Takahiko Nakaoki, J Adv Chem Eng 2016, 6:3(Suppl)
http://dx.doi.org/10.4172/2090-4568.C1.002

Biosynthesis of block copolymer for poly(3-hydroxyalkanoate) by *Ralstonia eutropha*

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Poly(3-hydroxybutyrate-co-3-hydroxyvalerate)-block-poly(3-hydroxybutyrate) copolymer (P3HBV-b-P3HB) was biosynthesized by addition of pentanoic acid and glucose as carbon sources by *Ralstonia eutropha*. First, pentanoic acid was metabolized for 72 h to provide P3HBV, and, after changing to a new medium, glucose was used as a second carbon source to give P3HB. In order to regulate the chain length of P3HB, the cultivation time of glucose was varied from 24 h to 96 h. The index of randomness of the butyrate and valerate units (D) was estimated based on the resonance line of the carbonyl carbon in the ^{13}C NMR spectrum. The D value was between 3.7 and 9.2 depending on the glucose cultivation time, corresponding to the formation of a block copolymer. The chain lengths of the P3HBV and P3HB blocks were estimated from these values. It was found that as the cultivation time of glucose increased, the chain length of the P3HBV block accumulated at the initial stage decreased, whereas that of the P3HB block increased. This indicates that the P3HBV block was consumed as an energy source for the activity of the microorganism while more of the P3HB block was accumulated, because the end group was active for polymerization.

Biography

Takahiko Nakaoki has completed his PhD from Osaka University (Japan) in 1992. He is Professror at Ryukoku University, Japan. He had been the Director of The Society of Polymer Science, Kansai branch. He has published more than 60 papers in international journals.

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