Supplementary Information (SI) for Green Chemistry.

Supplementary Information

Synthesis and Characterization of 3-Hydroxybutyrate and 3-Hydroxy-9-octadecenoate Copolymer from Engineered *Halomonas*

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Supplementary Tables

Supplementary Table S1: Strains and plasmids used in this study.

Strains/Plasmids	Description	Source/ Literature
Strains		
E. coli S17-1	Harboring the *tra* gene on the chromosome, used for conjugation	[1]
Halomonas bluephagenesis sp. TD01	Wild type isolated from Aydingkol Lake of Xinjiang, China	[2]
H. bluephagenesis sp. TD1.0	Carrying $P_{T7\text{-like}}$ RNA polymerase expression module on *H. bluephagenesis* sp. TD01	[3]
TXY21	TD1.0Δ*phaC*Δ*fadA*	This study
TXY26	TD1.0Δ*phaC*Δ*fadA*Δ*phaZ123*	This study
TXY27	Chromosome insertion of P_{Porin}- *phaC*$_{Ps\text{-}STQKopt}$ in G51 sites of TXY26	This study
TXY28	Chromosome insertion of P_{Porin}- *phaC*$_{Ps\text{-}STQKopt}$ in G49 sites of TXY27	This study
TXY29	Chromosome insertion of $P_{Porin58}$- *phaC*$_{Ps\text{-}STQKopt}$ in GY10 sites of TXY28	This study
TXY30	Chromosome insertion of P_{Porin}- *phaC*$_{Ps\text{-}STQKopt}$ in GY7 sites of TXY29	This study
TXY31	Chromosome insertion of P_{Porin}- *phaC*$_{Ps\text{-}STQKopt}$ in G4 sites of TXY30	This study
TXY32	Chromosome insertion of P_{Porin}- *phaC*$_{Ps\text{-}STQKopt}$ in G7 sites of TXY31	This study
Plasmids		
pSEVA321	An expression vector harboring RK2 replication origin, *ori*T sequence for conjugation in *H. bluephagenesis*, Cm^R	[4]
pSEVA341	High copy number expression vector used for overexpression, pRO1600/ColE1 replication origin, *oriT,* Cm^R	[4]
pQ08	pSEVA321 derivative, expressing *S. pyogenes* cas9, Cm^R	[5]
pSEVA341-*phaC*$_{Ps\text{-}STQK}$	pSEVA341 derivative, expressing *phaC*$_{Ps\text{-}STQK}$ (S325T, Q481K), Spe^R	[6]
pSEVA341-*phaC*$_{Ps}$	pSEVA341 derivative, expressing *phaC*$_{Ps}$, Spe^R	This study
pSEVA341-*phaC*$_{Ps\text{-}STQKopt}$	pSEVA341 derivative, expressing *phaC*$_{Ps\text{-}STQKopt}$, Spe^R	This study
pXY216	pSEVA341 derivative *fadA* knockout, *fadA* sgRNA, homologous arm length 1000 bp, Km^R and Spe^R	This study
pXY266	pSEVA341 derivative *phaZ1* knockout, *phaZ1* sgRNA, homologous arm length 1000 bp, Km^R and Spe^R	This study

pXY269	pSEVA341 derivative *phaZ2* knockout, *phaZ2* sgRNA, homologous arm length 1000 bp, Km^R and Spe^R	This study
pXY272	pSEVA341 derivative *phaZ3* knockout, *phaZ3* sgRNA, homologous arm length 1000 bp, Km^R and Spe^R	This study
pXY354	pSEVA341 derivative, G43 chromosome site sgRNA with integrated $phaC_{Ps\text{-}STQKopt}$, 1000 bp donor, Km^R and Spe^R	This study
pXY355	pSEVA341 derivative, G49 chromosome site sgRNA with integrated $phaC_{Ps\text{-}STQKopt}$, 1000 bp donor, Km^R and Spe^R	This study
pXY356	pSEVA341 derivative, G51 chromosome site sgRNA with integrated $phaC_{Ps\text{-}STQKopt}$, 1000 bp donor, Km^R and Spe^R	This study
pXY357	pSEVA341 derivative, G52 chromosome site sgRNA with integrated $phaC_{Ps\text{-}STQKopt}$, 1000 bp donor, Km^R and Spe^R	This study
pXY358	pSEVA341 derivative, G57 chromosome site sgRNA with integrated $phaC_{Ps\text{-}STQKopt}$, 1000 bp donor, Km^R and Spe^R	This study
pXY359	pSEVA341 derivative, G58 chromosome site sgRNA with integrated $phaC_{Ps\text{-}STQKopt}$, 1000 bp donor, Km^R and Spe^R	This study
pXY360	pSEVA341 derivative, G61 chromosome site sgRNA with integrated $phaC_{Ps\text{-}STQKopt}$, 1000 bp donor, Km^R and Spe^R	This study
pXY361	pSEVA341 derivative, GY2 chromosome site sgRNA with integrated $phaC_{Ps\text{-}STQKopt}$, 1000 bp donor, Km^R and Spe^R	This study
pXY362	pSEVA341 derivative, GY3 chromosome site sgRNA with integrated $phaC_{Ps\text{-}STQKopt}$, 1000 bp donor, Km^R and Spe^R	This study
pXY363	pSEVA341 derivative, GY4 chromosome site sgRNA with integrated $phaC_{Ps\text{-}STQKopt}$, 1000 bp donor, Km^R and Spe^R	This study
pXY364	pSEVA341 derivative, GY7 chromosome site sgRNA with integrated $phaC_{Ps\text{-}STQKopt}$, 1000 bp donor, Km^R and Spe^R	This study
pXY365	pSEVA341 derivative, GY10 chromosome site sgRNA with integrated $phaC_{Ps\text{-}STQKopt}$, 1000 bp donor, Km^R and Spe^R	This study
pXY366	pSEVA341 derivative, GY11 chromosome site sgRNA with integrated $phaC_{Ps\text{-}STQKopt}$, 1000 bp	This study

	donor, Km^R and Spe^R	
pXY367	pSEVA341 derivative, GY12 chromosome site sgRNA with integrated *phaC*$_{\text{Ps-STQKopt}}$, 1000 bp donor, Km^R and Spe^R	This study
pXY368	pSEVA341 derivative, GY13 chromosome site sgRNA with integrated *phaC*$_{\text{Ps-STQKopt}}$, 1000 bp donor, Km^R and Spe^R	This study
pXY369	pSEVA341 derivative, GY14 chromosome site sgRNA with integrated *phaC*$_{\text{Ps-STQKopt}}$, 1000 bp donor, Km^R and Spe^R	This study

Supplementary Table S2: DNA sequences of genes used in the study.

