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Supporting information
to

Ribulose-1,5-bisphosphate carboxylase/oxygenase (RuBisCO)-mediated *de novo* synthesis of glycolate-based polyhydroxyalkanoate in *Escherichia coli*

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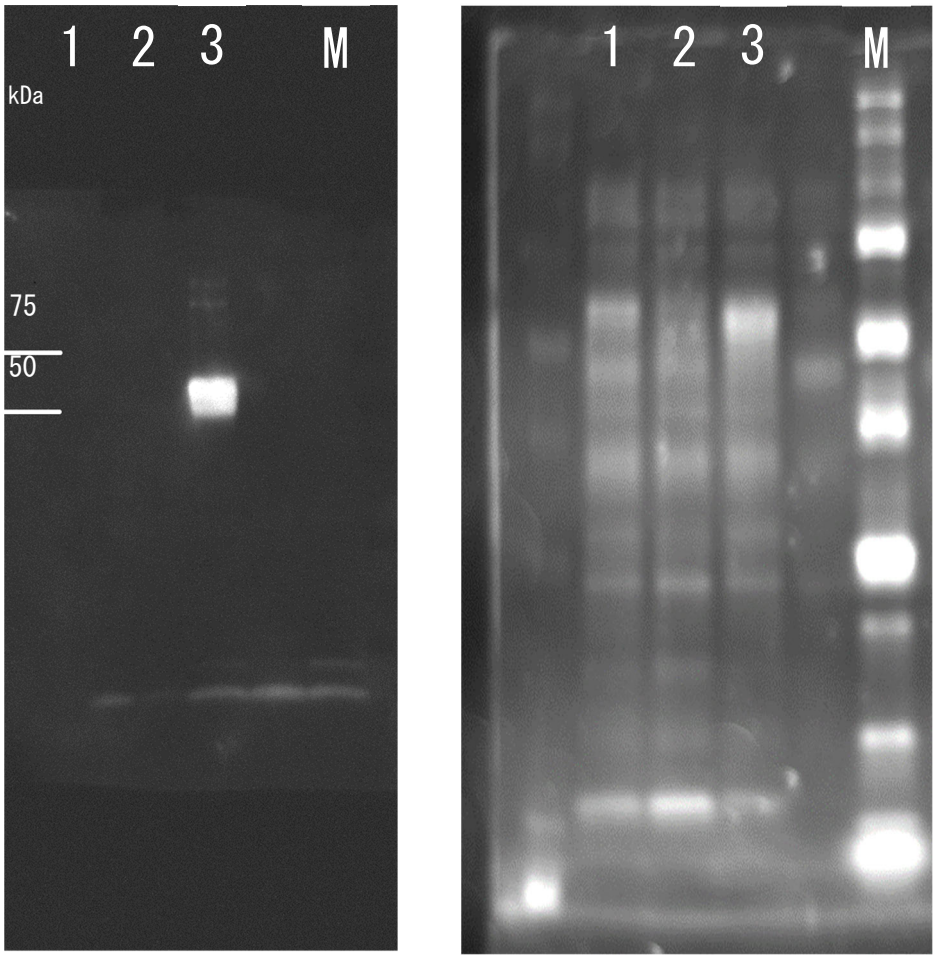


Fig. S1. Immunoblot membrane (left panel) and SDS-PAGE gel (right panel) of Figure 2. Lane 1, pBB5PRK$_{7942}$; Lane 2, pBB5RuBisCO$_{Rr}$PRK$_{7942}$; Lane 3, pBB5RuBisCO$_{Rr}$PRK$_{7942}$ + pUCRuBisCO$_{Rr}$; M, Size maker.

