

BIOCHEM show case

Develop a renewable polymer that was competitive in cost and performance to traditional fibres

Problem

Society uses immense quantities of synthetic polymers, most of them made from petrochemical sources. This means they are dependent on a depleting non-renewable resource and vulnerable to increasing oil prices. Many companies are now interested in sourcing polymers produced from renewable feedstock such as plants.

Technical solution

While the technology to create polylactic acid (PLA) in the laboratory has been known for many years, previous attempts at large-scale production were targeted solely at niche biodegradable applications and were not commercially viable. Cargill Dow developed the NatureWorks process and enhanced the physical properties of PLA resins to compete successfully with commodity petroleum-based plastics.

Benefits

- **Derived entirely from annually renewable resources**
- **Fibres have unique combination of desirable attributes such as superior hand, touch, and drape, wrinkle, resistance, excellent moisture management, and resilience**
- **Packaging applications have the benefits of a natural material that is compostable and recyclable without experiencing any tradeoffs in product performance**

- **The PLA process offers significant environmental benefits: no organic solvents; high yields throughout (>95%); recycle streams to eliminate waste; small (ppm) amounts of catalyst**
- **Requires 20-50% less fossil resources than comparable petroleum-based plastics**
- **Fully biodegradable or readily hydrolyzed into lactic acid for recycling back into the process**

NatureWorks LLC markets PLA as Ingeo.

Additional information

NatureWorks LLC

Website

<http://www.natureworkslc.com/>

EPA 2002 Greener Reaction Conditions Award

Website

<http://www.epa.gov/greenchemistry/pubs/pgcc/winners/grca02.html>