No.	Gene	SEQUENCE	Source
1	*phaC*$_{TD}$	ATGGCGACCGGCAAAGGCGCGGGCAGCTTCCACGCAGGAAGGCAAGTCCCAACCATTCAAGGTCACGCCGGGGCCATTCGATCCAGCCACATGGCTGGAATGGTCCCGC CAGTGGCAGGGCACTGAAGGCAACGGCCACGCGGCCGCGTCCGGCATTCCGGGCCTGGATGCGCTGGCAGGCGTCAAGATCGCGCCGGCGCAGCTGGGTGATATCCAGC AGCGCTACATGAAGGACTTCTCAGCGCTGTGGCAGGCCATGGCCGAGGGCAAGGCCGAGGCCACCGGTCCGCTGCACGACCGGCGCTTCGCCGGCGACGCATGGCGCAC CAACCTCCCATATCGCTTCGCTGCCGCGTTCTACCTGCTCAATGCGCGCGCCTTGACCGAGCTGGCCGATGCCGTCGAGGCCGATGCCAAGACCCGCCAGCGCATCCGCTT CGCGATCTCGCAATGGGTCGATGCGATGTCGCCCGCCAACTTCCTTGCCACCAATCCCGAGGCGCAGCGCCTGCTGATCGAGTCGGGCGGCGAATCGCTGCGTGCCGGCG TGCGCAACATGATGGAAGACCTGACACGCGGCAAGATCTCGCAGACCGACGAGAGCGCGTTTGAGGTCGGCCGCAATGTCGCGGTGACCGAAGGCGCCGTGGTCTTCGA GAACGAGTACTTCCAGCTGTTGCAGTACAAGCCGCTGACCGACAAGGTGCACGCGCGCCCGCTGCTGATGGTGCCGCCGTGCATCAACAAGTACTACATCCTGGACCTGC AGCCGGAGAGCTCGCTGGTGCGCCATGTGGTGGAGCAGGGACATACGGTGTTTCTGGTGTCGTGGCGCAATCCGGACGCCAGCATGGCCGGCAGCACCTGGGACGACTAC ATCGAGCACGCGGCCATCCGCGCCATCGAAGTCGCGCGCGACATCAGCGGCCAGGACAAGATCAACGTGCTCGGCTTCTGCGTGGGCGGCACCATTGTCTCGACCGCGCT GGCGGTGCTGGCCGCGCGGCGAGCACCCGGCCGCCAGCGTCACGCTGCTGACCACGCTGCTGGACTTTGCCGACACGGGCATCCTCGACGTCTTTGTCGACGAGGGCCAT GTGCAGTTGCGCGAGGCCACGCTGGGCGGCGGCGCCGGCGCGCCGTGCGCGCTGCTGCGCGGCCTTGAGCTGGCCAATACCTTCTCGTTCTTGCGCCCGAACGACCTGGT GTGGAACTACGTGGTCGACAACTACCTGAAGGGCAACACGCCGGTGCCGTTCGACCTGCTGTTCTGGAACGGCGACGCCACCAACCTGCCGGGGCGTGGTACTGCTGGTA CCTGCGCCACACCTACCTGCAGAACGAGCTCAAGGTACCGGGCAAGCTGACCGTGTGCGGCGTGCCGGTGGACCTGGCCAGCATCGACGTGCCGACCTATATCTACGGCT CGCGCGAAGACCATATCGTGCCGTGGACCGCGGCCTATGCCTCGACCGCGCTGCTGGCGAACAAGCTGCGCTTCGTGCTGGGTGCGTCGGGCCATATCGCCGGTGTGATC AACCCGCCGGCCAAGAACAAGCGCAGCCACTGGACTAACGATGCGCTGCCGGAGTCGCCGCAGCAATGGCTGGCCGGCGCCATCGAGCATCACGGCAGCTGGTGGCCGG ACTGGACCGCATGGCTGGCCGGGCAGGCCGGCGCGAAACGCGCCGCGCCCGCCAACTATGGCAATGCGCGCTATCGCGCAATCGAACCCGCGCCTGGGC GATACGTCA AAGCCAAGG CATGA	*Halomonas bluephagenesis*
2	*phaC*$_{Ps}$	ATGAGTAACAAGAATAGCGATGACTTGAATCGTCAAGCCTCGGAAAACACCTTGGGGCTTAACCCTGTCATCGGCCTGCGTGGAAAAGATCTGCTGACTTCTGCCCGAAT GGTTTTAACCCAAGCCATCAAACAACCCATTCACAGCGTCAAGCACGTCGCGCATTTTGGCATCGAGCTGAAGAACGTGATGTTTGGCAAATCGAAGCTGCAACCGGAAA GCGATGACCGTCGTTTCAACGACCCCGCCTGGAGTCAGAACCCACTCTACAAACGTTATCTACAAACCTACCTGGCGTGGCGCAAGGAACTCCACGACTGGATCGGCAAC AGCAAACTGTCCGAACAGGACATCAATCGCGCTCACTTCGTGATCACCCTGATGACCGAAGCCATGGCCCCGACCAACAGTGCGGCCAATCCGGCGGCGGTCAAACGCTT CTTCGAAACCGGCGGTAAAAGCCTGCTCGACGGCCTCACACATCTGGCCAAGGACCTGGTAAACAACGGCGGCATGCCGAGCCAGGTGGACATGGGCGCTTTCGAAGTCG GCAAGAGTCTGGGGACGACTGAAGGTGCAGTGGTTTTCCGCAACGACGTCCTCGAATTGATCCAGTACCGGCCGACCACCGAACAGGTGCATGAGCGACCGCTGCTGGTG GTCCCACCGCAGATCAACAAGTTTTATGTGTTTGACCTGAGCCCGGATAAAAGCCTGGCGCGCTTCTGCCTGAGCAACAACCAGCAAACCTTTATCGTCAGCTGGCGCAAC	*Pseudomonas* sp. 61-3

