

## **Non-Solvent Pretreatment of Poly(3-Hydroxybutyrate) for Improved Bio-Based Crotonic Acid Production**

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### **ABSTRACT**

In this study, high purity bio-based crotonic acid was obtained by non-solvent pretreatment of poly(3-hydroxybutyrate), PHB prior to pyrolysis. PHB was produced by *Cupriavidus necator* KCTC 2649 utilizing heat-treated oil palm frond juice followed by mild alkaline treatment with 0.05 M NaOH. It was found that NaOH-treated PHB was highly converted to its dehydrated monomer to give bio-based crotonic acid with 89% purity; 16% higher than that produced from chloroform-treated PHB. It is believed that pretreatment of PHB with low concentration NaOH assisted in high thermal conversion of PHB into crotonic acid by producing crotonyl chain-end and Na-binding carboxyl terminal end, of which both are the accelerator for  $\beta$ -chain scission of PHB into biocrotonic acid. Initial molar mass of PHB also played a role in biocrotonic acid production. Overall, improved biocrotonic acid production with high purity biocrotonic acid is an advantage for industrial production of crotonic acid from renewable resource.

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