.032	1.64 ± 0199
2PE-pri	13.0 ± 0.61	8.78 ±1.9	2.50 ± 0.24	7.09 ± 1.63
hexenyl-pri	3.04 ± 0.14	1.505 ±0.23	0.584 ± 0.056	1.22 ± 0.21
linalyl-pri	7.19 ± 1.20	0.079 ±0.06	1.38 ± 0.26	0.064 ± 0.049
geranyl-pri	18.6 ± 0.67	3.789 ±0.84	3.57 ± 0.32	3.06 ± 0.72

Supplemental Table S2. Summary of the purification of CsGT2 from young fresh leaves of *C.sinensis*

	Total protein (mg)	Total activity (mU)	Specific activity (mU mg^{-1})	Yield (%)	Purification fold (-fold)
1. Crude extract	681	457	0.67	100.0	1.0
2. 30-70%$(NH_4)_2SO_4$	616	414	0.67	90.5	1.0
3. HiTrap DEAE	63	39	0.62	8.5	0.9
4. HiTrap Q	30	29	0.97	6.3	1.4
5. Hydroxyapatite	5.4	8.7	1.61	1.9	2.4
6. HiTrap Blue	0.34	1.1	3.23	0.24	4.8
7. Mono Q	0.15	1.3	8.67	0.28	13

One unit activity was defined as the amount of enzyme biosynthesized 1 μmol of geranyl *β*-primeveroside per minute at 30^{o}C. Specific activity and purification fold were calculated from the activity data.

Supplemental Table S3. Gene specific primers used for 5', 3'-RACE, amplification of full-length genes from *C.sinensis*, construction of CsGT2-I141S or real-time PCR.

gene specific primers	Primer sequences
At_UGT85A1-Dig-Fw	5'-ATGGGATCTCAGATCATTCATAACT-3'
At_UGT85A1-Dig-Rv	5'-TTAATCCTGTGATTTTTGTCCCA-3'
At_UGT85A3-Dig-Fw	5'-ATGGGATCCCGTTTTGTTTCTAACGAA-3'
At_UGT85A3-Dig-Rv	5'-TTACGTGTTAGGGATCTTTCCCAA-3'
CsGT2-Race-FW	5'- GGCTGCTCATATTGCATGGGTATGGCTA-3'
CsGT2-Race-RV	5'-CGACAGGGTAGGAGAGAGAGGACTGGTTGT-3'
CACC-*Xho*I-CsGT1-FW	5'-CACCCTCGAGATGGGTAGCAGAAAGCAG-3'
CsGT1-*Bgl*II-stop-RV	5'-AGATCTTTAGTATTGCTCACAATAGTGAAGAGC-3'
CACC-*Nde*l-CsGT2-FW	5'-CACCCATATGGATTCAAAAAAGAGCAAAATG-3'
CsGT2-*BamH*I-RV	5'-GGATCCTAATTTTTGAGCAACTTCACATC-3'
CsGT2-134-I141S-FW	5'-GCAGTCCAGCTCATGAGTACCGGAGCCACG-3'
CsGT2-134-I141S-RV	5'-CGTGGCTCCGGTACTCATGAGCTGGACTGC-3'
qRT-CsGT1-FW2	5'-TGTCCAAAGAGGCATTTTCC-3'
qRT-CsGT1-RV2	5'- AAGGATGGCATGTCCTTGAG-3'
qRT-CsGT2-FW2	5'-CGCAGTCCAGCTCATGATTA-3'
qRT-CsGT2-RV2	5'-TCAACAAAGTGGCGAAACTG-3'
qRT-*β-PD* -FW	5'-AAGGATCCCCAGAGGGTCTA-3'
qRT-*β-PD* -RV	5'-TCCGAACCTTTGGGTGTAAC -3'
qRT-Cs18SrRNA-FW	5'-CACGGGGAGGTAGTGACAAT-3'
qRT-Cs18SrRNA-RV	5'-CCTCCAATGGATCCTCGTTA-3'

Supplemental Table S4. Composition of the buffers and solutions for purification and identification of CsGT2 protein

