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Production of biodegradable polyhydroxy butyrate (PHB) accumulating bacteria: A green alternative to plastics

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Poly hydroxybutyrate (PHB) is a unique biopolymer produced by microbes of extracellular polysaccharide (EPS), which is biodegradable and most close to plastics which is miscible with the conventional plastic. PHB is a biopolymer which can be completely degraded into H₂O and CO₂ by soil microorganisms. PHB has three unique characteristics viz., thermoplastic processability, complete water resistance, and complete biodegradability. Under nutrient stress, intracellular accumulation of PHB accumulates up to a level of as high as 90% of the dry cell weight. Our study emphasis on the encystment of *Azotobacter vinelandii* from fungus cultivars of termite which is associated with PHB accumulation. PHB accumulation was maximum with 2% sucrose and utilization of commercial sugars was better than glucose, 15mML⁻¹ ammonium acetate as Carbon and nitrogen source at 36-48hrs of growth under submerged and stationary growth. In 48hrs, 3.25gL⁻¹ of biomass was produced with 1.4gL⁻¹ of PHB concentration at pH 6.9 and temperature 30°C with agitation rate 150-200rpm respectively. The high cost of PHB production is the major limiting factor for its commercial use. The factors behind are the increased cost of the substrate used for downstream processing. As the public concern is increasing about the hiking cost of petroleum and damaging effects of the petroleum-based plastic materials in the environment, this study was focused on the production of biodegradable plastic poly hydroxy butyrate (PHB) from low cost and easily available raw materials naturally.

Biography

Velu Gomathi has completed her PhD, at the age of 27 years from Tamil Nadu Agricultural University and 6 months training at Duke medical center, USA and 6 months training at North Carolina State University, USA. She was the coordinator for PG education for Open and Distance learning in Agriculture. She has published more than 15 papers in reputed journals. She has received State Environmental Scientist award of the Year 2018 and received an international research grant from Indo-ASEAN for bioplastic production (2018-2020). She is one of the Committee Member in State Level Environmental Appraisal committee in Department of Environment, Government of Tamil Nadu, India.

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