		CCGACCAAGGCCCAGCGTGAGTGGGGTCTGTCGACTTACATCGATGCGCTCAAAGAAGCCGTCGACGTAGTTTCCGCCATCACCGGCAGCAAAGACATCAACATGCTCGG CGCCTGCTCCGGTGGCATTACCTGCACCGCGCTGCTGGGTCACTACGCCGCTCTCGGCGAGAAGAAGGTCAATGCCCTGACCCTTTTGGTCAGCGTGCTCGACACCACCCT CGACTCCCAGGTTGCACTGTTCGTCGATGAGAAAACCCTGGAAGCTGCCAAGCGTCACTCGTATCAGGCCGGCGTGCTGGAAGGCCGCGACATGGCCAAAGTCTTCGCCT GGATGCGCCCTAACGACCTGATCTGGAACTACTGGGTCAACAACTACCTGCTGGGTAACGAGCCACCGGTCTTCGACATTCTTTTCTGGAACAACGACACCACCCGGTTGC CTGCTGCGTTCCACGGCGATCTGATCGAAATGTTCAAAAATAACCCACTGGTGCGCGCCAATGCACTCGAAGTGAGCGGCACGCCGATCGACCTCAAACAGGTCACTGCC GACATCTACTCCCTGGCCGGCACCAACGATCACATCACGCCCTGGAAGTCTTGCTACAAGTCGGCGCAACTGTTCGGTGGCAAGGTCGAATTCGTGCTGTCCAGCAGTGGG CATATCCAGAGCATTCTGAACCCGCCGGGCAATCCGAAATCACGTTACATGACCAGCACCGACATGCCAGCCACCGCCAACGAGTGGCAAGAAAACTCAACCAAGCACA CCGACTCCTGGTGGCTGCACTGGCAGGCCTGGCAGGCCGAGCGCTCGGGCAAACTGAAAAAGTCCCCGACCAGCCTGGGCAACAAGGCCTATCCGTCAGGAGAAGCCGC GCCGGGCACGTATGTGCATGAACGTTAA	
3	*phaC*$_{\text{Ps-STQK}}$	ATGAGTAACAAGAATAGCGATGACTTGAATCGTCAAGCCTCGGAAAACACCTTGGGGCTTAACCCTGTCATCGGCCTGCGTGGAAAAGATCTGCTGACTTCTGCCCGAAT GGTTTTAACCCAAGCCATCAAACAACCCATTCACAGCGTCAAGCACGTCGCGCATTTTGGCATCGAGCTGAAGAACGTGATGTTTGGCAAATCGAAGCTGCAACCGGAAA GCGATGACCGTCGTTTCAACGACCCCGCCTGGAGTCAGAACCCACTCTACAAACGTTATCTACAAACCTACCTGGCGTGGCGCAAGGAACTCCACGACTGGATCGGCAAC AGCAAACTGTCCGAACAGGACATCAATCGCGCTCACTTCGTGATCACCCTGATGACCGAAGCCATGGCCCCGACCAACAGTGCGGCCAATCCGGCGGCGGTCAAACGCTT CTTCGAAACCGGCGGTAAAAGCCTGCTCGACGGCCTCACACATCTGGCCAAGGACCTGGTAAACAACGGCGGCATGCCGAGCCAGGTGGACATGGGCGCTTTCGAAGTCG GCAAGAGTCTGGGGACGACTGAAGGTGCAGTGGTTTTCCGCAACGACGTCCTCGAATTGATCCAGTACCGGCCGACCACCGAACAGGTGCATGAGCGACCGCTGCTGGTG GTCCCACCGCAGATCAACAAGTTTTATGTGTTTGACCTGAGCCCGGATAAAAGCCTGGCGCGCTTCTGCCTGAGCAACAACCAGCAAACCTTTATCGTCAGCTGGCGCAAC CCGACCAAGGCCCAGCGTGAGTGGGGTCTGTCGACTTACATCGATGCGCTCAAAGAAGCCGTCGACGTAGTTTCCGCCATCACCGGCAGCAAAGACATCAACATGCTCGG CGCCTGCTCCGGTGGCATTACCTGCACCGCGCTGCTGGGTCACTACGCCGCTCTCGGCGAGAAGAAGGTCAATGCCCTGACCCTTTTGGTCACCGTGCTCGACACCACCCT CGACTCCCAGGTTGCACTGTTCGTCGATGAGAAAACCCTGGAAGCTGCCAAGCGTCACTCGTATCAGGCCGGCGTGCTGGAAGGCCGCGACATGGCCAAAGTCTTCGCCT GGATGCGCCCTAACGACCTGATCTGGAACTACTGGGTCAACAACTACCTGCTGGGTAACGAGCCACCGGTCTTCGACATTCTTTTCTGGAACAACGACACCACCCGGTTGC CTGCTGCGTTCCACGGCGATCTGATCGAAATGTTCAAAAATAACCCACTGGTGCGCGCCAATGCACTCGAAGTGAGCGGCACGCCGATCGACCTCAAACAGGTCACTGCC GACATCTACTCCCTGGCCGGCACCAACGATCACATCACGCCCTGGAAGTCTTGCTACAAGTCGGCGCAACTGTTCGGTGGCAAGGTCGAATTCGTGCTGTCCAGCAGTGGG CATATCAAGAGCATTCTGAACCCGCCGGGCAATCCGAAATCACGTTACATGACCAGCACCGACATGCCAGCCACCGCCAACGAGTGGCAAGAAAACTCAACCAAGCACA CCGACTCCTGGTGGCTGCACTGGCAGGCCTGGCAGGCCGAGCGCTCGGGCAAACTGAAAAAGTCCCCGACCAGCCTGGGCAACAAGGCCTATCCGTCAGGAGAAGCCGC GCCGGGCACGTATGTGCATGAACGTTAA	*Pseudomonas* sp. 61-3
4	*phaC*$_{\text{Ps-}}$	ATGAGCAACAAAAACAGCGACGACCTGAATCGTCAGGCCAGCGAAAATACTCTGGGCCTGAACCCGGTGATTGGCCTGCGTGGCAAAGATCTGCTGACTAGCGCCCGTAT	*Pseudomonas*

