

## ON PLA AND CORN

### PLA made from corn

---

Poly(lactic acid) (PLA) is a polymer similar to polyester that can be melt-spun into fiber for textiles. The appeal of PLA is that it is made from annually renewable resources and that it is biodegradable. But these claims should be substantiated with more detailed information. For example, PLA fiber is made from conventionally-grown commodity corn. And biodegradability refers to conditions that can only be met in an industrial composting facility, and does not consider the scope of a final textile product. Although Patagonia agrees with the principles of renewable resources and end-of-life biodegradation, an extensive environmental analysis of PLA has not convinced us to adopt this fiber as a raw material.

#### 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. We discovered that the only source of the starch for making PLA fiber was commodity corn. This is the cheapest and most readily available source of starch because of government corn subsidies and the much bigger industry of making high-fructose corn syrup in the United States. Unfortunately, over 50% of corn grown in the U.S. 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 animals fed on GE feed) have not been fully researched and could well pose risks to human health. In any case, this type of crop threatens natural biodiversity, and the patented GE seeds threaten 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. In the end, the only part of the corn plant being used as a source of starch for making PLA is the kernels, which means that the rest of the plant becomes agricultural waste. Overall this seems like an inefficient way to make polymer feedstock.

#### The Future of PLA

In the future Patagonia would support finding other sources of starch for making PLA and other bio-plastics. 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 for a way of manufacturing this fiber to minimize the consumption of energy. And most important, the source of PLA would have to be grown organically to be considered truly a renewable resource. As we have learned through our conversion to 100% organic cotton, crops farmed with chemicals and without biodiversity severely deplete the lands we grow on.

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