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World Centric's Aseem Das shows faircompanies a partly decomposed biodegradable fork. The sugarcane fiber containers on the wall of their Palo Alto, California based offices- and sample room- don't taste like sugar, but Aseem says when fresh from the factory they do smell sweet.

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Sports stadiums serve beer in corn cups, beverage firms sell bio-bottles and takeout comes in sugar cane. A biocompostable supplier talks about Styrofoam bans and supplying Google's cafeteria.

By faircompanies staff

Another type of disposable: corn water bottles and sugar takeout containers: the 21st Century container is being created to decompose within 180 days.

In the United States, 64 billion paper and 73 billion styrofoam and plastic cups and plates were thrown away in 2003. The numbers are just as big, or bigger, for plastic bottles and takeout containers, not to mention all the bags, utensils, trays, lids, etc made from non-renewable materials. But this is beginning to change as modern containers can now end their lives in compost heaps instead of landfills.

Compostable water bottles and Ecotainers

The bottled water industry has been hit with a lot of bad publicity for all the environmental waste, but some bottlers have begun to retool the concept of a plastic water bottle. In 2003, Colorado-based BIOTA began to bottle their water in what they called "the world's first compostable bottle". Made from corn starch, it is compostable in 75 to 80 days.

They clearly explain to those unfamiliar with the concept, that the bottle **will not** "decompose on the shelf" and only under an adequate composting situation: high heat, high moisture levels and in the presence of micro-organisms.

Three years later, the UK's first biodegradable bottle went on sale when Belu began to bottle their water in a bio-bottle. Given the newness of the technology, they felt it prudent to answer a most basic question for unschooled consumers: "Can I eat a bio-bottle? A: We advise against it. **It could be done in theory** but only after it has been composted at which point it isn't very appetizing."

Recognizing that their cups are the "#1 source of waste" in their stores, in 2007 Tully's became the largest US coffee retailer to serve their brew in **compostable cups**. Officially called an Ecotainer, but dubbed the "green cup", it uses a corn-based lining and is what Tully's calls their effort to make a dent in the estimated 16 billion cups thrown into US landfills in 2006.

Not all are sold on the concept. The UK's Innocent Drink Company launched a trial of a corn-based eco bottle in 2007 and discontinued it because "it doesn't use any waste materials, and commercial composting is not yet a mainstream option in the UK."

In place of the compostable bottle they introduced a 100% recycled bottle, but this is not necessarily a long-term solution. There are compostable containers made from a waste material (a sugar industry byproduct, as we'll discuss later) and increasingly more communities are becoming compost-ready.

Saying no to Styrofoam

As legislation continues to limit the amount of garbage sent to landfills- from the European Union's 2016 goal of 35% of 1995 levels to the Zero Waste initiatives in regions like Nova Scotia (Canada) and Seattle's King County (US)-, commercial composting facilities are becoming more widespread. In Seattle, all residents will have curbside food waste recycling beginning in 2009, which will provide a very accessible receptacle for compostable containers.

Besides the growing push toward garbage diversion programs, local governments are more directly helping to motivate the transition from paper, plastics and Styrofoam to biodegradable alternatives. In 2007, the California cities of San Francisco and Oakland banned polystyrene (Styrofoam) takeout containers.

The Oakland baseball and basketball stadiums had already begun using compostable containers back in 2005 immediately diverting significant waste from their garbage: at just the McAfee Coliseum- home of the Oakland As baseball team- they go through 500,000 to 1 million cups every year.

San Francisco's Moscone Convention Center went 100% biodegradable with their food service at the end of 2007. For one 5-day convention, they estimated diverting **60,000 lunch boxes from the landfill**.

Sports stadiums and convention centers are able to make this switch quickly and easily with a change in purchasing agreements and by contracting a commercial composting facility (though the Oakland stadiums already had contracts for their food waste), but back in 1990 when Berkeley, California banned Styrofoam containers, the biodegradable alternatives weren't available.

Technology has moved quickly since then and today compostable options can be sourced from a wide range of crops and are being sold by a growing number of distributors. We talked to Aseem Das, the founder of the biocompostable distributor and educational center World Centric about the differences between corn and sugar containers, how composting is the recycling of this century and why compostables are important.