	STQKopt	GGTTCTTACCCAGGCCATCAAACAGCCGATCCACAGCGTTAAACACGTGGCCCACTTCGGCATCGAACTGAAAAACGTGATGTTCGGCAAAAGCAAACTGCAGCCGGAAA GCGATGACCGCCGCTTTAATGATCCGGCCTGGAGCCAAAACCCGCTGTACAAACGCTACCTGCAGACCTATCTGGCCTGGCGCAAAGAACTGCACGACTGGATCGGCAAC AGCAAACTGAGCGAACAGGACATTAACCGCGCCCACTTCGTGATTACCCTGATGACCGAAGCCATGGCCCCGACTAATAGCGCTGCCAATCCGGCTGCCGTGAAACGTTT CTTCGAAACCGGCGGCAAAAGCTTACTGGACGGCCTTACTCATCTGGCCAAAGACCTGGTGAACAACGGTGGTATGCCGAGCCAAGTTGACATGGGCGCCTTCGAAGTGG GTAAAAGCCTGGGCACCACTGAAGGTGCTGTGGTGTTCCGTAATGACGTGCTGGAACTGATTCAGTACCGCCCGACTACCGAACAAGTGCACGAACGTCCGCTGCTTGTT GTTCCTCCGCAGATCAACAAATTCTACGTGTTCGACCTGAGCCCGGATAAAAGCCTGGCCCGTTTCTGCCTGAGCAACAACCAGCAGACCTTCATCGTGAGCTGGCGCAAT CCGACTAAAGCCCAGCGTGAATGGGGCCTGAGCACTTATATCGACGCCCTGAAAGAAGCCGTGGACGTGGTTAGCGCCATCACCGGCAGCAAAGACATCAACATGCTGG GCGCCTGTTCTGGTGGTATCACCTGTACTGCCCTGCTGGGTCATTATGCTGCCCTGGGCGAAAAAAAAGTGAACGCCCTGACCCTGCTGGTTACTGTGCTGGACACCACTC TGGATAGCCAGGTGGCTCTGTTCGTGGACGAAAAAACCCTGGAAGCCGCCAAACGCCATAGCTATCAGGCCGGCGTTCTGGAAGGTCGCGACATGGCCAAAGTGTTCGCC TGGATGCGCCCGAATGACCTGATCTGGAACTACTGGGTGAACAACTACCTGCTGGGCAACGAACCGCCGGTTTTCGACATCCTGTTCTGGAACAACGACACCACTCGTCTT CCGGCCGCCTTTCATGGTGACCTGATCGAAATGTTCAAAAACAACCCGCTGGTTCGTGCCAATGCCCTGGAAGTTAGCGGCACTCCGATCGACCTGAAACAAGTGACCGC CGACATTTATTCTCTGGCCGGCACCAACGATCATATCACCCCGTGGAAAAGCTGCTACAAAAGCGCCCAGCTGTTCGGTGGCAAAGTGGAATTCGTGCTGAGCAGCAGCG GCCACATCAAAAGCATCCTGAACCCGCCGGGTAATCCGAAAAGCCGCTACATGACCAGCACTGACATGCCTGCGACTGCCAACGAATGGCAGGAAAACAGCACCAAACA CACCGACAGCTGGTGGCTGCATTGGCAAGCCTGGCAAGCTGAACGTAGCGGCAAACTGAAAAAAAGCCCGACCAGCCTGGGCAATAAAGCCTATCCGAGCGGTGAAGCT GCTCCGGGTACTTATGTGCACGAACGCTAA	sp. 61-3 codon optimized
5	*phaC*$_{1437}$	ATGAGTAACAAGAGTAACGATGAGTTGAAGTATCAAGCCTCTGAAAACACCTTGGGGCTTAATCCTGTCGTTGGGCTGCGTGGAAAGGATCTACTGGCTTCTGCTCGAAT GGTGCTTAGGCAGGCCATCAAGCAACCGGTGCACAGCGTCAAACATGTCGCGCACTTTGGTCTTGAACTCAAGAACGTACTGCTGGGTAAATCCGGGCTGCAACCGACCA GCGATGACCGTCGCTTCGCCGATCCGGCCTGGAGCCAGAACCCGCTCTATAAACGTTATTTGCAAACCTACCTGGCGTGGCGCAAGGAACTCCACGACTGGATCGATGAA AGTAACCTCGCCCCCAAGGATGTGGCGCGTGGGCACTTCGTGATCAACCTCATGACCGATGCCATGGCGCCGACCAACACCGCGGCCAACCCGGCGGCAGTCAAACGCTT TTTCGAAACCGGTGGCAAAAGCCTGCTCGACGGCCTCTCGCACCTGGCCAAGGATCTGGTACACAACGGCGGCATGCCGAGCCAGGTCAACATGGGTGCATTCGAGGTCG GCAAGAGCCTGGGCGTGACCGAAGGCGCGGTGGTGTTTCGCAACGATGTGCTGGAACTGATCCAGTACAAGCCGACCACCGAGCAGGTATACGAACGCCCGCTGCTGGT GGTGCCGCCGCAGATCAACAAGTTCTACGTTTTCGACCTGAGCCCGGACAAGAGCCTGGCGCGGTTCTGCCTGCGCAACAACGTGCAAACGTTCATCGTCAGCTGGCGAA ATCCCACCAAGGAACAGCGAGAGTGGGGCCTGTCGACCTACATCGAAGCCCTCAAGGAAGCGGTTGACGTCGTTACCGCGATCACCGGCAGCAAAGACGTGAACATGCT CGGGGCCTGCTCCGGCGGCATCACTTGCACTGCGCTGCTGGGCCATTACGCGGCGATTGGCGAAAACAAGGTCAACGCCCTGACCTTGCTGGTGACCGTGCTTGATACCAC CCTCGACAGCGACGTCGCCCTGTTCGTCAATGAACAGACCCTTGAAGCCGCCAAGCGCCACTCGTACCAGGCCGGCGTACTGGAAGGCCGCGACATGGCGAAGGTCTTCG CCTGGATGCGCCCCAACGATCTGATCTGGAACTACTGGGTCAACAATTACCTGCTAGGCAACGAACCGCCGGTGTTCGACATCCTGTTCTGGAACAACGACACCACACGG	*Pseudomonas* sp. 6-19

