Go Green
From Soil to Shelf

The future of biodegradable packaging

by Marcia Passos Duffy

Organic growers often face the dilemma of what to use to package their produce. After all, if a grower carefully nurtures crops from seed to maturity in an organic environment, it seems odd to place the produce in packaging made from petroleum-based plastic.

Traditional growers and packagers have felt the need to look at alternative packaging for other reasons. Conventional plastic (polyethylene terephthalate, or PET) has seen price hikes of 30 to 80 percent over the past two years because of the spiraling cost of petroleum, which is the raw material used to make PET.

These two market scenarios, along with the increased demand from consumers for "green" alternatives to plastic, have set the stage for the success of renewable, biodegradable packaging alternatives—those made from corn and other plant materials.

Experts predict that the market for biodegradable packaging will grow by 20 percent per year, and perhaps more as the price difference between materials made of renewable raw materials and standard plastic materials continues to decrease. Incidentally, this increased demand bodes well for U.S. corn growers, even though corn-based plastics required, so far, only 1 percent of the 11.8 billion bushels of corn produced last year.

Major players in the market

Only a handful of companies produce the raw materials necessary for biodegradable packaging. The largest player at the moment is NatureWorks, a division of Cargill, which has created polylactic acid (PLA), a corn-based resin that can be used for a variety of packaging materials.

PHOTO COURTESY OF EARTHCYCLE.

Earthcycle's President Shannon Boase with strawberries.

Several packaging companies purchase the PLA to make a variety of clear containers, clamshells, wraps and other packaging. The resin is also used for other consumer durable goods, as well as apparel and home textile materials.

NatureWorks takes the corn's starches and breaks it down into sugars, which are then fermented and separated into carbon and other elements. Small molecules are then chemically bonded to create larger molecules, called polymers, which are made into a granule-like plastic. The company produces 126,000 tons of this plastic material annually at the company's manufacturing plant in Blair, Neb.

David Stanton, NatureWork's regional marketing manager for North America, noted that in the last two years, the demand for its bio-based packaging has doubled the company's sales of the resin each year since 2004. Companies such as Newman's Own Organics and Wild Oats have been using the PLA, but this year the company got its biggest boost when Wal-Mart announced it would sell some of its produce in PLA containers, claiming that the move will save 800,000 barrels of oil per year. Wal-Mart will begin to substitute 114 million clear, petroleum-based, plastic clamshell containers with corn-based plastic packaging for cut fruit, herbs, strawberries and brussels sprouts. NatureWorks is also shipping trays to Google's cafeteria and to Filmmaker George Lucas' studio in San Francisco. PLA

is also used as trays for Del Monte's and Meijer stores' fresh-cut fruit.

Stanton noted that despite fears that the increased demand for corn would result in the need for genetically modified corn being used to create the resin, the company's corn-based polymer does not contain any genetically modified material. "This is certified by an internationally recognized organization, Gene Scan," he said.

While it seems that corn-based packaging is the perfect alternative to using expensive, nonrenewable petroleum-based plastics, PLA does not come without its own troubles. While corn-based packaging is biodegradable, it won't break down easily in a backyard compost. The packaging, which cannot be recycled with regular PET plastics, must be sent to an industrial composting facility where heat and humidity are controlled. (A list of these sites in the United States can be found at the company's Web site, *www.NatureWorksLLC.com*.)

Packaging that can go in a compost pile

The problem with composting corn-based plastic has led to concerns within the organic and environmentalists communities. Blogs and other Internet forums buzz with criticisms of corn-based plastics, predicting that PLA containers will clog up the recycling engine for PET plastic now in place, or would end up being thrown away and filling up landfills. Another objection is the morality of turning something that could be food into packaging when so many on the planet go hungry—an argument that is gaining momentum as more grain harvest is being converted to ethanol.

NatureWorks packaging showcasing grapes.

PHOTO COURTESY OF NATUREWORKS.

One commonsense solution to this problem would be to create containers from a waste product that would be backyard compost-friendly. A two-year-old company based in Vancouver, Canada, Earthcycle (*www.earthcycle.com*), has done just that. It's durable sustainable packaging is made from palm fiber, which backyard composts in less than 90 days. Palm fiber is a waste material left over after palm fruit is harvested for oil (used for making food and cosmetics products). This waste is a renewable resource—each tree gives fruit at least twice a year and it

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Vegetables in NatureWorks' packaging.

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is certified biodegradable and compostable.

The company has secured contracts with major retailers and grocery chains such as Wild Oats, Trader Joe's, Wal-Mart, Loblaws, Henry's Markets, Whole Foods and Publix. "Right now, our packaging is available for fresh produce and food service items. However, the versatility of the material makes our packaging suitable for other sectors, such as consumer electronics and consumer goods," said Earthcycle's president, Shannon Boase. All of Earthcycle's packaging is available to small to medium-sized producers who can purchase anything from cartons to pallet-load sizes (500 units per carton).

Historically, palm fiber has been considered a waste product and was incinerated, causing huge environmental problems in the country of Malaysia where palm oil is produced. Boase was first introduced to palm fiber packaging while working on a technology commercialization project for the Malaysian government.

"Our success in the U.S. market has been driven by our key, early adopter clients such as Wal-Mart and Oppenheimer," said Boase. "Wal-Mart is creating a strong agenda to move towards more renewable packaging and has a goal of zero waste by 2010. Oppenheimer, one of the fresh produce industry's largest marketing and distribution agents and headquartered out of Vancouver, has an extensive sales network in the U.S., which has been key in Earthcycle's growth south of the border."

Corn-based PLA plastic does have its strengths over palm-based fiber though, such as the ability to hold high-water produce, such as lettuce, and a clear plastic look. For clamshell packaging, such as for berries and tomatoes, palm-based fiber is competitive in price and durability, and has the added benefit of being backyard compost-friendly.

"We can provide a clear plastic lid for our packaging, either PET or PLA," said Boase. The most visible difference is that Earthcycle's packaging is opaque, whereas PLA is most often clear. "There is no mistaking Earthcycle for plastic!" said Boase.

While the compostability of the palm fiber-based packaging is attractive to organic producers concerned about the recycling problems of PLA plastic, Boase said that if a producer is also looking for a local package, palm fiber is not it. "We don't hide the fact that our manufacturing is done in Malaysia... because that's where all the raw material—the palm fiber waste—is located."

While these renewable packaging alternatives are not perfect, they do not use petroleum and do address vexing environmental problems. "For brand owners and retailers, it is the opportunity to place a natural product—fresh produce—in a natural package not made from oil," said NatureWork's Stanton. Earthcycle's Boase agrees, "We are living on finite oil resources, so why should we be using it for highly disposable applications such as packaging?"

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See page C10 for a list of distributors where growers can buy biodegradble packaging.