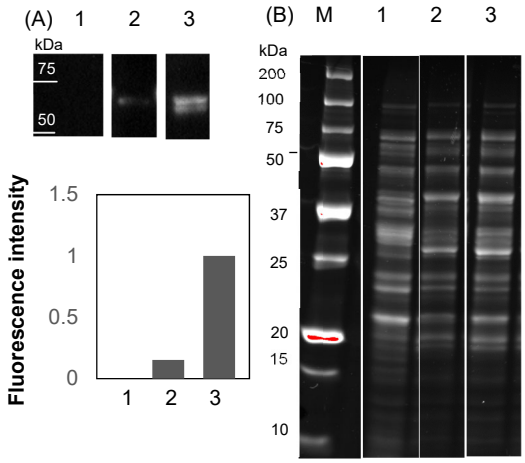


Fig. S2. Immunoblot analysis of RuBisCO$_{Rr}$ in recombinant *E. coli* JW2946 under polymer-producing conditions, and the band intensities of RuBisCO (A). SDS-PAGE image of the same sample (C). Three microgram of crude protein was loaded in each lane. Lane 1, pBBR1-MCS5 + pTV118N; Lane 2, pBB5*pct*PRK$_{7942}$PGP$_{Rr}$ + pTV*pct*RuBisCO$_{Rr}$C1AB; Lane 3, pBB5RuBisCO$_{Rr}$PRK$_{7942}$PGP$_{Rr}$ + pTV*pct*RuBisCO$_{Rr}$C1AB; M, Size maker. Whole images were shown in Fig. S3.

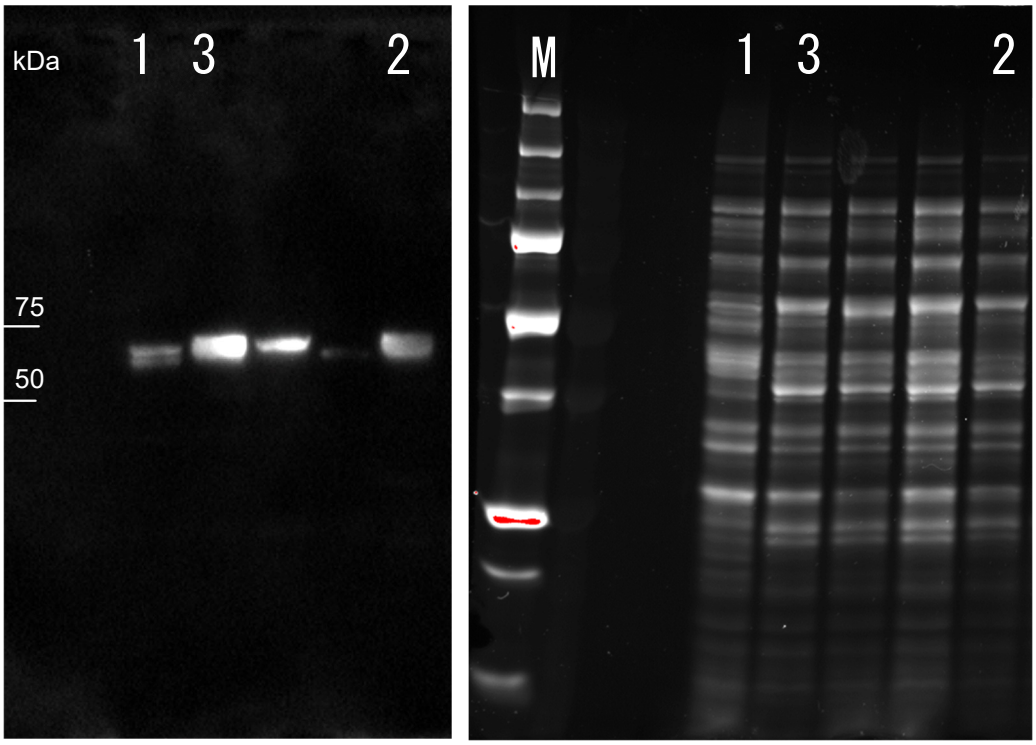
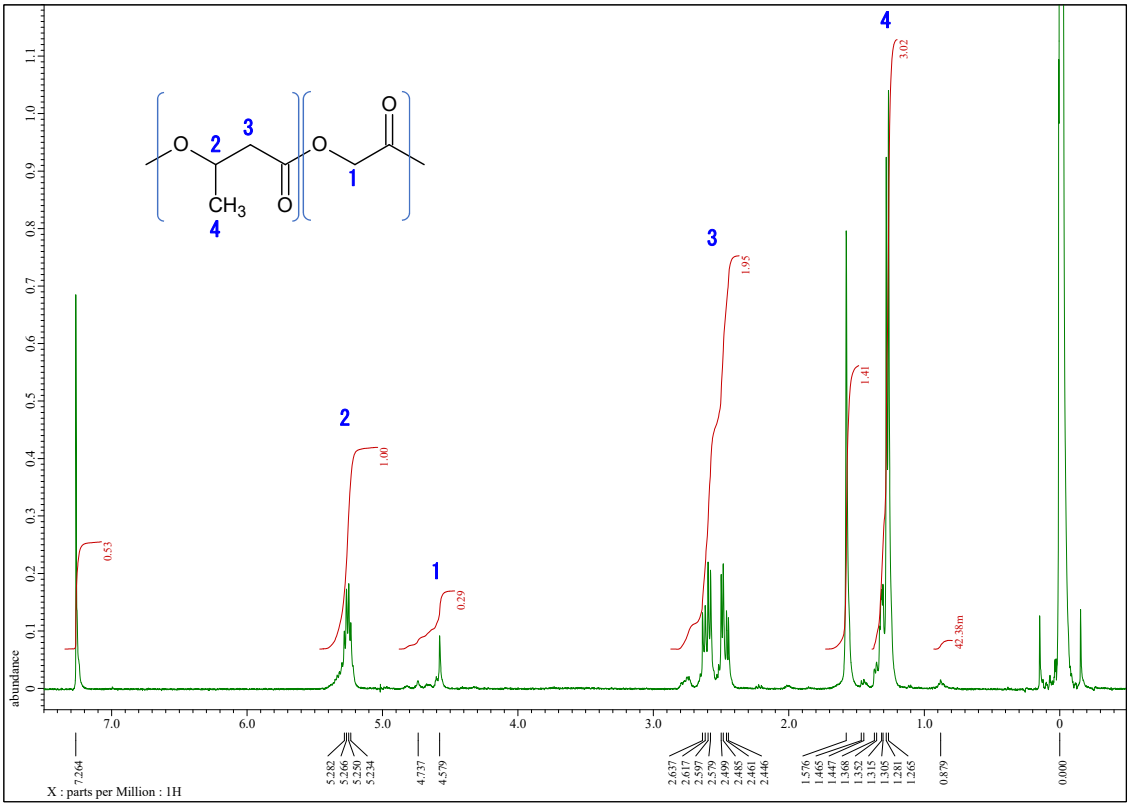


