Supplementary

Table 1 Primers used in this study

Name	Sequence (5'-3')
Primers for fragments that connect pet-28a	
pET-*groes*-F	TAAGAAGGAGATATACCATGGGCATGAGACTAAAGCCA
pET-*groes*-R	TGGTGGTGCTCGAGTGCGGCCGCTTATTCGATTATTGCTAG
pET-*groel*- F	GAAGGAGATATACCATGGGCATGGCGAAGATCCTG
pET-*groel*- R	TGGTGGTGCTCGAGTGCGGCCGCTTAGAAGTCCATGTCCCC
pET-*irre*- F	TAAGAAGGAGATATACCATGGCCATGCCCAGTGCCAACGTC
pET-*irre*- R	TGGTGGTGCTCGAGTGCGGCCGCTCACTGTGCAGCGTCCTG
Primers for fragments that connect pBBR1MCS-5	
pBBR-*groes*- F	GGTATCGATAAGCTTTAATACGACTCACTA
pBBR-*groes*- R	AGAACTAGTGGATCCTTATTCGATTATTGC
pBBR-*groel*- F	GGTATCGATAAGCTTTAATACGACTCACTA
pBBR-*groel*- R	AGAACTAGTGGATCCTTAATTAGAAGTCCATGTC
pBBR-*irre*- F	GGTATCGATAAGCTTTAATACGACTCACTA
pBBR-*irre*- R	AGAACTAGTGGATCCTCACTGTGCAGCGTC
Degenerate primers for key enzyme genes of carotenoid synthesis pathway amplification	
crtB-F	ATGCGCTTTCCCGGCCGCGAY
crtB-R	TYAKCGCGCCCGSGTCCASAG
crtG-F	ATGRACRTCGCSCTTGCCWTS
crtG-R	TCAAKCTCCAGCGTCGCCAGY
crtY-F	ATGCGCCGCGCAGYCGTGATC
crtY-R	TCASRCCAWYTCGCCCAGCAT
crtI-F	ATGCCTTCAACCATCAGTTGY
crtI-R	TCAGCGGYTCCAGATCGCRGA

crtZ-F	ATGTCSCYSCYMAMYGSMWTY
crtZ-R	TCAATCCGGGATSGTSRTSSR
Primers for *crtB* deletion	
crtB-*L*-F	TTCCTGCAGCCCGGGGGATCCCACTATGCGCCCACCGACTT
crtB-*L*-R	GCGTCCACAGTCCTGCCGTGACCGTCGGCGATATCGT
crtB-*R*-F	ACGATATCGCCGACGGTCACGGCAGGACTGTGGACGC
crtB-*R*-R	ACCGCGGTGGCGGCCGCTCTAGAGCTGGTGAGCGGCGCTAA
Gm-F	ATGTTACGCAGCAGCAAC
Gm-R	CGAATTGTTAGGTGGCGG
Primers for *irre* insertion	
crtB-*L*-F	TTCCTGCAGCCCGGGGGATCCCACTATGCGCCCACCGACTT
crtB-*L*-R	TAGTGAGTCGTATTAGACCGTCGGCGATATCGT
crtB-*R*-F	CAAGATGCCGCGCAGTGACGGTAGGACTGTGGACGC
crtB-*R*-R	ACCGCGGTGGCGGCCGCTCTAGAGCTGGTGAGCGGCGCTAA
irre-△*crtB*-F	ACGATATCGCCGACGGTCTAATACGACTCACTA
irre-△*crtB*-R	GCGTCCACAGTCCTACCGTCACTGCGCGGCATCTTG

