

Review Paper:

Production of Polyhydroxyalkanoates (PHAs) using Synthetic Biology and Metabolic Engineering Approaches

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Abstract

Polyhydroxyalkanoates are polyesters that are biological in origin and are produced by micro-organisms through fermentation processes. Researchers have been attracted towards applications of these polyester compounds as an alternative to plastics as they are biodegradable, renewable, biocompatible and eco-friendly. However, presently these polymers have limitations because of lower rate of microbial production and high production cost. Production steps like the selection and improvement of strains, media development, downstream processing are being intensively researched in order to improve the overall process efficiency and finally to substitute the mainstream polymers with that of biodegradable polymers.

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This review article provides an insight into PHA biosynthesis, microbial strains that produce PHA, use of novel methods such as synthetic biology or morphology engineering to design new pathways in microorganisms and also use of plants by altering their metabolic pathways in a way to produce biopolymers.

Keywords: Biodegradable, Synthetic Biology, Morphology Engineering, Biopolymers, Zero wastage.