

Production of polyhydroxyalkanoate copolymer using C1 sources from *Methylobacterium extorquens* AM1윤지희, 오민규<sup>†</sup>

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C1 compounds such as methanol and formate is environmentally sustainable feedstock, synthesized from CO<sub>2</sub> or CO. For utilization of C1 compounds, *M. extorquens* AM1 was used. It produces poly-3-hydroxybutyrate (PHB), belonging to the polyhydroxyalkanoates (PHA) and used in bioplastics. However, it is stiff and fragile due to high crystallinity, limiting its application. For production of copolymer poly(3-hydroxybutyrate-co-3-hydroxyvalerate) (P(3HB-co-3HV)) with better properties, bktB, phaJ1 and phaC2 were heterologously expressed. Further, expression level of bktB was increased by UTR engineering and phaA was deleted for higher portion of 3HV. As a result, P(3HB-co-3HV) was synthesized with high portion of 3HV by adding propionate and butyrate as a precursor. And addition of butyrate below 0.1 g/l showed synergistic effects not only on increase of 3HV portion but also on improvement of cell mass and PHA titer. Also, when using formate as a sole carbon source P(3HB-co-3HV) was synthesized with 10%(mol%) 3HV. This study showed PHA copolymer with high portion of 3HV could be synthesized using low-carbon sources, especially using only C1 carbon source.