

Production of Poly- β -Hydroxybutyrate (PHB) by a Thermophilic Strain of Bacillus and Pseudomonas Species

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Abstract : Five hydrocarbon degrading bacterial strains isolated from contaminated environment were investigated with respect to polyhydroxybutyrate (PHB) biosynthesis. Screening for bioplastic production was done on assay mineral salts agar medium containing 0.2% poly (3-hydroxybutyrate) as the sole carbon source. Two of the test bacteria were positive for PHB biosynthesis and were identified based on gram staining, biochemical tests, 16S rRNA gene sequence analysis as Pseudomonas aeruginosa and Bacillus licheniformis which grew at 37 and up to 65 °C respectively, thus suggesting the later to be thermotolerant. In this study, the effects of different carbon and nitrogen sources on PHB production in these strains were investigated. Maximum PHB production was obtained in 48 hr for the two strains and amounted to yields of 72.86 and 62.22 percentages for Bacillus licheniformis and Pseudomonas aeruginosa respectively. In these strains, glycine was the most efficient carbon sources for the production of PHB compared with other carbon (glucose, lactose, sucrose, Arabinose) and nitrogen (L- glycine, L-cysteine, DL-Tryptophan, and Potassium Nitrate) sources. The screening of microbial strains for industrial PHB production should be based on several factors including the cell's capability to mineralize an inexpensive substrate, rate of growth and the extent of polymer accumulation.

Keywords : bacteria, poly-3-hydroxybutyrate (PHB), hydrocarbon, thermotolerant

Conference Title : ICMMPPE 2017 : International Conference on Materials, Minerals and Polymer Engineering

Conference Location : Amsterdam, Netherlands

Conference Dates : May 14-15, 2017