World Centric: the Iraq War as the impetus to sell corn cups to Apple

"World Centric started about three years ago; kind of the catalyst for that was the Iraq War. We asked consumers, because our society is so built around consumption, what we can do during normal consumption to create this awareness which reduces our environmental impact and social impact of our consumption. We wanted to create a revenue stream that would feed into the educational effort."

"And the revenue stream was bringing to market products and services which were **environmentally and socially sustainable**. So that led us to doing a Fair Trade Eco Store which were initially Fair Trade goods: chocolate, coffee, honey, cocoa, and biodegradable products, as well."

"The biodegradables really caught on over the last two years. We've seen a lot of interest from individual consumers all the way to big corporations. Google is using them in their cafeteria as is Hitachi, Apple, conventions centers, stadiums, and large food services. The reason for that is that people get it right away; that they are not plastic, not Styrofoam and they are going to compost."

Sugar waste to replace Styrofoam

(Aseem points to stacks of takeout containers, cups and plates).

"These products are made out of sugar cane fiber which is the pulp that is left after the sugar cane is pressed while making sugar. Normally the pulp is just burned and causes pollution. So now you're taking a waste material and creating value out of it and it's something to replace plastic and Styrofoam."

"Out of all the products this takes the least amount of energy to manufacture. All of this is sourced in China because China banned Styrofoam take out containers a few years ago so when they had to come up with an alternate to replace Styrofoam they came up with sugar cane fiber. It's a pretty simple technology; anyone can do it; it's just capital intensive."

Bioplastics

"These are the cornstarch products; the starch from the corn is converted into a polymer. This process is more energy intensive, but still if you compare how much energy it takes to take the raw petroleum and convert it into plastic this is about 30% more efficient. But these do require composting; ideally you would put them in a compost for them to break down. They are much more chemically processed than the other sugar cane material which is just molded into different forms."

"There's another cornstarch material which is these utensils; there are knives, spoons and forks. They also come from cornstarch, but they are a different polymer formulation. These can take heat to about 190 degrees; these are the only heat resistant cornstarch stuff we currently have."

"They work well, but one of the issues with this material is that we have to make it quite thick because it's pliable when it's formulated so once it gets to that thickness it takes longer to compost."

"So the sugarcane fiber is leak proof up to about 200 degrees Fahrenheit. One of the issues with it is that it will form some condensation on the bottom because it's porous and the heat goes through. The cornstarch stuff is only heat resistant to about 120 degrees Fahrenheit."

Sugar or corn?

Sugar, soy, corn, potato... the options can be a bit overwhelming. There is a compostable alternative for every plastic, paper or Styrofoam container, but they vary a bit in biodegradability and heat resistance. At World Centric they divide the options between products made from sugarcane fiber- or bagasse- and bioplastics.

Bagasse:

- Made from the sugarcane fiber remaining after extraction of juice from the sugarcane.
- It avoids pollution from the normal burning of sugarcane pulp after juice extraction.
- Microwave and freezer safe.
- Handles hot liquids up to 200 Fahrenheit (moisture forms at the bottom for hot food items).
- Composting time: 90-180 days at a commercial composting facility.

Bioplastics:

- Made from starch (corn, potato, tapioca, etc), cellulose, soy protein, lactic acid, etc.
- Corn starch is the main raw material.
- Main resins currently: PolyActide (PLA) and Mater-Bi.
- Newer resins: potato starch, soybean protein, cellulose- "Most of these are currently not certified for compostability, though some are for biodegradability. The field of bioplastics is constantly evolving with new materials and technologies being worked on and being brought to market."
- Heat resistant to 120 degrees F (corn-starch based products) and 220 degrees F (potato and tapioca starch based products).
- Composting time: 90-180 days **at a commercial composting facility**.

faircompanies: Are your products more expensive than what they are replacing?

"The items made with cornstarch are comparable to the plastic pricing and the sugarcane fiber is comparable to the paper pricing. The only time there is a big pricing difference is when you're comparing these products with Styrofoam. Styrofoam is very light and there is very little material in it and these could be 30 to 50% more expensive than Styrofoam and that's why Styrofoam is used everywhere."

"Styrofoam is a horrible toxin. It doesn't break down; in terms of its functional use it's a pretty good material: it is very light, it's very insulating, it doesn't leak although it does leak toxins into your food."

"Styrofoam is made out of styrene and benzene and both styrene and benzene are carcinogenic so when you're eating, especially hot liquids you have styrene leaching into the foods and that can make way into the fatty tissues and cause cancer. And then it doesn't break down; it's going to be in the environment for 500 years, who knows."

