Molecular and functional analysis of the poly-β-hydroxybutyrate biosynthesis operon of Pseudomonas sp BJ-1


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ABSTRACT. The operon comprising the genes for poly-β-hydroxybutyrate (PHB) biosynthesis in Pseudomonas sp BJ-1 was cloned and sequenced. Sequence analysis of 8991 bp revealed that the regions contain two related operons. The first operon contains the three genes phbA, phbB and phbC, and the other contains the two genes flp1 and flp2. The deduced amino acid sequences of PHBA and PHBB showed high identity with other bacterial PHB genes. Transcription of the three genes of the first operon is controlled by a single hypothetical promoter region, whereas the other two flp genes are controlled by two hypothetical promoter regions. Analysis of expressed protein at different times showed that PHBA protein levels increased from 0 to 4 h; PHBB and PHBC showed similar kinetics. Detection of enzyme activity showed three proteins with bioactivity and biological function in the synthesis of PHB intermediates.

Key words: Poly-β-hydroxybutyrate; Biosynthesis; Operon; Pseudomonas sp BJ-1