

Poly(2-hydroxyisovalerate-co-lactate) production in Escherichia coli by metabolic engineering method

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Polyhydroxyalkanoates (PHAs) production in metabolically engineered strains have been studied recently. Here, we show the production of PHAs containing 2-hydroxyisovalerate (2HIV) in Escherichia coli. To generate the 2HIV, feedback resistant *ilvBNmut*, *ilvCD*, and *panE* are amplified. Also, *pct540* and *phaC1437* are overexpressed for 2HIV synthesis. This strain can produce poly(13.2 mol% 2HIV-co-7.5 mol% 2HB-co-42.5 mol% 3HB-co-36.8 mol% LA), under 20g/L glucose and 2g/L sodium 3-hydroxybutyrate (3HB). To produce sole PHA of 2HIV and LA, *poxB*, *pflB*, *adhE* and *frdB* genes are deleted. This strain under 20g/L glucose and 2mM L-isoleucine can produce poly(20 mol% 2HIV-co-80 mol% LA) at the polymer content of 9.6% w/w. These results indicate that novel PHAs can be produced with branched-chain amino acid metabolism engineering. [This work was supported by the Technology Development Program to Solve Climate Changes on Systems Metabolic Engineering for Biorefineries from the Ministry of Science and ICT (MSIT) through the National Research Foundation (NRF) of Korea (NRF-2012M1A2A 2026556 and NRF-2012M1A2A2026557) and NRF grant funded by the MSIT (NRF-2016R1A2B4008707)]