

Supplementary material

Supplementary Figures

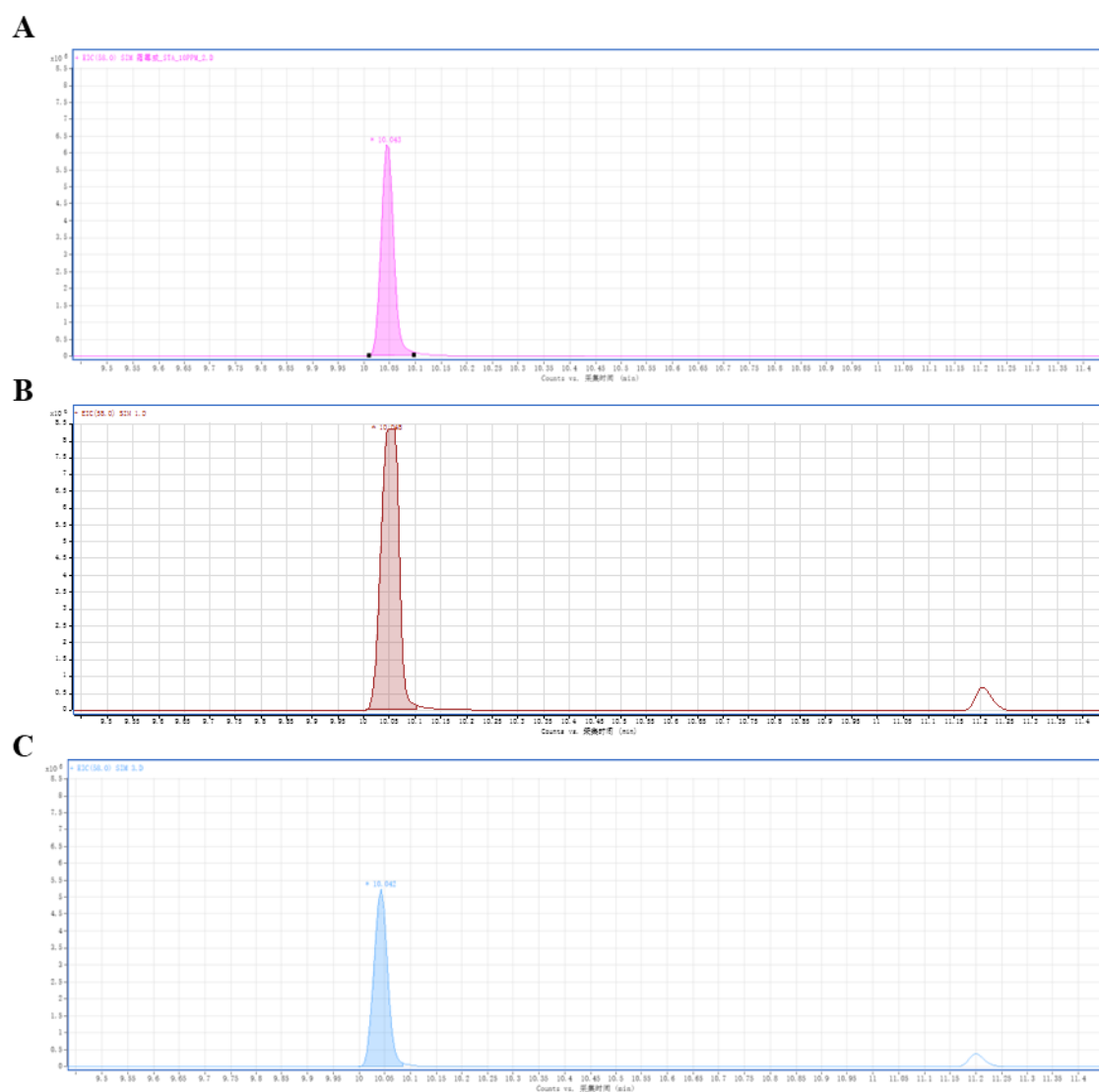


Figure S1. The representative gas chromatogram of propamocarb. (A) Gas chromatogram of 10 ppm propamocarb standard solution. (B) Gas chromatogram of M729 leaves at 48 h after 400 ppm propamocarb spraying. (C) Gas chromatogram of Y3F604 leaves at 48 h after 400 ppm propamocarb spraying.

