

Cost-Saving Method in Making Biodegradable Plastic

summary... With no dependency on fossil fuels, this alternative method of making renewable plastics uses inexpensive feed stocks (ie sugar) to feed the bacteria that grow polymers. The resulting plastics are fully biodegradable within a short period of time.



description... The technology portfolio is a collection of technologies related to the production of biopolymer polyhydroxyalkanoate (PHA). The portfolio includes processes to produce PHAs using recombinant organisms, including one method to obtain high levels of PHAs comprising 4-hydroxybutyrate (4HB) monomer units in a cost-efficient manner. PHAs with 4HB monomer units are useful in biodegradable thermoplastic applications requiring greater flexibility than PLAs.

Benefits of the technology are as follows:

- *Less expensive:* Production of PHAs comprising 4HB monomer units does not depend on immediate precursors of 4HB, and host cell can be used from an inexpensive feed stocks such as glucose, sucrose, or fructose.
- *Faster production:* Reduces the fermentation time required for PHA production from four days to one.
- *Composition control:* The method allows for careful and predictable control of the resulting PHA composition, enabling the use of special recombinant strains for engineering.
- *Low risk, proven technology:* The two pathways to production, PHA biosynthetic and succinic semialdehyde metabolic pathways, are well established. PHAs have been created using this method in large-scale fermentation tests.

The technology portfolio consists of five patents:

- US 6,117,658 Methods of making polyhydroxyalkanoates comprising 4-hydroxybutyrate monomer units
- US 5,891,686 Method of production of poly-β-hydroxyalkanoate copolymers
- US 5,518,907 Cloning and expression in Escherichia coli of the Alcaligenes eutrophus H16 poly-beta-hydroxybutyrate biosynthetic pathway
- US 5,371,002 Method of production of poly-beta-hydroxyalkanoate copolymers
- US 5,334,520 Production of poly-beta-hydroxybutyrate in transformed escherichia coli

market significance... The process eliminates dependency on fossil fuels while providing a cheap, sustainable and renewable source of plastic. The resulting polymers can be used in a variety of applications, such as containers, packaging, and bags, using cost-efficient, biodegradable alternative methods of production.

keywords... biopolymer polyhydroxyalkanoate (PHA), biodegradable plastic, thermoplastic, copolymers, sustainable plastics



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