

ABSTRACT

Synthesis Of Poly(hydroxybutyrate) From Malt Waste By *Alcaligenes latus* Under Nitrogen Limitation in Fed-Batch Culture

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The purpose of this project report was to investigate the production of the microbial biopolymer poly(3-hydroxybutyrate), also called P(3HB) or PHB, by the microorganism *Alcaligenes latus* ATCC 29712, using malt waste as substrate. The microbial digestion was done in a fed- batch culture, under nitrogen limitation.

PHB belongs to a class of microbial bio-polyesters called poly(hydroxyalkanoates) or PHAs. PHAs are obtained from renewable natural resources and they are biodegradable unlike some synthetic plastics. Thus, PHB is the potential answer for today's problems of non-biodegradable solid waste management and conservation of the world's finite fossil fuels.

Sucrose was also used as a substrate and the results were compared. It was found that malt waste with a relatively low dissolved sugars level compared to that of the sucrose substrate, can support a larger proportion of biomass concentration, although the PHB content of the microorganisms was only 13.9% for malt waste, compared to 73.2% for sucrose. This implies that the final polymer content of microorganisms grown on malt waste can be further increased by employing malt waste with as high a dissolved sugars content as possible, as well as maintaining an optimum dissolved sugars level, by feeding.

The productivity obtained for malt waste under the non-ideal conditions used, was half that of the sucrose medium. This may be remedied by increasing the inoculum's size and only feeding as necessary, in order to maintain an acceptable level of dissolved sugars in the substrate.

Keywords: Deborah Wilson; Poly(hydroxybutyrate); *Alcaligenes latus*; microbial bio-plastics; malt waste.