

**Synthesis, characterization and structural properties of intracellular copolyester poly(3-hydroxybutyrate-co- 3- hydroxyvalerate) produced by Comamonas sp. EB 172 from renewable resource.**

ABSTRACT

Microbial copolymer was produced by a local isolate, *Comamonas* sp. EB 172, using mixed organic acids such as acetic, propionic, and butyric acids as carbon sources in pH-stat fed-batch fermentation. Maximum polymer production (6.59 g/L) was achieved at 50 h of fermentation when 73.64 g/L mixed acids, generated from the acidogenic fermentation of palm oil mill wastewater, were used. Accumulation of polymer in the cell was 70% (wt/wt), which was observed under transmission electron microscope. The morphological, chemical, thermal, and mechanical properties of the solvent-extracted biopolymer were determined by various techniques (SEM, GC, <sup>13</sup>C NMR, FT-IR, TGA, and tensile testing). The copolymer poly(3-hydroxybutyrate-co-3-hydroxyvalerate) (PHBV) consisted of 87 mol% β-hydroxybutyric acid (HB) and 13 mol% β-hydroxyvaleric acid (HV). With chemical properties similar to commercial PHBV and mechanical strength of around 30 MPa and 8% elongation at break, the biopolymer offers potential for industrial applications.

**Keyword:** *Comamonas* sp. EB 172; Characterization; Fed-batch fermentation; Mixed organic acids; PHBV.