CHAPTER 7

Modification of Polyhydroxyalkanoates (PHAs)

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7.1 Introduction

Polyhydroxyalkanoates (PHAs) are biodegradable and biocompatible polyesters with versatile structural compositions. Bacterial PHAs are produced using a combination of renewable feedstock and biological methods mostly via a fermentation process. Native and recombinant microorganisms have been generally used to produce different types of PHAs, such as homopolymers\(^1,2\) and copolymers of diverse morphology.\(^3\)\(^\textbf{-}^5\) Alternative production schemes of PHAs in vitro based on cell-free enzymatic catalysis are gaining momentum and may become the preferred route to some specialty products.\(^6,7\)

In addition to their biodegradability, compatibility, and compostability, PHAs were reported to possess gas-barrier properties almost similar to those of polyvinyl chloride and polyethylene terephthalate.\(^8\) These combinations of excellent physico-chemical properties coupled with the current concerns over environmental pollution and waste degradation drive their increasing commercial exploitation in different niche applications spanning from biomedical, packaging, automotive, infrastructure, aerospace to military applications.\(^7,9\)