

# INVESTIGATION OF PHOTOFERMENTATIVE POLY-HYDROXYBUTYRATE (PHB) PRODUCTION VIA *RHODOBACTER CAPSULATUS*

## ABSTRACT

Plastics are materials that the society has become fully dependent upon. The flexible and versatile nature of plastics has made these materials to be utilized in almost every aspect of society, from food packaging to advanced technological innovations. Overwhelmingly produced by the refining of crude oil, common plastics have drastically negative impacts on environment in both production and at the end-of-life cycles. Poly-hydroxyalkanoates (PHA) are microbial storage compounds. Occurring in the form of granules within the microbial cells, material properties of poly-hydroxyalkanoates are remarkably similar to those of everyday plastics such as low density polyethylene. Hence, poly-hydroxyalkanoates can be considered as a more environmentally benign replacement to plastics, and are fully biodegradable. Poly-hydroxybutyrate (PHB) is the most commonly found PHA in microorganisms. It is synthesized by various kinds of microorganisms under stress conditions, such as abundant supply of carbon and limited supply of other nutrients such as nitrogen and phosphorus.

Aim of this study is to produce PHB using wastewater via a photofermentative bacteria, *Rhodobacter capsulatus*. The experiments will be first performed with synthetic media and the environmental conditions will be optimized. PHB production will then be investigated for the wastewater, that is, a by-product of sugar industry, vinasse. Accumulation of PHB will be investigated along with the production of hydrogen gas, with PHB to be recovered from the cells. This presentation covers the preliminary experiments performed with *Rhodobacter capsulatus* in order to produce PHB and its further extraction from the cells.

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