Fig. S3. Immunoblot membrane (left panel) and SDS-PAGE gel (right panel) of Figure 3. Lane 1, pBBR1-MCS5 + pTV118N; Lane 2, pBB5*pct*PRK$_{7942}$PGP$_{Rr}$ + pTV*pct*RuBisCO$_{Rr}$C1AB; Lane 3, pBB5RuBisCO$_{Rr}$PRK$_{7942}$PGP$_{Rr}$ + pTV*pct*RuBisCO$_{Rr}$C1AB; M, Size maker.

(A)


4
3.02
3
1.95
2
1.00
1
0.29
0.53
1.41
42.38m
abundance
X : parts per Million : 1H
7.264
5.282
5.266
5.250
5.234
4.737
4.579
2.637
2.617
2.597
2.579
2.499
2.485
2.461
2.446
1.576
1.465
1.447
1.368
1.352
1.315
1.305
1.281
1.265
0.879
0.000

(B)

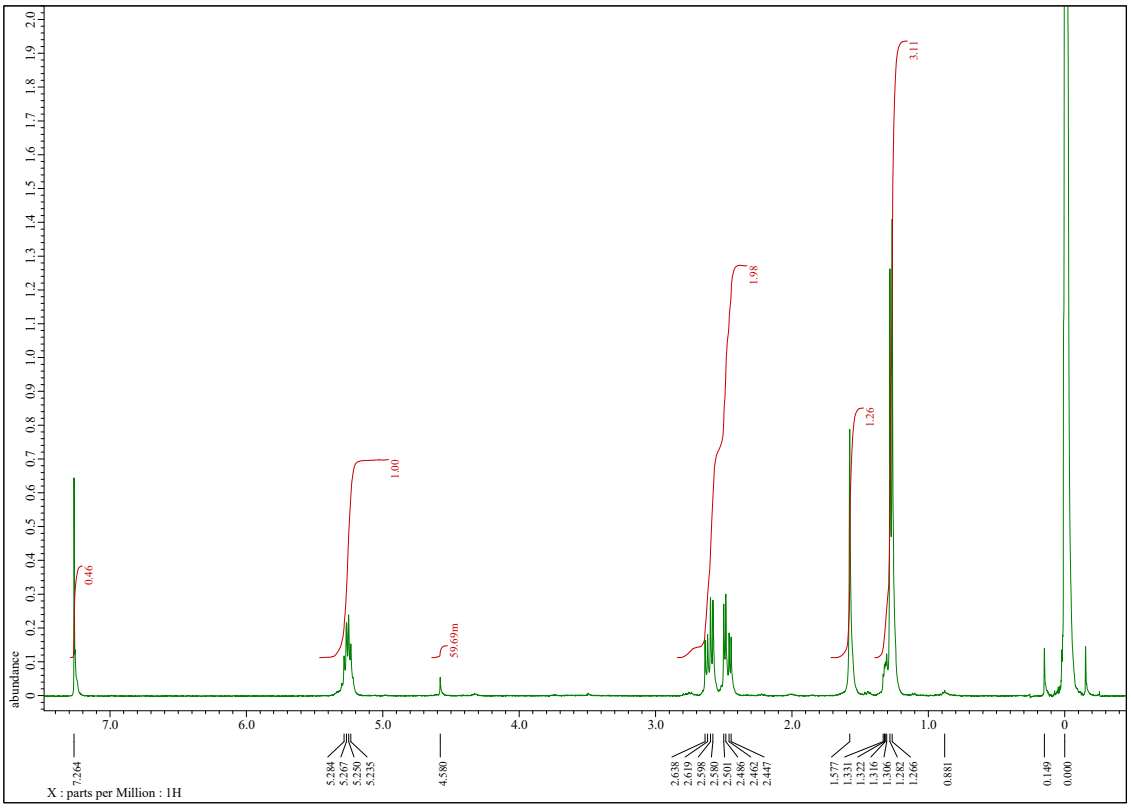


Fig. S4. ^{1}H NMR analysis of P(GL-*co*-3HB) produced by the recombinant *E. coli* JW2946 harboring pBB5RuBisCO$_{Rr}$PRK$_{7942}$PGP$_{Rr}$ + pTV*pct*RuBisCO$_{Rr}$C1AB (A) and pBB5*pct*PRK$_{7942}$PGP$_{Rr}$ + pTV*pct*C1AB (B).

Table S1. Glycolate-based PHA production in recombinant *E. coli* JW2946 harboring the PRK_{7942} and PGP_X genes without RuBisCO gene. [a]

Plasmids	CDW (g/L)	Polymer production (mg/L)	Monomer composition (mol%)	
			GL	3HB
pBB5*pct*PRK_{7942} + pTV*pct*C1AB	1.34±0.14	25.0±1.7	trace	100
pBB5*pct*$PRK_{7942}PGP_{Ec}$ + pTV*pct*C1AB	1.39±0.04	28.5±0.6	9.5±0.3	90.5±0.3
pBB5*pct*$PRK_{7942}PGP_{6803}$ + pTV*pct*C1AB	1.70±0.01	23.4±7.6	10.7±3.4	89.3±4.9
pBB5*pct*$PRK_{7942}PGP_{7942}$ + pTV*pct*C1AB	1.36±0.11	23.5±3.6	trace	100
pBB5*pct*$PRK_{7942}PGP_{Rr}$ + pTV*pct*C1AB	1.53±0.05	28.2±0.3	trace	100

[a] Data are mean ± standard deviation of three independent trials.

Table S2. Glycolate-based PHA production in recombinant *E. coli* JW2946 [a]

Plasmids	CDW (g/L)	Polymer production (mg/L)	Monomer composition (mol%)			Molecular weight ($\times 10^4$)	
			GL	LA	3HB	M_n	M_w
pBBR1MCS-5 + pTV*pct*C1AB	3.68	88.5	trace	3	97	6.21	23.8
pBB5RuBisCO$_{Rr}$$PRK_{7942}PGP_{Rr}$ + pTV*pct*RuBisCO$_{Rr}$C1AB	1.49	13.5	3	trace	97	11.8	67.0

[a] The cells were cultivated in 100 mL media using shake flask. The monomer composition was determined by ^{1}H NMR.