Production of poly(3-hydroxybutyrate-co-3-hydroxyalkanoate) by recombinant *Escherichia coli*

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Abstract

Recombinant *E. coli* strains WA101, WB101 and WAB101 harboring p104613C2ReABstb were cultured in LB medium containing sodium decanoate of 2 g/L or sodium decanoate and sodium gluconate of 2 g/L and 10 g/L, respectively, at 30 °C. When sodium decanoate was used as a sole carbon source, all the recombinant *E. coli* strains accumulated poly(3-hydroxybutyrate-co-3-hydroxyalkanoates) [P(3HB-co-3HA)] having various monomer fractions. The mole fraction of 3HB and 3-hydroxyhexanoate (3HHx) in copolymer varied highly depending on the host strains and the kinds of applied mutation. When the *fadB* mutant *E. coli* strains were applied for the production of PHA, the PHA containing high 3HB fraction up to 86 mol% was obtained.

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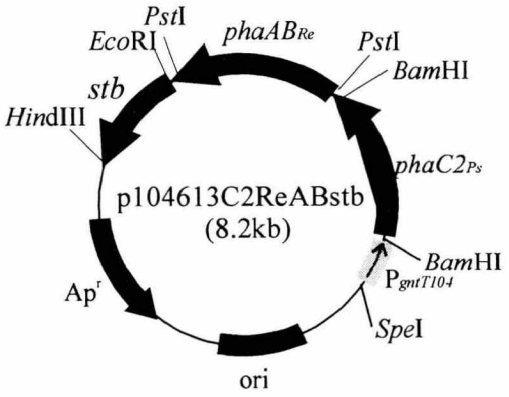

Figure 1. Schematic diagram of p104613C2ReABstb

Table 1. Results of flask cultures of recombinant *E. coli* strains harboring p104613C2ReABstb[a]

Strain	Condition	DCW (g/L)	PHA conc. (g/L)	PHA content (wt%)	Composition			
					3HB	3HHx	3HO	3HD
WA101	[b] Decanoate	1.90	0.60	31.4	34	63	3	0
	[c]Gluconate + Decanoate	3.92	1.90	48.4	89	8	2	1
WB101	Decanoate	1.20	0.30	25.5	86	10	4	0
	Gluconate + Decanoate	3.48	0.88	25.3	87	11	1	1
WAB101	Decanoate	1.25	0.31	25.0	70	26	3	1
	Gluconate + Decanoate	4.15	1.34	32.3	95	2	2	1

[a] Cells were cultivated for 72 h in LB medium supplemented with carbon sources as specified in Table.

[b] Sodium decanoate was added to the concentration of 2 g/L.

[c] Sodium gluconate was added to the concentration of 10 g/L.