		TTGCCCGCGGCGTTCCACGGCGACCTGGTCGAACTGTTCAAAAATAACCCACTGATTCGCCCGAATGCACTGGAAGTGTGCGGCACCCCCATCGACCTCAAGCAGGTGAC GGCCGACATCTTTTCCCTGGCCGGCACCAACGACCACATCACCCCGTGGAAGTCCTGCTACAAGTCGGCGCAACTGTTTGGCGGCAACGTTGAATTCGTGCTGTCGAGCGG CGGGCATATCAAGAGCATCCTGAACCCGCCGGGCAATCCGAAATCGCGCTACATGACCAGCACCGAAGTGGCGGAAAATGCCGATGAATGGCAAGCGAATGCCACCAAG CATACAGATTCCTGGTGGCTGCACTGGCAGGCCTGGCAGGCCCAACGCTCGGGCGAGCTGAAAAAGTCCCCGACAAAACTGGGCAGCAAGGCGTATCCGGCAGGTGAAG CGGCGCCAGGCACGTACGTGCACGAACGGTAA	
6	*phaC1*$_{1317}$	ATGAGTGACAAGAACAACGAAGACCTGAAACGCCAGGCCTCGGAGAACACCCTGGGACTCAACCCGGTGATCGGCATCCGCGGCAAGGATCTCCTGACCTCTGCCCGCA TGGTGCTCGCCCAGGCACTCAAGCAACCCTTCCACAGTGCCAAGCACGTTGCCCACTTCGGTCTGGAGCTGAAGAACGTCGTGTTCGGCCAGTCCGAACTCAAACCCGAG GACGGCGACCGCCGCTTCGCCGATCCAGCCTGGAGCCAGAACCCGCTGTACCGCCGCTACCTGCAGACCTACCTGGCCTGGCGCAAGGAGCTGCACGACTGGATCGAGCA CAGCTCGCTGTCCGAGCAGGACGCCAGCCGCGGCCATTTCGTGATCAACCTGATGACCGAGGCCATGGCACCAAGCAACAGCATGGCCAACCCGGCCGCGGTCAAACGCT TCTTCGAGACCGGCGGCAAGAGCCTGCTCGACGGCATGTCGCACCTGGCCAAGGACATGATCAACAACGGCGGCATGCCCAGCCAGGTCAACATGGCCGCCTTCGAAGTA GGCAAGAACCTGGCCACCACCGAGGGCGCCGTGGTTTTCCGCAACGACGTGCTGGAGCTGATCCAGTACAAGCCGATCACCGAGAGCGTGCACGAGCGCCCGCTGCTGGT GGTGCCGCCGCAGATCAACAAGTTCTACGTGTTCGACCTGTCGCCGGACAAGAGCCTGGCGCGCTTCCTGCTGCGCAGCCAGGTGCAGACCTTCGTGGTCAGCTGGCGCA ACCCGACCAAGGCGCAGCGCGAGTGGGGCCTGTCCACCTATATCGCGGCGCTCAAGGAAGCCATCGAGGTCATCTGCGCCATCACCGGCAGCAAGGACGTCAACATGCTC GGCGCCTGCTCCGGCGGCCTGACCACCGCCTCCCTGCTCGGCCACTACGCCGCCCTCGGCGAGCAGAAGGTGCATGCCCTGACCCTGCTGGTCAGCGTGCTCGACACCCAG CTCGACACCCAGGTGGCGCTGTTCGCCGACGAGAAGACCCTCGAGGCCGCCAAGCGCCGTTCCTACCAGGCCGGCGTGCTGGAAGGCAGCGACATGGCCAAGGTGTTCGC CTGGATGCGCCCGAATGACCTGATCTGGAACTACTGGGTCAACAACTACCTGCTCGGCAACGAGCCGCCGGTGTTCGACATCCTCTACTGGAACAACGACACCACGCGCC TGCCGGCCGCCCTGCACGGCGAGTTCATCGAGATGTTCCAGACCAACCCGCTGACCCGCCCGGGCGCGCTGGAGGTCTGCGGCACGCCGATCGACCTCAAGCAGGTCACC TGCGACTTCTTCTGCGTCGCCGGCACCACCGACCACATCACGCCCTGGGATTCCTGCTACAAGTCGGCCCACCTGTTCGGCGGCAAGTGCGAGTTCGTGCTGTCCAACAGC GGCCATATCCAGAGCATCCTCAACCCGCCGGGCAACCCCAAGGCGCGCTACATGACCAACAGCGAGATGCCGGCCGACCCCAAGGCCTGGCAGGAAAGCTCGACCAAGC ACGCCGACTCCTGGTGGCTGCACTGGCAGAGCTGGCTGGCCGAGCGCTCGGGCAAGACCAAGAACGCGCCCACCGCCCTGGGCAACAAGAAATTCCCGGCCGGCGAGGC CGCCCCGGGCACCTATGTGCACGAACGCTGA	*Pseudomonas stutzeri* 1317
7	*phaC2*$_{1317}$	ATGCGAGACAAGCCCAATAGCGGCGCCCTGCCCACGCCTGCCACCTTCATGAACGCCCAGAGCGCCGTGGTCGGCGTGCGCGGCCGCGACCTGCTCTCCACCGTGCGCCT GCTCGCCGTGCAGGGGCTCAAGCATCCCGTGCGCAGCAGCCGCCATCTGCTCGCCTTCGGCGGCCAGCTCGGCCGCGTACTGCTCGGCGACACCCTGCACAAGACCAACC CGCAGGATGCCCGCTTCGCCGATCCCACCTGGCAGCTCAACCCCTTCTACCGGCGCAGCTTGCAGGCCTATCTGGCCTGGCAGAAGCAACTGGGTGCCTGGATCGACGAC AGCGAGCTGTCGGCCGACGACCGCGCCCGCGCGCGCTTTCTCGCGGCGATCCTCAGCGACGCCCTGGCGCCGTCCAACAGCCTGCTCAACCCGCTGGCGCTCAAGGAGCT GTTCAACAGTGGCGGCAGCAGCCTGTTCAAGGGCATGCGCCATCTGCTCGACGACCTGCTGCACAACGACGGCCTGCCCAGCCAGGTGAGCAAGCACGCCTTCGAAGTCG	*Pseudomonas stutzeri* 1317

		GCCGCAACCTAGCCTGCACCCCAGGTGCCGTGGTGTTTCGCAACGAGCTGCTGGAGCTGATCCAGTACCGGCCGATGAGCGAGAAACAGTACGTCAGGCCGCTGCTGATC GTGCCGCCACAGATCAACAAGTACTACATCTTCGATCTGTCCAACGACAAGAGCTTCGTCCAGTACGCCCTGAAGAACGGCTTGCAGACCTTCATGATCAGCTGGCGCAA CCCGGACGCGCGGCACCGCGAGTGGGGTCTGTCGAGCTACGTGCAGGCGGTCGAGCAGGCCGTCGACGCCTGCCGCGCGATCACCGGCAGCAAAGACGTCAACCTGCTC GGCGCCTGCGCCGGTGGCCTGACCATCGCCGCCCTGCAGGGCCACCTGCAGGCCAAGCGGCAGTTGCGCAAGGTGGCCAGCGCCACCTACATGGTCAGCCTGCTGGACAG CCAGATCGATAGCCCGGCCATGCTGTTCGCCGACGAGCAGACCCTGGAGTCGGCCAAGCGCCGCTCCTACCAGCGCGGCGTGCTGGACGGCCGCGACATGGCCAAGGTGT TCGCCTGGATGCGTCCCAATGACCTGATCTGGAACTACTGGGTCAACAACTACCTGCTCGGCAAGCAGCCGCCGGCCTTCGACATCCTCTACTGGAACAACGACAACGCCC GCCTGCCGGCCGCTCTGCACGGCGACCTGATCGACTTCTTCAAGCACAACCCACTCAGCCGCGCCGGCGGCCTCGAGGTCTGCGGCACCCCGGTGGACTTGAGCAAGGTC GCGGTGGACAGCTTCAGCGTGGCCGGCATCAACGACCACATCACCCCCTGGGACGCGGTGTACCGCTCGGCCCTGCTGCTCGGCGGCGAACGCCGCTTCATCCTGTCCAA CAGCGGACATATCCAGAGCATCCTCAACCCGCCAGGCAACCCCAAGGCCAACTACTACGAGAACGGCAAGCTGACCTCGGATCCGCGCGCCTGGTACCACGACGCCCGG CGCGTGCAGGGCAGCTGGTGGCCGCAGTGGCTGGAATGGATTCAGGCACGCTCCGGCGAGCAGCGCGAAACCCTGCTGGCACTGGGCGACCAGAAGCATCCGCCGCAGG AGGCCGCGCCCGGCACCTACGTGCATATCCGCTGA	
8	*$phaC_{Bc}$*	ATGACTACATTCGCAACAGAATGGGAAAAGCAATTAGAGCTATACCCAGAAGAGTACCGAAAAGCATACCGCCGAGTGAAAAGGGCGAGTGAAATTTTATTATGTGAAC CAGAGCCGCAAGTAGGATTAACGCCGAAAGAGGTTATTTGGACGAAGAATAAGACGAAGCTTTATCGCTACATTCCAAAACAAGAAAAAACACAAAGAGTTCCAATTCT GTTAATATATGCTCTTATCAATAAACCATATATTATGGATTTAACTCCTGGAAATAGTTTAGTGGAATATCTAGTGGATCGTGGTTTTGATGTGTATATGCTTGATTGGGGC ACATTTGGTTTAGAAGATAGTCATTTGAAATTTGATGATTTCGTGTTTGATTATATTGCAAAAGCAGTAAAAAAAGTAATGCGAACTGCAAAATCGGACGAGATTTCTTTA CTTGGTTATTGCATGGGTGGAACGCTAACTTCTATTTATGCAGCACTTCATCCGCACATGCCAATTCGTAATTTAATTTTCATGACAAGTCCTTTTGATTTCTCTGAAACAGG ATTGTATGGTCCTTTGTTAGATGAGAAATACTTCAATTTAGATAAAGCGGTTGATACATTTGGAAATATTCCGCCAGAAATGATTGATTTCGGAAACAAAATGTTAAAACC AATTACGAACTTTGTCGGTCCATATGTTGCTTTAGTAGATCGTTCAGAGAATGAGCGCTTCGTCGAAAGCTGGAGATTGGTTCAAAAGTGGGTTGGTGATGGTATTCCGTT CCCAGGTGAATCATACAGACAGTGGATTCGTGATTTTTATCAAAATAATAAACTGGTTAAGGGTGAACTCGTTATTCGCGGACAAAAGGTAGACCTTGCAAATATTAAGG CGAATGTCTTAAATATTTCCGGGAAACGTGATCATATTGCTTTGCCATGTCAAGTAGAAGCATTACTAGACCATATTTCTAGCACAGATAAACAATATGTATGTTTACCGA CAGGGCATATGTCTATCGTTTACGGTGGAACAGCTGTAAAACAAACATATCCGACGATTGGAAATTGGCTTGAAGAGCGTTCTAATTAA	*Bacillus cereus* strain MLY1
9	*$phaC_{4AK4}$*	ATGAGCCAACCATCTTATGGCCCGCTGTTCGAGGCCCTGGCCCACTACAATGACAAGCTGCTGGCCATGGCCAAGGCCCAGACAGAGCGCACCGCCCAGGCGCTGCTGCA GACCAATCTGGACGATCTGGGCCAGGTGCTGGAGCAGGGCAGCCAGCAGCCCTGGCAGCTGATCCAGGCCCAGATGAACTGGTGGCAGGATCAGCTCAAGCTGATGCAG CACACCCTGCTGAAAAGCGCAGGCCAGCAGAGCGAGCCGGTGATCACCCCGGAGCGCAGCGATCGCCGCTTCAAGGCCGAGGCCTGGAGCGAACAACCCATCTATGACT ACCTCAAGCAGTCCTACCTGCTCACCGCCAGGCACCTGCTGGCCTCGGTGGATGCCCTGGACGGCGTCCCCCAGAAGAGCCGGGAGCGGCTGCGTTTCTTCACCCGTCAGT ACGTCAACGCCATGGCACCCAGCAACTTCCTGGCCACCAACCCGGAGCTGCTCAAGCTCACCCTGGAGTCCGACGGCCAGAACCTGGTGCGCGGGCTGGCCCTCTTGGCC	*Aeromonas hydrophila* 4AK4