There are some cities now imposing bans on plastic bags. Critics argue this legislation can make it difficult for storeowners because of the expense of compostables. Do you see this as a problem?

"I don't think so. There are a couple of options because the store owners can have a policy where they say, 'Bring your own bag' or if you are going to use a bag you must pay 15 cents. I think that most people are at that point of awareness where people will go with this."

"There is a significant price difference for the store owners to use these compostable bags which are more expensive than the plastic bags. If they can build it into their pricing it should be doable."

The air miles of a compostable bag

"We have some bags made out of cornstarch. These are actually made in Norway. You start getting into interesting issues like where something is produced, how far does it travel to get here, how sustainable is it to bring from China or Norway to the US to market it and sell it. Then we think about the whole issue of local sustainable economies and trying to produce locally and reducing the whole ecological footprint."

"The corn starch products are coming from resin made in the USA. In the USA, 70% of the corn currently is GMO corn. It is almost impossible to get these products in non GMO corn."

"And that's just where the US is. And since this bag (he holds up the biobag made in Norway) is made in Europe and Europe has very strict laws against GMO products and bringing GMO products into the EU so this is non GMO. Then again the levels of sustainability or levels of where you want to be vary."

"One of the main things about corn starch is that it's a food source. The corn stuff is becoming an issue because a lot of the corn is going into ethanol production which is raising the price of the corn. There are a lot of interrelated issues even when you're trying to sell a green product."

Do you feel the sugar-based products are better?

"Yes, definitely, but on the other hand you do need plastic. It can serve the function of what a bio-plastic does. The technology can hopefully move somewhere where we don't have to use a food source and they can use some agriculture waste or something else to produce these things."

"Another issue is that all the products that come to us are wrapped in plastic except for the utensils. We're selling products that are biodegradable, but the packaging is still plastic. So this is plastic packaging for a biodegradable container. We're trying to move to corn packaging for all the products."

"The drawbacks are that this is much more expensive; the other thing is we work with different factories; this is made in Taiwan right now and we have to ship this to different factories and they have to have the technology to work with this material to make bags out of it. You can't just use a normal plastic machine to make bags out of this. It's a different material and requires different processing even when making bags."

What happens if people throw away these products instead of composting them? Will they break down in landfills?

"That is a very hard question to answer because normally landfills, at least in the US, are designed to be tomb landfills where nothing actually biodegrades and the reason for that is they don't want all the toxic chemicals leaching into the groundwater or getting into the ground so they are lined with a liner to keep the bio-degradation rate very low."

"So if the sugar cane gets into the landfill it will probably take as long as paper takes to biodegrade. Now with these it's hard to say, as in a normal compost pile it takes about 6 months for these to biodegrade, so in a landfill it could be a few years. Still if you look at it in terms of energy it's still 30% more energy efficient than doing plastic."

Composting as the new recycling

"The infrastructure for composting these products is kind of like recycling was 20 years ago; cities and counties don't have the infrastructure for taking this up and composting them in commercial composting facilities. We're late getting there, but by 2015 cities in California are required to redirect more than 70% of their waste away from landfills."

"And the reason for that is that we're running out of landfill space across the country and as you run out of landfill space organic food waste, which accounts for 30% of what goes into the landfills, becomes a natural thing to direct out of the landfills."

"If you can compost them these biodegradables become a natural addition to that food waste because businesses and restaurants can just throw this stuff into their regular compost pick-up or food waste which would be picked up by the city or the county and taken to a commercial compost facility to be composted."

"San Francisco and Oakland just passed laws to ban Styrofoam and all commercial businesses are required not to use Styrofoam and have an alternate end; it doesn't have to be compostable, but it can not be Styrofoam. Within 2-4 years most of the cities in the Bay Area will have commercial compost pick-up."

Do you think eventually we can find a reusable solution for takeout- something that we won't dispose of?

"Yes. That's something we talk about here. We say, 'What are we doing, we're replacing something that is not good with another disposable item, it still takes energy, water and still ends up in a compost'. It's not an ideal situation. An ideal situation would be where either the consumers or restaurants provide a more sustainable alternative."

"I heard that in Germany some restaurants are giving some people these reusable containers, but they charge them a deposit when they take them out and when they bring them back in they get their deposit back which is a much better way than using the disposables so hopefully we can move to that level."

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