Progress Towards the Commercialization of PHA Bioplastics

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Abstract

Metabolix has applied advanced metabolic pathway engineering at the genome level to solve the manufacturing challenges for a range of PHA copolymers. Metabolix has built into the genome of the production host the ability to produce both the building blocks and polymerization capability for several different PHA copolymer families. The capability to produce many compositions with a single bacterial system has proven highly advantageous in all phases of commercialization. Utilizing the same basic fermentation process, a range of benign co-feeds and a common downstream recovery process, PHA copolymers can now be produced economically with targeted polymer properties. By combining these highly engineered microbial biofactories, and readily available feedstocks with outstanding chemical engineering, projected manufacturing costs have been reduced to levels competitive with existing materials. Both fermentation and recovery processes have been demonstrated in industrial equipment across a broad spectrum of copolymer compositions.

Metabolix's PHAs are a broad and versatile family of plastics, ranging in properties from rigid, strong and stiff to tough and highly elastomeric. They can be made as resins or aqueous dispersions with excellent film forming characteristics. Robust in use, yet biodegradable, PHAs offer a renewable and environmentally friendly alternative in many applications now served by synthetic plastics, including fiber, film, molded goods, extruded products, adhesives, and coatings. Given the challenges inherent in large scale industrial bioprocessing and commercialization in diverse markets, Metabolix's strategy is to develop alliances along the value chain, including for manufacturing and for key channels to market.