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Supplementary Table S3: Genes related to *β*-oxidation in *H. bluephagenesis*.

Genes	**Sequence ID**	**Description**
fadA	TD01_03183	3-ketoacyl-CoA thiolase
phaA1	TD01_01557	beta-ketoadipyl CoA thiolase
phaA2	TD01_02102	acetyl-CoA acetyltransferase
phaA3	TD01_02197	acetyl-CoA acetyltransferase
phaA4	TD01_03154	acetyl-CoA acetyltransferase
phaA5	TD01_03174	acetyl-CoA acetyltransferase
fadB	TD01_03182	multifunctional fatty acid oxidation complex subunit alpha
ech1	TD01_00231	enoyl-CoA hydratase
ech2	TD01_00241	enoyl-CoA hydratase
ech3	TD01_01124	enoyl-CoA hydratase
ech4	TD01_01554	enoyl-CoA hydratase
ech5	TD01_01647	enoyl-CoA hydratase
ech6	TD01_02403	enoyl-CoA hydratase
ech7	TD01_02830	enoyl-CoA hydratase
dcaE	TD01_01553	2,3-dehydroadipyl-CoA hydratase
0120	TD01_00120	succinate-semialdehyde dehydrogenase
0462	TD01_00462	3-hydroxybutyryl-CoA dehydrogenase
1315	TD01_01315	aldehyde dehydrogenase
1555	TD01_01555	3-hydroxyacyl-CoA dehydrogenase
1564	TD01_01564	enoyl-CoA hydratase
2829	TD01_02829	3-hydroxybutyryl-CoA dehydrogenase

Supplementary Figures

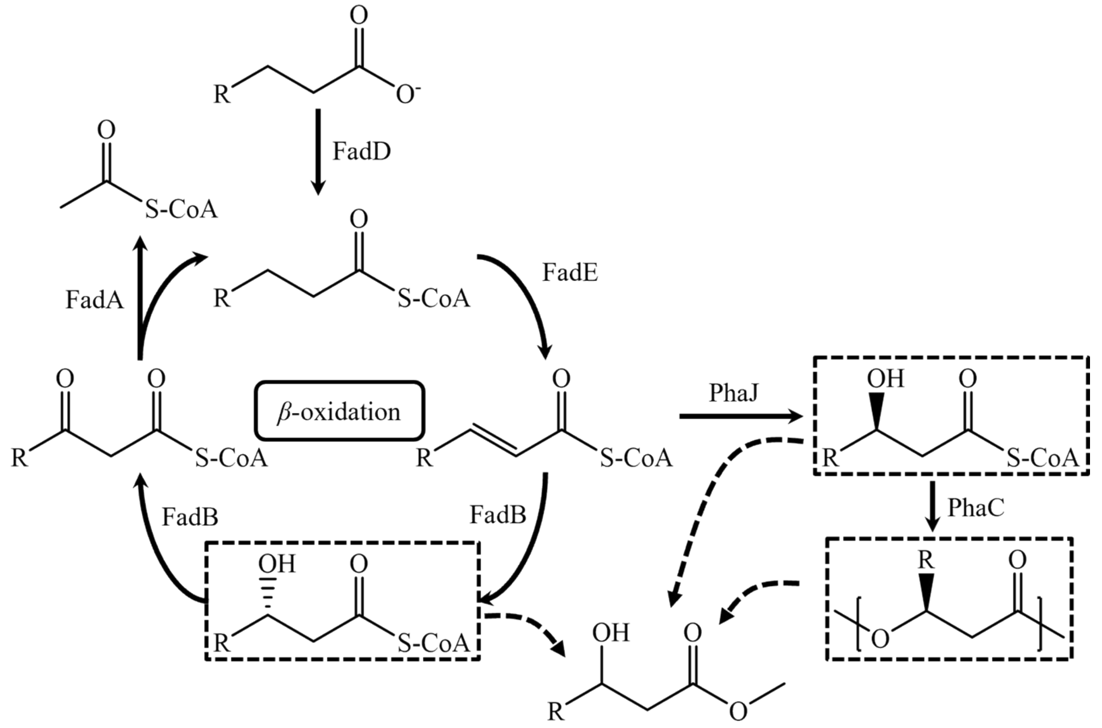

Fig. S1 Three possible sources of detected products

The substances in the dashed box may transform into the same product after methylation.

