Production of polyhydroxybutyrate from oil palm empty fruit bunch (OPEFB) hydrolysates by Bacillus cereus suaeda B-001

ABSTRACT

Polyhydroxybutyrate (PHB) is a biodegradable polymer accumulated in intracellular granules by numerousbacteria. Its physical and chemical characteristics are like those of petrochemical plastics. PHB is producedmainly by gram-negative bacteria such asRalstonia eutropha, which have lipopolysaccharides that co-purify withthe PHB and cause immunogenic reactions, limiting their use for biomedical applications. PHB produced fromgram-positive bacteria such asBacillus spp.do not have lipopolysaccharides, which makes it suitable for bio-medical application. The aim of this work was to evaluate the ability ofBacillus cereus suaedaB-001 to accu-mulate PHB using oil palm empty fruit bunch (OPEFB) hydrolysate as the sole carbon source, comparing it tocommercial glucose as the control. OPEFB was chemically pre-treated using an acid-hydrolysed process bysulphuric acid and neutralized by a NaOH solution to obtain reducing sugars. PHB biopolyester accumulated to43.1% of cell dry weight with glucose at 15 g/L as the sole carbon source, and PHB accumulated to 55.4% of celldry weight using OPEFB hydrolysates at 20 g/L. The conversion of OPEFB acid hydrolysates to PHB using thegram-positive bacteriaBacillus cereus suaedaB-001 has not been reported.

Keyword: Polyhydroxybutyrate; Oil palm empty fruit bunch; Bacillus cereus suaeda B-001; OPEFB acid hydrolysate