

Case study for a palm biomass biorefinery utilizing renewable non-food sugars from oil palm frond for the production of poly (3-hydroxybutyrate) bioplastic

ABSTRACT

In this paper, we assess the economic viability of renewable non-food sugars from oil palm frond (OPF) as fermentation feedstock for the production of the bioplastic, poly(3-hydroxybutyrate), P(3HB) within an integrated palm biomass biorefinery. The production cost of P(3HB) is estimated based on 9900 t/y of the potential amount of renewable sugars that can be produced from OPF in a typical palm oil mill in Malaysia. Based on the case study, approximately 99,780 t/y of renewable sugars could be produced from 10 neighbouring palm oil mills, each with the capacity to process an average of 200,000 t/y of fresh fruit bunch (FFB). With 20,000 t/y of P(3HB) production, the specific production cost of P(3HB) using renewable sugars from OPF is estimated at \$ 3.44/kg P(3HB), which is 41% lower compared with that produced from commercial glucose.

Keyword: Oil palm frond; Poly(3-hydroxybutyrate); Renewable sugars; Oil palm biomass