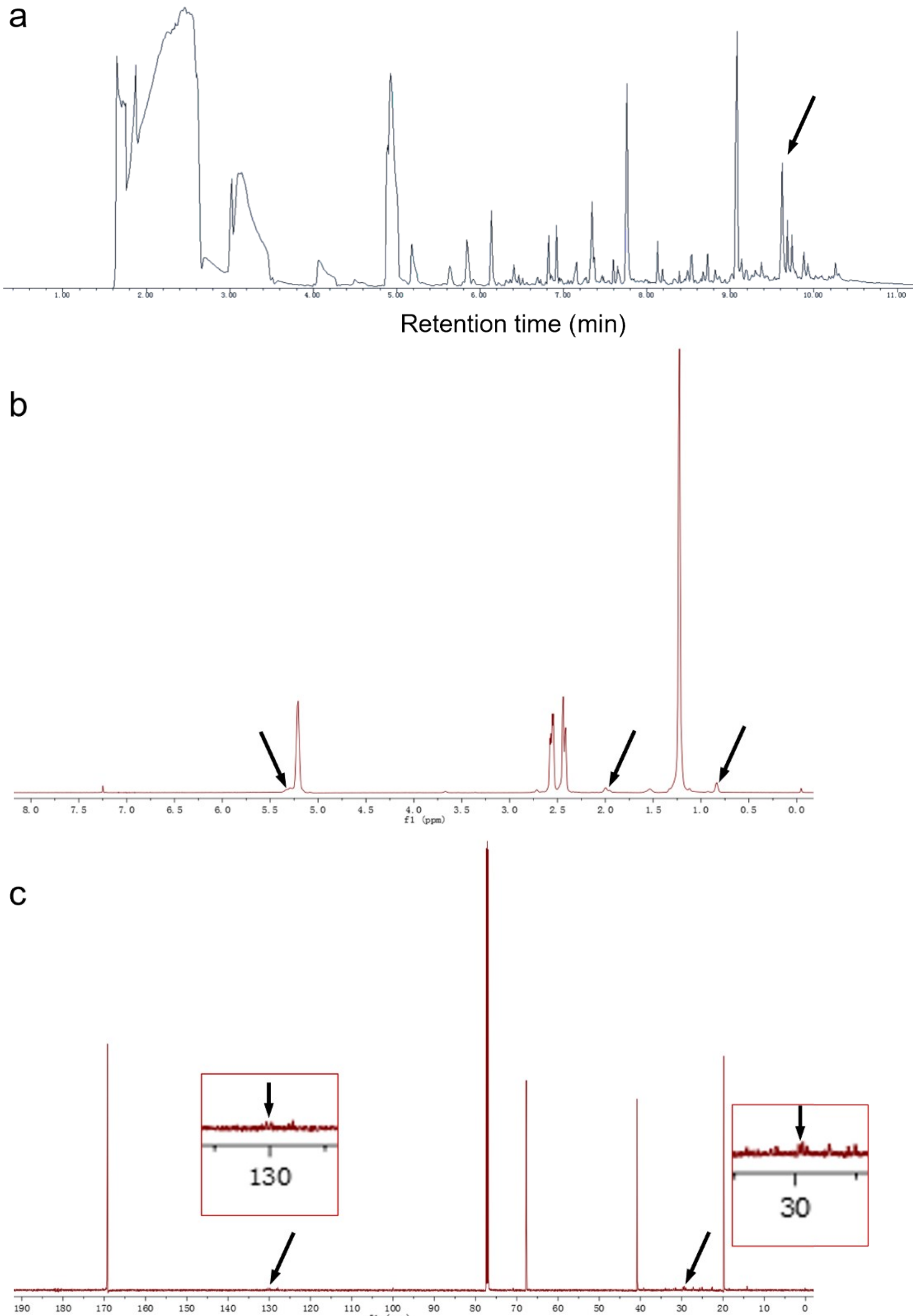

Fig. S2 Analysis of purified PHA material.

(a) GC-MS study of PHA material. (b) ^{1}H NMR study of the PHA material. (c) ^{13}C NMR study of the material. The arrows represent the characteristic peaks of P3H9Od.