Fig.1 Plasmid construction strategy

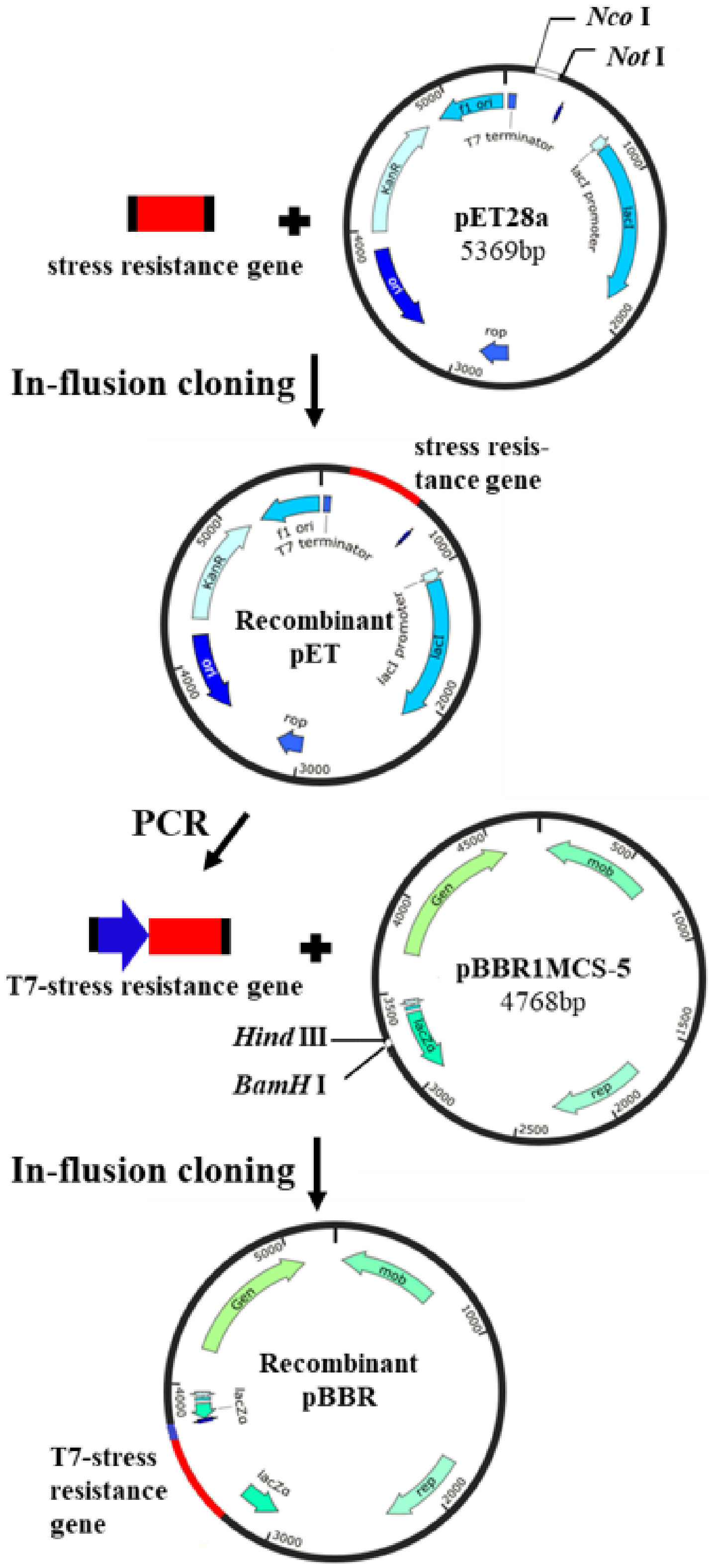


Fig. 2 Gene deletion strategy

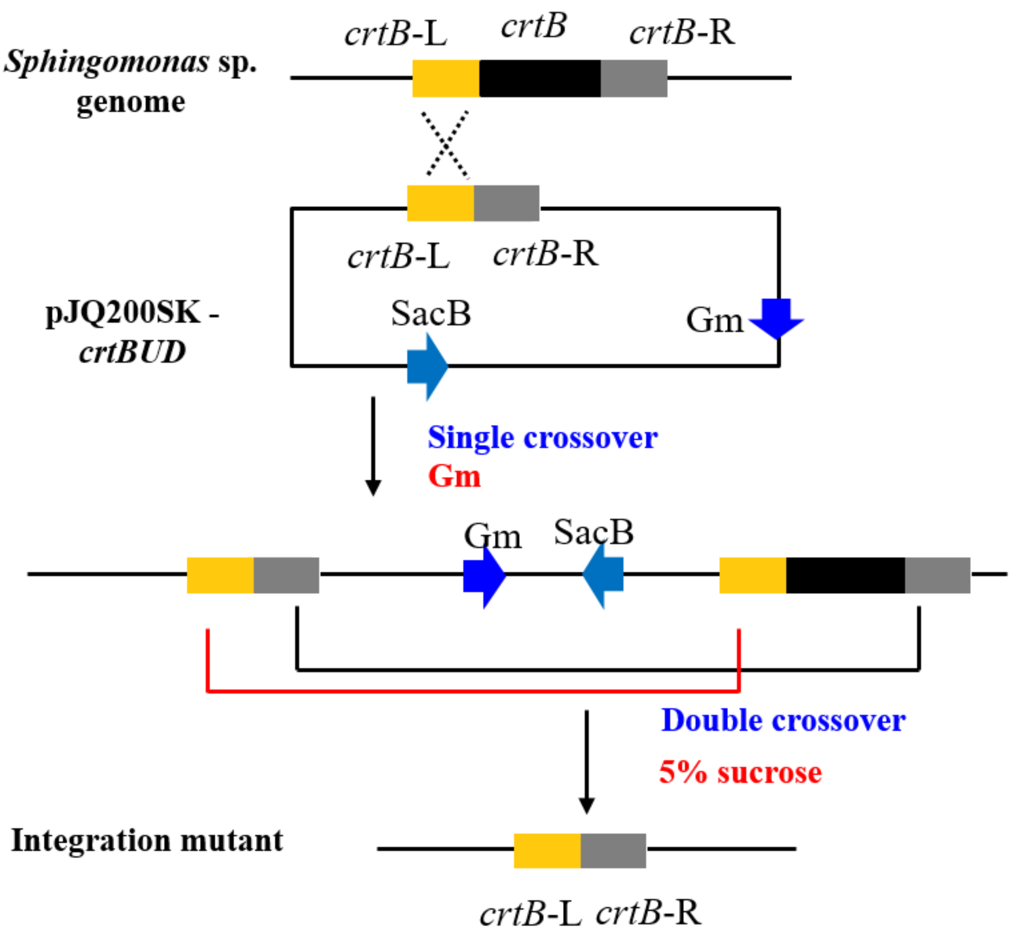
