

The PLA Picnic

Summer picnics: sunshine, green grass, a shady tree, good food, and great fun. Picnickers and all consumers will soon be able to use many products derived from corn, not just in their food, but also in their clothing, packaging, and utensils. How? PLA – polylactic acid.

PLA is a biodegradable plastic polymer that can be derived from corn. Best known for its ability to biodegrade, the polymer can be processed to replace hydrocarbon-based polymers, such as polystyrene or polyethylene that

are not as environmentally friendly. PLA can be molded, vacuum formed, blown, or extruded to yield products typically made from petroleum-based conventional plastics. So far, researchers haven't found anything made from conventional plastic resins that can't be made from PLA.

The PLA alternative

In response to the growing global problem of waste disposal many countries have banned some petroleum-based disposable products such as plastic shopping bags. They are also pressuring industries to

reduce and minimize packaging materials, use renewable resources, and increase recycling. One way to meet these goals is through the use of PLA since it can replace traditional plastics in many instances. PLA also takes less fuel to produce (from 20 – 50% less fossil resources),

the source material is an annually renewable resource, and PLA breaks down into natural components when composted.

PLA is an alternative not just for plastics but also for molded foam products. The

foam packaging used to protect computers and electronics during shipping creates a vast amount of waste that enters landfills. This molded foam cannot be safely burned and is not easily recycled. The compostable PLA foam has additional benefits for the electronics industry. PLA foam does not develop static electricity like conventional foam packing does – making it ideal for packaging of sensitive electronics.

The same polylactic acid being used in plastics and foams can also be made into fibers for woven and non-woven fabrics – everything from cord and rope to mattresses, carpeting, and clothing. Corn-based PLA



can be blended with more traditional fibres like cotton, wool, and silk to make exercise clothing, suits, or dresses.

Medical and therapeutic uses for PLA have been employed for many years. PLA, although considered a synthetic polymer, is absorbable, biocompatible, and immunologically inactive. With such properties special medical products can be made from PLA. It has suitable mechanical properties and absorbability when used for implants in bone or soft tissue and is used for resorbable sutures as might be used in eye or internal surgery. PLA is also used in delivery systems for sustained release of medication such as anti-cancer drugs.

PLA packaging can be used in many applications. Wrapping of produce or flowers with clear film, candy wrappers, disposable cups and fast food containers, deli trays, compost bags – all can be made of PLA. One industry interested in PLA packaging is the horticulture industry that uses millions of pounds of polystyrene and other plastics for disposable plant containers, flats, and pots each year. The PLA alternative offers disposable containers that are sourced from plants and are environmentally friendly for disposal.

How PLA is made

A renewable resource such as corn is harvested and the grain is milled to separate out the starch. The starch is processed to produce unrefined dextrose. The dextrose is used to make polylactic acid through a fermentation process. Using a special condensation process a cyclic intermediate is produced, called lactide. The lactide, a monomer, is purified through a vacuum distillation process. Polymerization is then achieved through melting. The polymers of the lactic acid, polylactic acid, can be produced with various molecular weights, allowing for the broad range of applications.

And unmade

PLA can be unmade through recycling back into a monomer and into polymers, or composted and degraded. PLA plastics can go into commercial compost sites. The plastic degrades into lactic acid and smaller pieces over a period of 45 to 60 days in controlled compost. Microorganisms degrade the fragments into carbon dioxide and water. Alternatively, the plastics can be incinerated like paper, with few by-products. Lastly,

since water breaks down PLA it can also go into landfills.



So as you pack for future picnics, the plates, forks, spoons, food and drink containers, the blanket, and your clothing could all be made from PLA. Don't forget the food!

For more information:

Cargill Dow Nature Works site:

<http://www.cargilldow.com/natureworks.asp>

Iowa Corn Growers' Association:

<http://www.iowacom.org/newuses.htm>

University of Nebraska PLA Research page:

<http://agproducts.unl.edu/pla.htm>

Kentucky Corn Growers' Association:

<http://www.kycorn.org/newcornuses/pla.html>

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