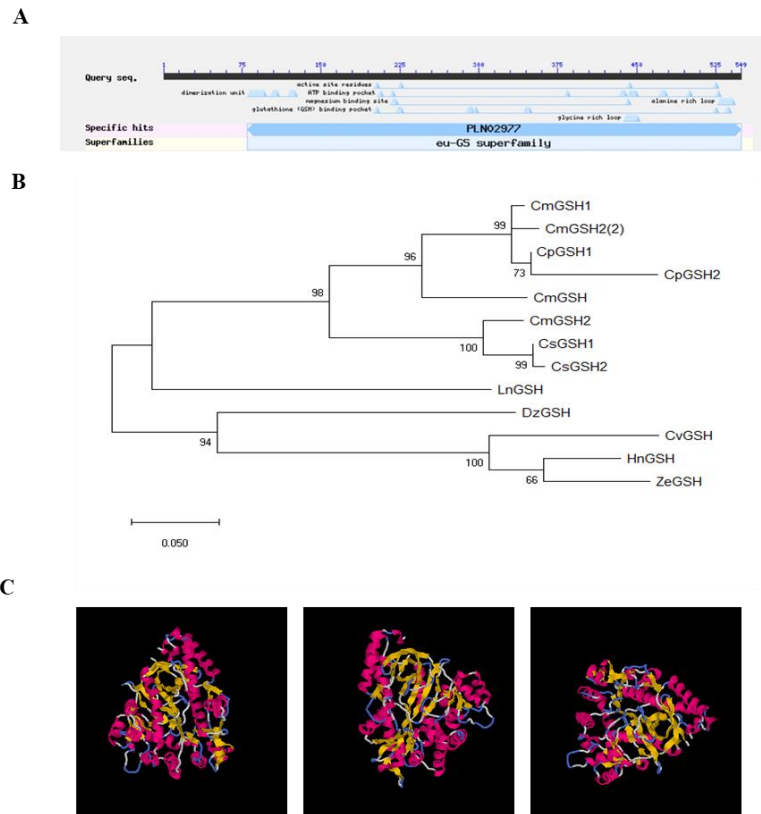


Figure S2. Cloning and bioinformatic analysis of *CsGSH2*. (A) Sequence analysis of *CsGSH2*. (B) Phylogenetic analysis of *CsGSH2* with the GSH2 proteins of other species using the neighbor-joining algorithm. (C) Three-dimensional structure of *CsGSH2* protein.

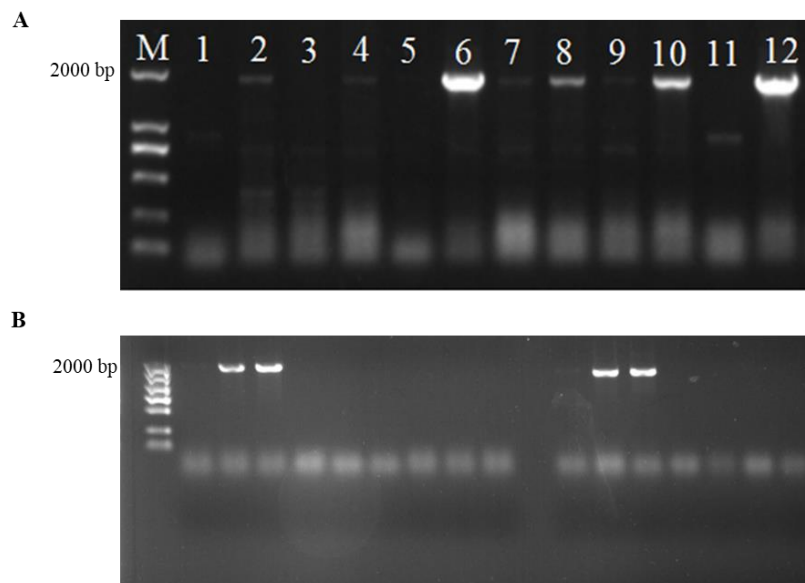


Figure S3. Identification of *CsGSH2*-overexpressing cucumber plants by PCR. (A) Overexpression of *CsGSH2*. (B) Anti-expression of *CsGSH2*. The PCR results showed that 1900 bp fragment contained *CsGSH2*(1650 bp) and a 250 bp fragment from p1250 vector

