Changes in diad sequence distribution by preferential chain scission during the thermal hydrolysis of poly (3-hydroxybutyrate-co-3-hydroxyhexanoate)

ABSTRACT

Polyhydroxyalkanoates (PHAs) are microbial polyesters produced by many types of bacteria as an intracellular energy reserve material under substrate limiting conditions and in the presence of excessive carbon sources.[1] Poly((R)-3-hydroxybutyrate) (PHB), the most commonly used microbial polyester, was the first member of the PHA family to be discovered, and more than 150 other monomer units have been reported to date.2, 3 Poly((R)-3-hydroxybutyrate-co-(R)-3-hydroxyhexanoate) (PHBHHx) is a copolymer in the PHA family that consists of randomly distributed (R)-3-hydroxybutyrate (HB) and (R)-3-hydroxyhexanoate (HHx) units.[4] This type of copolymer exhibits improved mechanical properties and processability compared with those of PHB and poly((R)-3-hydroxyvalerate) (PHBV).[5] PHBHHx copolymers are currently produced on a large scale and have proven to be biocompatible in clinical studies using mouse fibroblasts cells, and rabbit articular cartilage-derived chondrocytes.[6] PHBHHx is a highly favorable copolymer of the PHB family due to its biodegradability, flexible mechanical properties and good melt processability.

Keyword: Polyhydroxyalkanoates (PHAs); Poly((R)-3-hydroxybutyrate) (PHB); Poly((R)-3-hydroxybutyrate-co-(R)-3-hydroxyhexanoate) (PHBHHx) ; (R)-3-hydroxybutyrate (HB); (R)-3-hydroxyhexanoate (HHx)