Production of Polylactic Acid and its Copolymers by metabolically engineered *Escherichia coli*

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Polylactic acid (PLA) is a promising biomass-derived polymer, but is currently synthesized by a two-step process: fermentative production of lactic acid followed by chemical polymerization. Here we report production of PLA homopolymer and its copolymer, poly(3-hydroxybutyrate-co-lactate), by direct fermentation of metabolically engineered *E. coli*. In this study, the metabolic pathways of *E. coli* were further engineered based on *in silico* genome-scale metabolic flux analysis. Using this engineered strain, PLA homopolymer and P(3HB-co-LA) copolymers containing up to 70 mol% lactate could be produced up to 11 wt% and 46 wt% from glucose, respectively. [This work was supported by the Korean Systems Biology Research Project (20110002149) of the Ministry of Education, Science and Technology (MEST) through the National Research Foundation of Korea. Further support by the World Class University Program (R32-2008-000-10142-0) through the National Research Foundation of Korea funded by the MEST is appreciated.]