

Production of materials – biopolymers essay

[Business](#), [Industries](#)



Polyhydroxybutyrate, or PHB, was discovered in 1926 by French microbiologist, Maurice Lemoigne, who was researching the use of bacteria to produce polyesters, at the time. However, it was overlooked and forgotten for over 30 years, as there wasn't any need for such a biopolymer; petroleum was still inexpensive and abundant so PHB was unnecessary. In 1957, PHB was rediscovered in Britain and USA, and was further developed and researched during the 1960s. The mass production of PHB began after the 1990s because of the growing need for an environmentally friendly plastic alternative. Properties of PHB...

The biodegradability of PHB gives it extraordinary appeal as a potential replacement for the widely used polymers derived from petrochemicals. These petrochemical products, such as polypropylene and polyethylene, are often used for packaging, but are a hazard to the environment because of the fact that when discarded they do not decompose and can cause injury to plants and animals. PHB however can be completely broken into carbon dioxide and water by bacteria and thus be an ideal replacement—in disposable nappies and packaging in the form of bottles, bags and wrapping, particularly for medical and hospital supplies—without fear of pollution.

PHB's biocompatibility and biodegradability also open it up to other uses, currently not possible with petrochemical products. The natural degradability of PHB plastics can be, and is being, utilized in the medical industry, in things such as plates made which can be left in place to heal fractured bones. Once the bone is healed, the PHB is slowly broken down within the body without any adverse effects. Production of PHB.

.. The biopolymer PHB is produced by placing bacteria, such as *Alcaligenes Eutrophus* and *Pseudomonas*, in a suitable growth medium e. . molasses from agricultural waste and fed high levels of nutrients such as glucose, causing it to multiply rapidly. Nitrogen is then restricted from the nutrient supply, making the bacteria unable to reproduce further. The bacteria store their excess energy in the biopolymer PHB, much as humans do with fatty tissue. The levels of PHB extracted can reach a maximum of 80% of the bacteria's dry body weight, with the organism being harvested and the polymer separated out.

EvaluationThe biopolymer Polyhydroxybutyrate is a product that will continue to benefit our society socially, environmentally and politically as it is biodegradable, biocompatible and would give governments an incentive to run their country in a more environmentally-friendly approach. However, as it is an incredibly costly material to produce, up to 10 times that of petrochemical products, as well as having a high-level energy consumption process, its makers have to consider and evaluate the advantages and disadvantages of generating PHB.