

A synthetic biology approach to develop recombinant *E. coli* for the production of 3-hydroxypropionic acid and Coenzyme B<sub>12</sub> from glycerol

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3-hydroxypropionic acid is one of the valuable platform chemicals and widely used in industrial application. As chemical synthesis of 3-HP requires expensive starting materials and high energy consuming process, its production through microorganism based bio-process has been developed. Although one of the recent reports showed commercially available 3-HP production in *Escherichia coli*, with heterologous enzyme expression and process optimization, there is still room for improvement on its productivity and titer. In addition, coenzyme B12 is the key material for the bio-process production of 3-HP. In this research, glycerol which is a waste from bio-fuel production process was used as a substrate as well as sole carbon source and novel pathway was introduced and reconstructed in *Escherichia coli* for 3-HP production without any coenzyme B12 supplement. Heterologous genes encoding pathway enzymes and the enzyme reactivase for 3-HP production were expressed under constitutive strong promoters and maximized 5'-untranslated regions. This work was supported by the Advanced Biomass R&D Center.