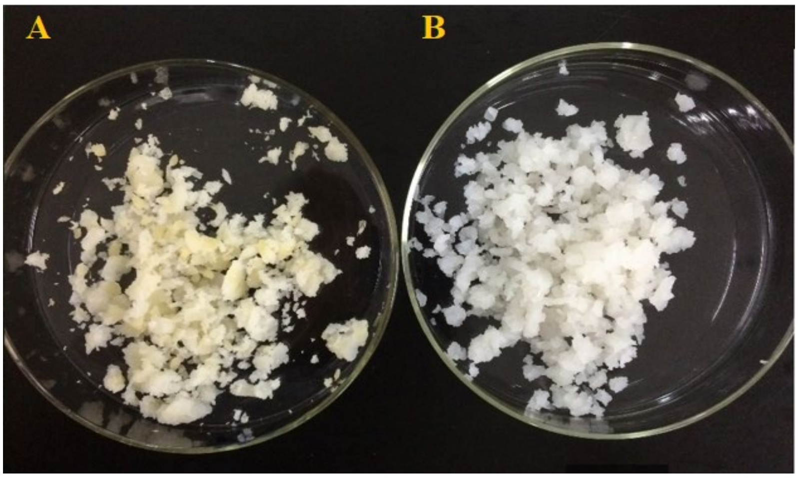


Fig. 3 Effects of *crtB* deletion on product color



A. Product of *S*. sp. NX-3. B. Product of *S*. sp.-*ΔcrtB*.