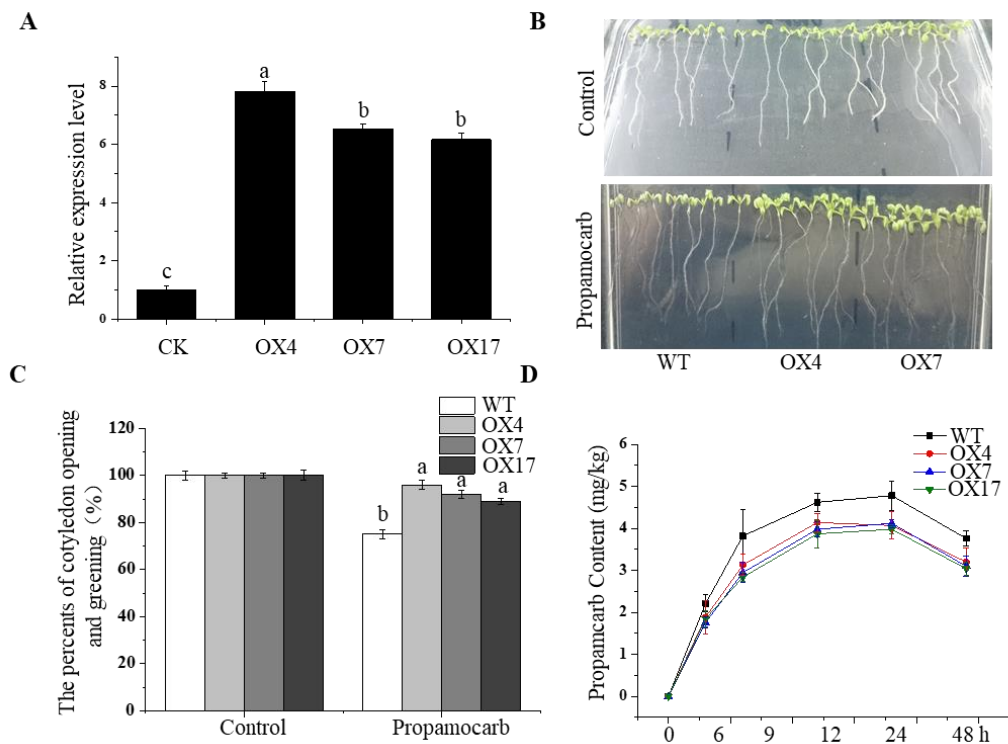


Figure S4. Effects of *CsGSH2* overexpression in *Arabidopsis thaliana*. (A) *CsGSH2* mRNA levels in control and *CsGSH2*-overexpression (OX) plants. (B) Phenotypes of *Arabidopsis* plants with 2 mM propamocarb. (C) The percentage of cotyledon opening and greening in the control and OX plants. (D) Propamocarb residues in the control and OX leaves at 0, 6, 9, 24, 48 h. Data are mean (\pm SD) of three independent experiments with five replicates each, different lower case letters indicate significant differences ($p < 0.05$ by Tukey's test).

Supplementary Tables

Table S1. Sequences of the primers used in this study.

Oligo name	Oligo sequence (5'→ 3')	Description	Cucumber gene ID
GST1-F	AGTGATAGAGGAAGCAGTAGAA	qRT-PCR analysis	Csa4M303130
GST1-R	CTGGCAGGAATCCAAAAGG		
GST2-F	GAAAACCCATCTGCGAATC	qRT-PCR analysis	Csa3M133380
GST2-R	AATAATCCCCACATCACCAAG		
GST3-F	AGCTTAACACCGAACGAGATT	qRT-PCR analysis	Csa5M409710
GST3-R	ATAGATGTATTTGAATTTCTGTGGC		
GST4-F	GCAGTGGTTGAGCAAAGTGA	qRT-PCR analysis	Csa7M395820
GST4-R	CAAAACAGGGAGATGGTGTAGAT		
GSH-F	AATCCTTGAGAACAATGGCG	qRT-PCR analysis	Csa1M571280
GSH-R	GGTGAATGAGACAAACCGACT		
RDR-F	CAGAGCCTTCTACGGTTTCC	qRT-PCR analysis	Csa3M597320
RDR-R	GTGCTGTCAATCCACTTCA		
EF1 α -F	CCAAGGCAAGGTACGATGAAA	qRT-PCR analysis	
EF1 α -R	AGAGATGGGAACGAAGGGGAT		
CsGSH2-F	ATGGGTTCTTCCCATTCTTCAC	PCR clone	Csa1M571280
CsGSH2-R	TCAAGTTAAGTAAATGCTGTCCAAG		
CsGSH2-GF	gtcgacggtatcgataagcttATGGGTTCTTCC CATTCTTCATG	Subcellular localization	Csa1M571280
CsGSH2-GR	tttactcatactagtggatccTCAAGTTAAGTAA ATGCTGTCCAAGA	Subcellular localization	

PCXSN-1250-F	CGGCAACAGGATTCAATCTTA	Transgenic detection
PCXSN-1250-R	CAAGCATTCTACTTCTATTGCAGC	Transgenic detection
