Production of 3-Hydroxypropionic acid from Acetate by Metabolically Engineered Escherichia coli

김연희, 임채호, 박성훈†
울산과학기술원
(parksh@unist.ac.kr†)

Acetate, a major unwanted byproduct of industrial biological production and of lignocellulosic biomass hydrolysate, could have a great potential to be very cost-effective and alternative carbon source in the production of platform chemicals. Here we engineered Escherichia coli strain for 3-hydroxypropionic acid (3-HP) production from acetate. Several strategies of metabolic engineering including the disruption Acetyl-CoA competing pathways, blockage of glyoxylate shunt, improvement of cofactor (i.e., NADPH) supply, and redirection of the gluconeogenesis pathway were employed. Resting cell was adopted in acetate for the conversion of acetate to 3-HP, and the highest yield 0.16 mol/mol, about 32% of maximum theoretical yield was observed with the engineered producing strain.