

PLA AND CORN

Poly(lactic acid) (PLA) is a polymer similar to polyester that can be melt-spun into fiber for textiles. PLA is made from annually renewable resources and under certain circumstances is biodegradable. But the PLA used to produce textile fibers is typically derived from conventionally grown, commodity corn, and it will only biodegrade under ideal conditions in an industrial composting facility. We support the idea of making products from renewable resources that biodegrade, but after an extensive environmental analysis of PLA, we were not convinced enough to adopt this fiber.

The Problem with Corn

Making plastics and synthetics out of renewable resources instead of petroleum is a fantastic idea. Lactic acid, the building block of PLA, can be obtained by extracting starch from plants and breaking it down through fermentation. Several years ago, Patagonia investigated PLA fiber to use in our product line. At that time we discovered that commodity corn was the only source of the starch used to make PLA fiber. This is the cheapest and most readily available source because of government corn subsidies and the much bigger high-fructose corn syrup industry in the United States. Unfortunately, more than 85% of corn grown in the United States is genetically engineered (GE, a.k.a. genetically modified, GM).

GE crops have been found to contaminate other crops through the natural dispersion of seeds and pollen, so the total amount of GE corn is unknown. Currently, the only way to avoid GE corn is to choose organic, and even those plants are at risk of contamination from GE crops. The effects of eating GE food – or eating animals that were fed GE corn – have not been fully researched and in the long term could well pose risks to human health. In any case, this type of crop threatens natural biodiversity, and the patented GE seeds cede way too much corporate control over agriculture. Since there is no way to guarantee that PLA is not made from GE corn, we decided not to use it.

Beyond the issue of genetic engineering, corn may not be the right source of starch for PLA. Conventionally farmed corn is typically a mono-crop that receives a lot of synthetic fertilizers and pesticides; and organic corn is in high demand for organic food. The only part of the plant that's used to make PLA is the kernels, which means everything else becomes agricultural waste. Overall, this seems like an inefficient way to make polymer feedstock.

The Future of PLA

Patagonia supports finding other sources of starch for making PLA and other bioplastics. But we would choose crops that grow fast with minimal inputs of water and fertilizer. We would look for a way to use all parts of the plant to make the polymer, and a way to manufacture the fiber that minimizes the use of energy. And most important, the source of PLA would have to be grown organically to be truly a renewable resource. As we have learned through our conversion to 100% organic cotton, crops farmed with chemicals threaten biodiversity and severely deplete the lands we grow on.

In our effort to reduce our use of petroleum as a raw material for textile fibers, we are using more and more recycled polyester, which uses waste instead. The manufacture of polyester, in general, requires less energy and resources compared to many other textile polymers, including PLA.