

Biosynthesis of PHBV by *Ralstonia eutropha* with Organic Salts

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ABSTRACT

Abstract Polyhydroxyalkanoate, a kind of biodegradable plastics, can be biosynthesized by various microbes during a limitation of certain critical nutrient. The properties of polyhydroxyalkanoates are similar to those of conventional plastics. Due to its high production cost, polyhydroxyalkanoates have not been widely used in many fields. Recently, scientists have worked hard to reduce the production cost of biodegradable plastics. In this study, the effect of organic salts on the biosynthesis of PHBV (poly-hydroxybutyrate-co-hydroxyvalerate) was investigated. The concentration of glucose in the medium maintained 20 g/L, and the limiting nutrient (NH₄)₂SO₄ was 1.2 g/L. In addition, one of organic sodium salts (sodium acetate, sodium propionate, sodium butyrate, sodium valerate and sodium lactate) was used as a second carbon source. To obtain high yield of PHB (or PHBV), exploration of the optimal timing for adding these organic salts and their optimal concentrations was performed. Experimental results showed that the HB (hydroxybutyrate) biosynthesis (about 25.9% of the biomass) could be maximized, if the concentration of sodium acetate in the medium was 1 g/L. Similarly, the HB biosynthesis (about 53.0% of the biomass) was maximized at 1 g/L of sodium propionate. However, adding 3 g/L sodium propionate was best to maximize HV (hydroxyvalerate) synthesis (about 5.22% of the biomass). Adding 1 g/L sodium butyrate maximized HB yield (about 25.2% of the biomass). Added 1 g/L sodium valerate maximized HB biosynthesis (about 21.2% of biomass), and adding 3 g/L sodium valerate maximized HV biosynthesis (0.23 g/L, about 5.7% of biomass). Adding 6 g/L sodium lactate maximized HB (40.4% of the biomass) and HV (0.068%) yields. From the above study, the optimal concentrations were as follows: sodium propionate 3 g/L, sodium acetate 1 g/L and sodium butyrate 1 g/L. Various combinations of mixed organic salts were used to maximize the PHBV yield. However, experiments results showed the HV yields for the cases of (sodium propionate + sodium acetate) and (sodium propionate + sodium butyrate) were about 0.21 and 0.19 g/L, respectively. The yield of HV was 0.11 g/L if the medium contained sodium propionate (3 g/L), sodium acetate (1 g/L) and sodium butyrate (1 g/L). Key words: PHB, *Ralstonia eutropha*, organic salts

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