

Table S1 List of primers used for RT-qPCR in broccoli

Function	Gene Name	Protein name	Sequence (5' to 3')	Gene ID *
Housekeeping gene	Actin-2		F GGAGCTGAGAGATTCC	LOC106315376
			R GAACCACCACTGAGGA	
Transcription factor	MYC2	Transcription factor MYC2	F GCAAGGAGGAGTGTTT	LOC106295384
			R ATCGTTCTCGCCTTGAT	
	MYB28	Transcription factor MYB28	F CCACCACGCAGCCAGA	LOC106301630
			R TCAGGGAAGCCATTGG	
	MYB34	Transcription factor MYB34	F CTTCATGCTCTTATGGG	LOC106322588
			R CTTCTTGAGATTTGTGT	
Side-chain elongation	BCAT4	Branched-chain amino acid aminotransferase 4	F ATGTTTTGTTTTTGGAT	LOC106292635
			R CGATGACACTTTTACGT	
	MAM1	Methylthioalkylmalate synthase 1	F CTTCACTGACTCCCAA	LOC106324637
			R AAACCATCAAAACCAT	
	MAM3	Methylthioalkylmalate synthase 3	F TAGGTGAGAGAAGTGG	LOC106321871
			R CTATGGGTTTATGTGGT	
Core structure synthesis	CYP79F1	Cytochrome P450 79F1	F AACCTCCTTGCTTACCT	LOC106343089
			R TTGTCCTAACCTTCCCT	
	CYP79F2	Cytochrome P450 79F2	F CTGGTCGAAAGTGAAT	LOC103872429
			R TTTGGATAAAGGTTGG	
	CYP79B3	Tryptophan N- monooxygenase 2	F CCCTTTGCTTACCGCTG	LOC103864341
			R CTTTCTTTGCCGACGAC	
	CYP83A1	Cytochrome p450, family 83, subfamily a, polypeptide 1	F TTCCCGTTATTCGGATT	LOC106342466
			R CTCTCAGTTTCTGGCTT	
	CYP83B1	CYP83B1 monooxygenase	F ACACTTCCTCTTTCGTC	LOC103833295
			R CGGTTCCGTACTCGTTA	
GSL degradation	SUR1	S-alkyl-thiohydroximate lyase SUR1	F GACATAACACCTGACC	LOC106306752
			R CCTTGAGCCTATCACAC	
	UGT74B1	UDP- glycosyltransferase 74B1	F CGAATCAAAGACGATA	LOC103840711
			R ACCAAACGAAACAAAA	
	UGT74C1	UDP- glycosyltransferase 74C1	F ATGATCTGCCTTCTTTC	LOC106342937
			R ACTTTGCTGGTTTATTC	
	SOT17	Cytosolic sulfotransferase 17	F AAGGCTGGAGACCGAA	LOC106343839
			R TTCAGGAGAGGGTTGG	
	SOT18	Cytosolic sulfotransferase 18	F CGAAGGAGGAAGAGG	LOC106336556
			R TGGCATAAACAGCAGG	
	MY	Myrosinase 1	F ACCAAATACGGCGACC	LOC106326800
			R TCCAAGAGCCCATGCA	

Note: * identified from the Brassica oleracea var. oleracea cultivar TO1000 genome data base.

The genes were reported in reference "A Comprehensive Gene Inventory for Glucosinolate Biosynthetic Pathway in *Arabidopsis thaliana*".

Table S2 Desulphated GSLs identified in broccoli florets, stem, and leaves using UPLC–MS.

No.	Retention time (min)	Trivial name	Abbreviations	Semisystematic name	Molecular weight ^a
1	8.3	Glucoiberin	IBE	3-Methylthioallylthio GLS	343
2	10.6	Sinigrin	SIN	2-Propenyl	279
3	11.2	Glucoraphanin	GRA	4-Methylsulfinylbutyl GLS	357
4	18.5	4-hydroxyglucobrassicin	4OH	4-Hydroxyindol-3-ylmethyl GLS	384
5	24.72	Glucoerucin	ERU	4-Methylsulthiobutyl GLS	351
6	27.09	Glucobrassicin	GBC	Indole-3-methylthio GLS	368
7	30.16	4-Methoxyglucobrassicin	4ME	4-Methoxyindol-3-ylmethyl GLS	398
8	33.62	Neoglucobrassicin	NGBC	1-Methoxyindol-3-ylmethyl GLS	398

^a As desulfo- glucosinolate

Table S3 Effects of MeJA on GSLs content in broccoli florets, stem and leaves.

Cultivars	Organ/ Tissue	Control			MeJA		
		Total GSLs content ($\mu\text{mol/g DW}$)	Aliphatic GSLs content ($\mu\text{mol/g DW}$)	Indole GSLs content ($\mu\text{mol/g DW}$)	Total GSLs content ($\mu\text{mol/g DW}$)	Aliphatic GSLs content ($\mu\text{mol/g DW}$)	Indole GSLs content ($\mu\text{mol/g DW}$)
Yanxiu	Florets	11.76 \pm 0.84	1.92 \pm 0.18	9.84 \pm 0.93	17.43 \pm 1.55	2.38 \pm 0.13	15.04 \pm 1.53
	Stem	2.70 \pm 0.59	0.78 \pm 0.17	1.92 \pm 0.34	5.17 \pm 0.57	1.31 \pm 0.16	3.73 \pm 0.31
	Leaves	4.44 \pm 0.43	0.38 \pm 0.062	4.07 \pm 0.47	6.87 \pm 0.86	0.45 \pm 0.12	6.42 \pm 0.88
Xianglv NO.3	Florets	19.84 \pm 1.29	2.93 \pm 0.13	16.91 \pm 1.18	27.66 \pm 1.66	4.44 \pm 0.61	23.22 \pm 2.22
	Stem	3.17 \pm 0.53	1.33 \pm 0.20	1.84 \pm 0.33	6.51 \pm 0.59	1.64 \pm 0.56	4.87 \pm 0.55
	Leaves	7.96 \pm 0.56	0.66 \pm 0.073	7.30 \pm 0.44	7.95 \pm 0.58	0.74 \pm 0.16	7.21 \pm 0.71

