

Production of poly (3-hydroxybutyrate-co-3-hydroxyvalerate) by a new *Bacillus* OU40^T from inexpensive carbon source

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Utilization of wastes from agro industry is becoming increasingly important due to concerns of environmental impact. The goal of this work was to characterize and evaluate the ability of a novel *Bacillus* OU40^T strain to produce Polyhydroxyalkanoates by using agricultural wastes, which was isolated from polluted water. The growth of isolate OU40^T was assessed in mineral media containing glucose, starch, bagasse, whey and rice bran. Highest cellular copolymer content yielded 71.98% using rice bran, followed by starch(64.85%), whey(60.09%), bagasse(59.29%) and glucose(45.00%). The biomass production was fastest between 30-38h and obtained in the range of 3.0 to 3.5 g/L. The characterization of the polymer was carried out with FTIR, H¹ NMR, ¹³C NMR, DSC, GPC, XRD and GC-MS. Biopolymers produced by strain OU40^T had an average molecular weight 1,304 kDa to 2,332 kDa with melting point 155-160 T_m (°C) and percentage of crystallinity 40- 50%. This strain is producing PHBV copolymer with feed stocks without precursors. The cells were characterized by the presence of iso-C15: 0, iso-C_{16:0}, iso-C17: 0 and C_{13:0} as the predominant fatty acids and MK-7 as the isoprenoid quinone. The DNA G+C content was 52.5%. Based on phenotypical, biochemical and genotypic investigations, the strain OU40^T was assigned to the genus *Bacillus*. The 16S rRNA gene sequence is deposited in EMBL/Genbank under accession number FN 663629. The type strain is OU40^T (=JCM 17287^T=CCM 7835^T=DSM 24141^T). The strain utilized rice bran completely and CDW was noticed up to 3.012%. PHBV content was reported as 71.97% CDW with 84.40% HB units and 15.60% HV units. Till now production of PHBV copolymer with 15.60% HV units by utilizing rice bran as carbon source by *Bacillus* strain has not been reported.

Keywords: Poly (3-hydroxybutyrate-co-3-hydroxyvalerate), PHBV; *Bacillus cereus*, Cell dry weight, Agro industrial wastes, Polyhydroxyalkanoates.

Biography

Shaik Mahmood got his M.Sc degree in the year 1984 and PhD in 1988 from Osmania University. His PhD thesis is Rhizosphere Microbiology. He joined the University in 1989 as an Assistant Professor and later promoted as Associate Professor. He was awarded Young Scientist, Under Young Scientist Scheme Department of science and Technology (DST), New Delhi and Scientist of the year 2005 by National Environment Science Academy, New Delhi. Earlier he has been recipient of the awards of Junior Research Fellow (CSIR) Senior Research Fellow (CSIR) and Research Associate (UGC). He held various administrative positions like: Mess and General Warden, NRSH hostel, O.U- Course Co-coordinator, Dept of Bio Informatics, O.U- and Coordinator, PGRR Center for Distance Education, Osmania University. Dr. SK. Manhood's areas of specialization are: Bioinformatics and Environmental Microbiology. He has 23 years of research experience. He has written Two Books and published 100 research papers to his credit in various reputed international journals with Impact Factor. He has guided 1 M.Phil and 6 PhD scholars and presently 6 scholars are working under him. He was Principal Investigator to four Research projects from National funding agencies- i.e., Department of Science and Technology and University Grants Commission, New Delhi. He has attended 38 national and 5 international conferences. He is a life member of Indian Institute of Public administration (New Delhi), Indian Science Congress Association (Calcutta,) National Environmental Science Academy (New Delhi) apart from the Editorial Board member Indian Biological sciences. At present he is Co-coordinator, Dept of Bio Informatics, Osmania University.

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