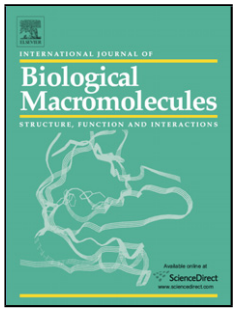
Accepted Manuscript



Title: Perspectives on the production, structural characteristics and potential applications of bioplastics derived from polyhydroxyalkanoates

Authors: Priscilla B.S. Albuquerque, Carolina B. Malafaia

PII: S0141-8130(17)33045-3
DOI: http://dx.doi.org/10.1016/j.ijbiomac.2017.09.026
Reference: BIOMAC 8201

To appear in: *International Journal of Biological Macromolecules*

Received date: 14-8-2017
Revised date: 6-9-2017
Accepted date: 12-9-2017

Please cite this article as: Priscilla B.S.Albuquerque, Carolina B.Malafaia, Perspectives on the production, structural characteristics and potential applications of bioplastics derived from polyhydroxyalkanoates, International Journal of Biological Macromoleculeshttp://dx.doi.org/10.1016/j.ijbiomac.2017.09.026

Perspectives on the production, structural characteristics and potential applications of bioplastics derived from polyhydroxyalkanoates

Priscilla B.S. Albuquerque[1], Carolina B. Malafaia[1]*

[1]Laboratório de Bioprocessos, Centro de Tecnologias Estratégicas do Nordeste (CETENE), Av. Prof. Luís Freire, 01, Cidade Universitária, 50740-540, Recife, PE, Brazil.

(*)Corresponding author: carol08malafaia@hotmail.com, Phone: +55.81.33347200.

Abstract

Since the last two decades, the use of synthetic materials has increased and become more frequent in this capitalist system. Polymers used as raw materials are usually disposed very rapidly and considered serious damages when they return to the environment. Because of this behaviour, there was an increasing in the global awareness by minimizing the waste generated, in addition to the scientific community concern for technological alternatives to solve this problem. Alternatively, biodegradable polymers are attracting special interest due to their inherent properties, which are similar to the ones of the conventional plastics. Bioplastics covers plastics made from renewable resources, including plastics that biodegrade under controlled conditions at the end of their use phase. Polyhydroxyalkanoates (PHAs) are polyesters composed of hydroxy acids, synthesized by a variety of microorganisms as intracellular carbon and energy storage. These environmentally friendly biopolymers have excellent potential in domestic, agricultural, industrial and medical field, however their production on a large scale is still limited. This review considered the most recent scientific publications on the production of bioplastics based on PHAs, their structural characteristics and the exploitation of different renewable sources of raw materials. In addition, there were also considered the main biotechnological applications of these biopolymers.

Key-words: biodegradable plastics; biopolymers derivatives; P(3HB); poly(3-hydroxybutyrate)-co-(3-hydroxyvalerate); sustainability.

1. Introduction

Over the years, man has taken from nature both elements and products essential to his existence, trying to ensure comfort and a high quality of life. In the name of the well-being and development, the society has explored many raw materials and various products synthesized by living organisms present as structural constituents, being mostly of organic origin. Such products, namely biopolymers, are high molecular weight macromolecules classified according to the monomeric unit used and the structure of the