Table S4 Effects of MeJA on glucoraphanin content, sulforaphane content and myrosinase activity in broccoli florets, stem and leaves.

Cultivars	Organ/ Tissue	Control			MeJA		
		Glucoraphanin content ($\mu\text{mol/g DW}$)	Sulforaphane content ($\mu\text{g/g DW}$)	Myrosinase activity (U/min/mg protein)	Glucoraphanin content ($\mu\text{mol/g DW}$)	Sulforaphane content ($\mu\text{g/g DW}$)	Myrosinase activity (U/min/mg protein)
Yanxiu	Florets	0.86 \pm 0.12	33.05 \pm 5.48	1.87 \pm 0.60	1.44 \pm 0.14	53.36 \pm 3.05	3.15 \pm 0.17
	Stem	0.25 \pm 0.05	5.21 \pm 0.83	0.68 \pm 0.14	0.87 \pm 0.12	5.78 \pm 0.76	0.74 \pm 0.19
	Leaves	0.31 \pm 0.096	3.53 \pm 0.61	1.81 \pm 0.30	0.18 \pm 0.034	3.70 \pm 0.95	2.19 \pm 0.29
Xianglv NO.3	Florets	2.70 \pm 0.16	49.97 \pm 6.15	1.59 \pm 0.20	4.15 \pm 0.64	80.28 \pm 6.70	3.61 \pm 0.25
	Stem	1.07 \pm 0.10	5.31 \pm 0.77	0.54 \pm 0.14	1.89 \pm 0.20	6.45 \pm 0.97	0.64 \pm 0.019
	Leaves	0.66 \pm 0.073	4.71 \pm 1.11	1.47 \pm 0.26	0.74 \pm 0.16	4.42 \pm 0.90	1.88 \pm 0.25

Table S5 Correlation analysis of sulforaphane content between glucoraphanin contents and myrosinase activity in broccoli florets

		Sulforaphane content	glucoraphanin contents	myrosinase activity
Sulforaphane content	Pearson correlation	1.000	0.896**	0.754**
	Significant (2-tailed)		0.000	0.005
	Sample number	12	12	12
Glucoraphanin contents	Pearson correlation	0.896**	1.000	0.444
	Significant (2-tailed)	0.000		0.148
	Sample number	12	12	12
Myrosinase activity	Pearson correlation	0.754**	0.444	1.000
	Significant (2-tailed)	0.005	0.148	
	Sample number	12	12	12

**, Correlation is significant at the 0.01 level (2-tailed)

Table S6 Effects of MeJA on glucoraphanin content, sulforaphane content and myrosinase activity in broccoli florets, stem and leaves.

Cultivars	Organ/ Tissue	Control		MeJA	
		Total phenolics content (mg/g DW)	Total flavonoids Content (mg/g DW)	Total phenolics content (mg/g DW)	Total flavonoids Content (mg/g DW)
Yanxiu	Florets	11.32±0.44	9.73±0.97	10.56±0.32	12.10±0.89
	Stem	8.66±0.41	0.77±0.067	7.80±0.71	0.52±0.18
	Leaves	7.11±0.68	3.09±0.65	7.57±0.60	2.42±0.14
Xianglv No.3	Florets	9.79±0.60	7.31±1.36	9.11±1.48	10.47±0.53
	Stem	6.75±0.48	0.73±0.14	6.42±0.68	0.56±0.11
	Leaves	8.15±0.12	1.77±0.32	7.60±0.89	1.33±0.31

Table S7 Effects of MeJA on glucoraphanin content, sulforaphane content and myrosinase activity in broccoli florets, stem and leaves.

Cultivars	Organ/ Tissue	Control			MeJA		
		DPPH (%)	ABTS (%)	FRAP (μmol/mg FW)	DPPH (%)	ABTS (%)	FRAP (μmol/mg FW)
Yanxiu	Florets	63.63±6.11	64.17±2.49	12.10±1.94	79.62±5.06	78.59±3.83	16.46±1.57
	Stem	44.67±1.40	41.72±4.50	6.40±0.52	46.24±4.61	41.17±1.71	6.20±1.23
	Leaves	44.49±2.86	35.93±7.13	6.37±1.40	48.04±3.77	39.77±0.57	7.80±0.41
Xianglv No.3	Florets	66.40±2.52	63.86±2.69	10.67±1.31	83.67±2.38	84.57±3.59	14.92±1.58
	Stem	48.46±3.07	40.71±0.56	3.14±0.74	47.17±5.27	39.84±2.50	4.03±1.07
	Leaves	52.81±0.82	41.17±2.38	9.09±0.27	49.37±2.49	39.21±0.85	8.08±0.50