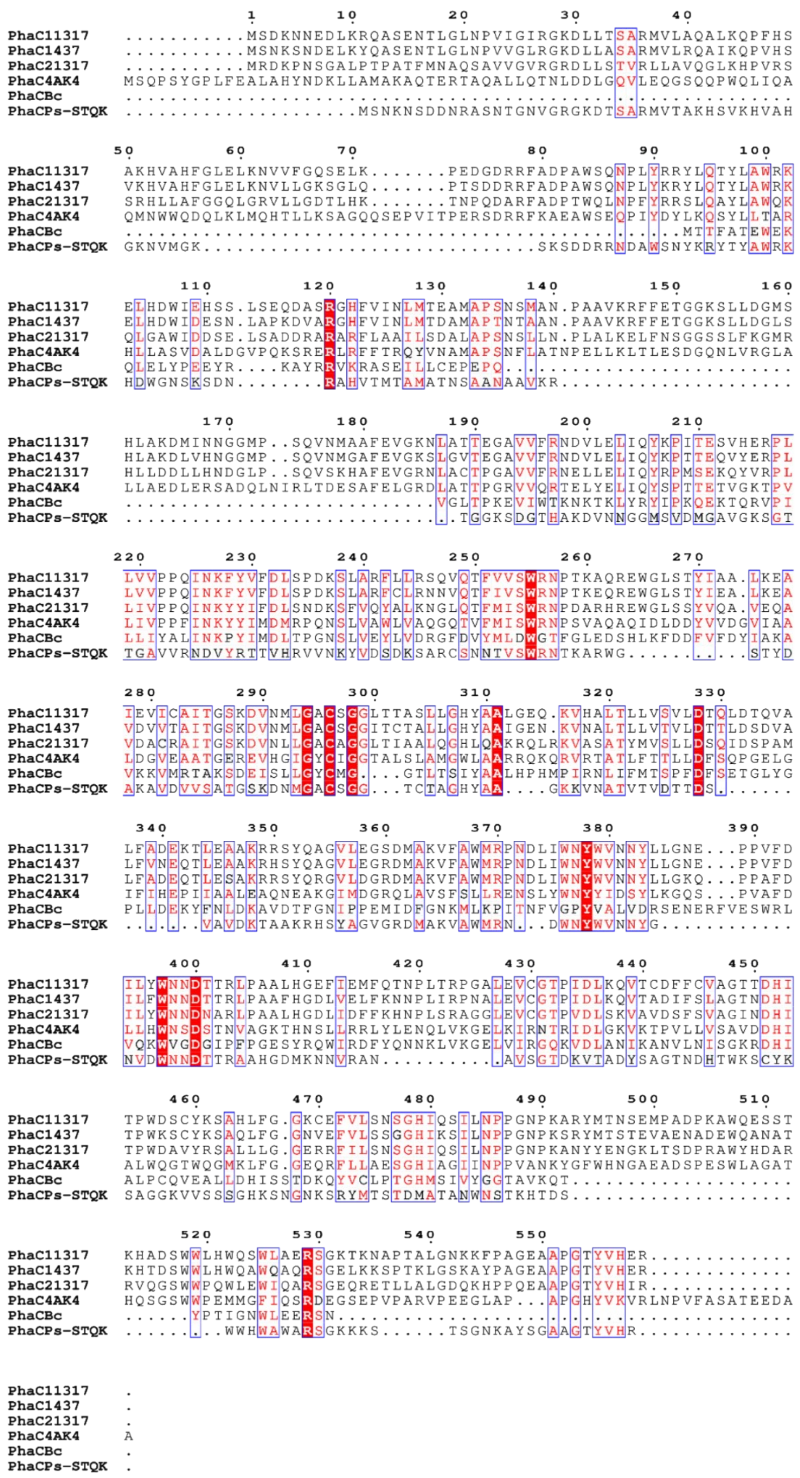

Fig. S3 The protein sequences and homology of six PhaCs selected.

Amino acids with red highlights and white text are identical amino acids, and those in red text are amino acids with similar properties.

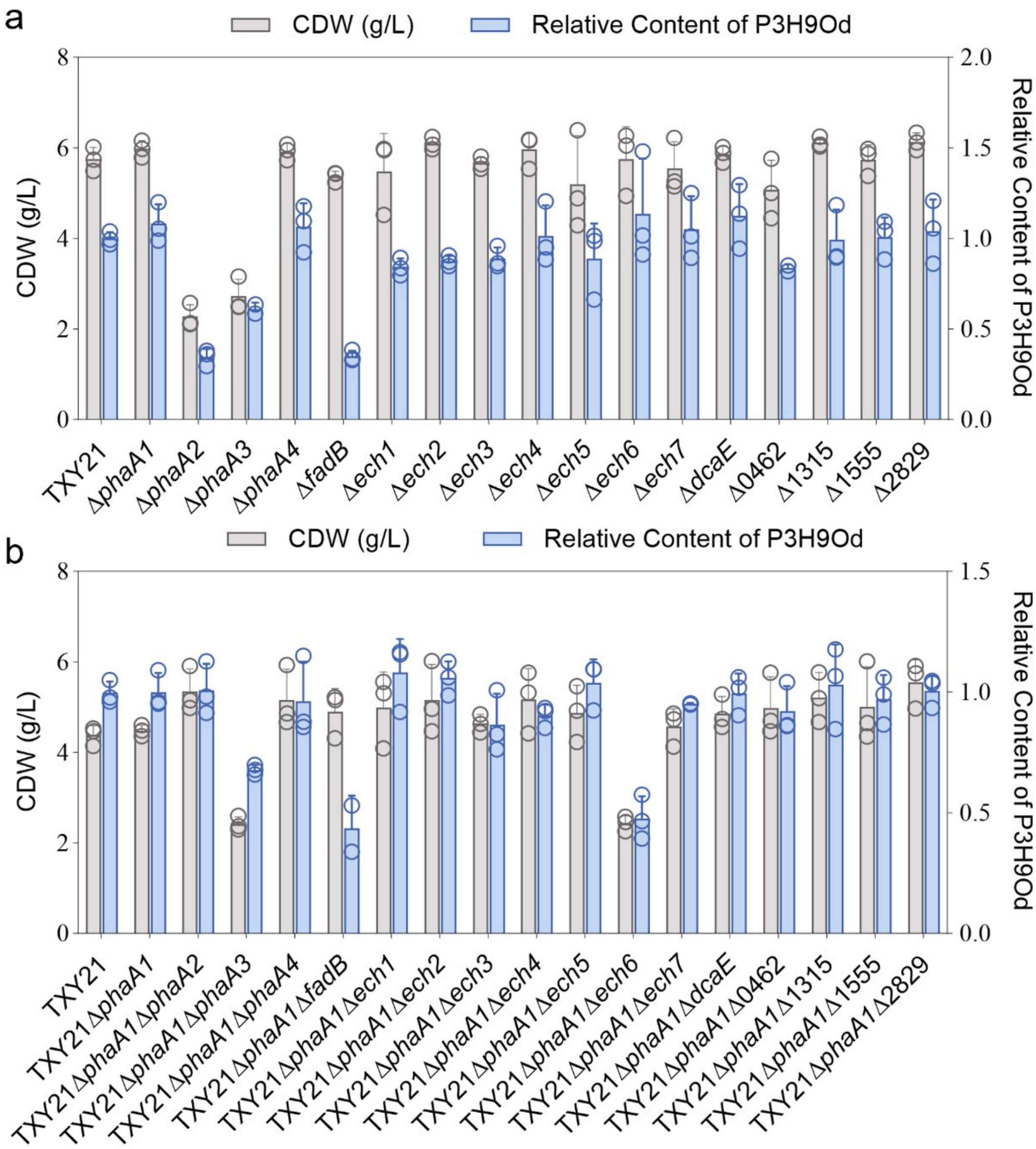

Fig. S4 Additional deletion of *β*-oxidation related genes.

(a) Gene deletion from TXY21. (b) Gene deletion from TXY21Δ*phaA1*.

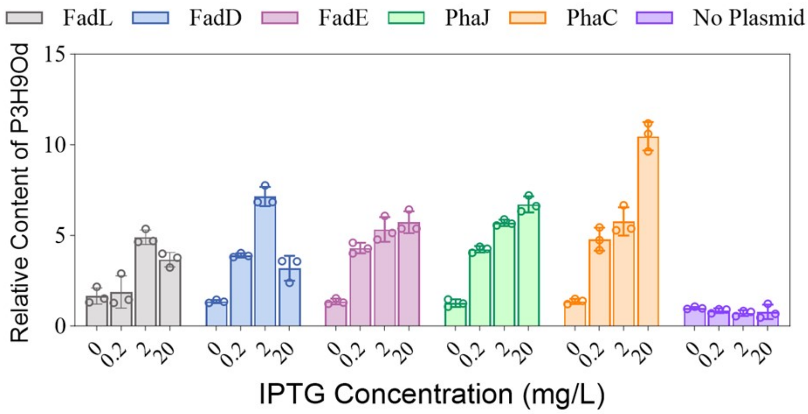

Fig. S5 Overexpression of enzymes involved in the P3HB3H9Od synthesis pathway in *H. bluephagenesis* TXY26 harboring pSEVA341-P$_{Re}$-*phaC*$_{Ps\text{-}STQKopt}$

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