

Renewable lignocellulosic materials for the production of biodegradable microbial plastic (poly- β -hydroxy butyrate) - An innovative way for pollution mitigation

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In recent years, the global plastic pollution is overcome through the usage of eco – friendly and efficient bioproducts for the day to day use commodities. The plastics are one of the most commonly used commodities made from the chemical building blocks which create severe environmental threats to the biosphere. To overcome this, the use of bioplastic is the only known natural remedy for the recreation of natural environment. Bioplastic production is an emerging technology which is practiced by world - wide manufacturers using the first generation raw materials which include refined monomeric, dimeric and polymeric carbohydrate materials as carbon sources which are obtained from the crop plants. This method of production technologies instantaneously increase the production cost. In our studies we have aimed to overcome those drawbacks and use cheap renewable resources like aquatic weed water hyacinth and industrial waste of coir pith for the production of bioplastic as carbon based raw materials. For this invention, the compound lignocellulosic materials were converted into simple monomeric sugars by white biotechnological methods and it is provided for fermentative production of bioplastic. From this production studies we got good quantities of bioplastic. The maximum quantity bioplastic was obtained during the supplementation of water hyacinth as carbon source than the coir industrial pith. The bacteria *R. eutropha* and *B. megaterium* were used. In addition to we applied statistical optimization tools for the efficient bioplastic production. The maximum PHB content of 58% and 42% were obtained from the water hyacinth and coir pith hydrolysates supplemented media respectively. The produced bioplastics were characterized through FTIR, GPC, NMR and DSC instrumentations and it was confirmed as poly β -hydroxy butyrate (PHB). It is a widely acceptable microbial bioplastic produced intracellularly during nutrient starved condition except the carbon source. It is used in enormous fields such as biomedical, industrial, agricultural, pharmaceutical etc. The bioproducts synthesized using lignocellulosic biomasses is known as second generation bioproducts. This technique also enhanced by strain improvement using molecular biotechnological methods which leads to the production of good material structure and higher production rates.

Biography

A. G. Murugesan has obtained his PhD from the Madurai Kamaraj University during 1990. He is a professor of Environmental Biotechnology at M.S. University. He has published more than 300 papers in reputed journals and rendering his serving for several journals of repute. He is operating a number of funded projects. 21 candidates have completed PhD at present. He is a fellow in several academics and serving as an expert member in a number of high level committees on environment.

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