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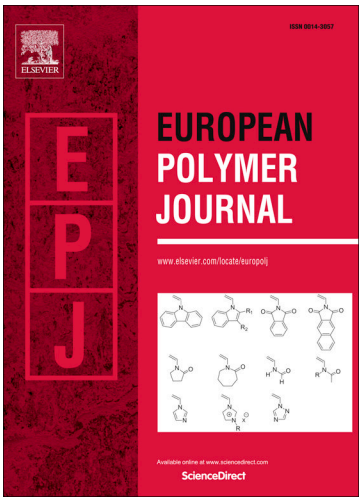

Polyhydroxyalkanoates (PHA) production by photoheterotrophic microbial consortia: Effect of culture conditions over microbial population and biopolymer yield and composition.

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-Revised Version-

Polyhydroxyalkanoates (PHA) production by photoheterotrophic microbial consortia: Effect of culture conditions over microbial population and biopolymer yield and composition.

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Abstract

Three microbial consortia (C2, C4, C5) grown under photoheterotrophic conditions assimilate acetate and butyrate, as individual and mixed substrates. By controlling the culture conditions, it was possible to manipulate the microbial population composition and thus the yield of polyhydroxyalkanoates (PHA) accumulation. Under limited ammonium conditions, pH control, and a sequential two-step process, C2 and C4 produced PHA. C4 showed the highest production of 44% of the cell dry mass (CDM), close to the theoretical value calculated with a stoichiometric balance. Analysis of the confocal microscopy images confirm the accumulated biopolymer percentages produced by each consortium, and it was in close correlation with microbial distribution and substrate consumption pattern. ^{1}H, ^{13}C, NMR, and MALDI-TOF spectra identified the primary structure of the obtained biopolymers as copolymers of 3-hydroxybutyrate (3HB) and 3-hydroxyvalerate (3HV).