Buffer/Solution	Composition
Buffer A	100 mM Tris-HCl (pH 7.5) containing 10 mM sodium ascorbate, 5 mM dithiothreitol, 1 mM phenylmethylsulfonyl, 1 mM EDTA, 0.1% CHAPS, 0.1% (v/v) 2-mercaptoethanol, 5% (w/v) polyvinylpolypyrrolidone and 10% (w/v) DOWEX1x2(Cl^-)
Buffer B	20 mM Tris-HCl (pH 8.0) containing 0.1% (v/v) 2-mercaptoethanol
Buffer C	20 mM borate buffer (pH 9.0) containing 0.1% (v/v) 2-mercaptoethanol
Buffer D	5 mM potassium phosphate buffer (pH 6.8) containing 0.1% (v/v) 2-mercaptoethanol
Buffer E	20 mM potassium phosphate buffer (pH 6.8) containing 0.1% (v/v) 2-mercaptoethanol
Solution F	25 mM NH_4HCO_3/acetonitrile (1:1 v/v)
Solution G	10 mM dithiothreitol/50 mM NH_4HCO_3
Solution H	55 mM iodoacetoamide/50 mM NH_4HCO_3
Solution I	50% acetonitrile containing 1% formic acid

Supplemental Table S5. GenBank accession numbers used for construction of the phylogenetic tree in Figure 7.

Abbreviation	Plant species		Accession NO
Ad_GT4	*Actinidia deliciosa*	fuzzy kiwifruit	AIL51400
At_UGT79B1	*Arabidopsis thaliana*	Arabidopsis	NP_200217
At_UGT79B6	*Arabidopsis thaliana*	Arabidopsis	NP_200212
At_UGT85A3	*Arabidopsis thaliana*	Arabidopsis	NP_173655
Bp_UGT94B1	*Bellis perennis*	daisy	Q5NTH0
Cm_F7G2RhaT	*Citrus maxima*	pomelo	Q8GVE3
Cr_UGT3	*Catharanthus roseus*	madagascar periwinkle	BAH80312
Cr_UGT4	*Catharanthus roseus*	madagascar periwinkle	BAH80313
Cr_UGT85A23	*Catharanthus roseus*	madagascar periwinkle	F8WLS6
Cs_F7G6RhaT	*Citrus sinensis*	orange	NP_001275829
Cs_UGT1_UGT85K11	*Camellia sinensis*	tea plant	BAO51834
Cs_UGT2_UGT94P1	*Camellia sinensis*	tea plant	BAO51835
Gj_UGT85A24	*Gardenia jasminoides*	gardenia	F8WKW1
Gm_SGT3_UGT91H4_RhaT	*Glycine max*	soybean	NP_001240857
Ib_UGT85A32	*Ipomoea batatas*	sweet potato	BAO51842
Ip_UGT79G16	*Ipomoea purpurea*	morning glory	Q53UH5
Me_UGT85K4	*Manihot esculenta*	cassava	AEO45781
Me_UGT85K5	*Manihot esculenta*	cassava	AEO45782
Mt_UGT85H2	*Medicago truncatula*	barrel clover	XP_003618665
Nh_Rt	*Nierembergia sp. NB17*	cupflower	BAC10994
Pd_UGT85A19	*Prunus dulcis*	almond	ABV68925
Ph_Rt (UGT79A1)	*Petunia x hybrida*	petunia	CAA50376
Sb_UGT85B1	*Sorghum bicolor*	sorghum	XP_002463518
Si_UGT94D1	*Sesamum indicum*	sesame	BAF99027
Sl_NSGT1	*Solanum lycopersicum*	tomato	AGO03777
Sr_UGT85A8	*Stevia rebaudiana*	stevia	AAR06913
Sr_UGT85C1	*Stevia rebaudiana*	stevia	AAR06922
Sr_UGT85C2	*Stevia rebaudiana*	stevia	AAR06916
Vp_UGT94F1	*Veronica persica*	persian speedwell	BAI44133
VvGT16	*Vitis vinifera*	grapevine	XP_002263158
Vv_UGT85A28 (VvGT14)	*Vitis vinifera*	grapevine	BAO51844
Vv_UGT85A30	*Vitis vinifera*	grapevine	NP_001277170
Vv_UGT85A33	*Vitis vinifera*	grapevine	NP_001277168