Fantastic Plastics: Seeking the genuinely biodegradable

Imagine living without your Bruce Springsteen albums or Saran Wrap or disposable diapers or a thousand other indispensable items made out of that miracle resin, plastic. Plastic is everywhere, as much a part of our consumerism as credit cards, the "plastic" money that keeps our wobbly economy going.

But unlike paper products, tin cans, glass and other substances, plastic is an environmental double whammy—it doesn't degrade *and* it's hard to recycle. Although plastic products account for only 14 percent to 21 percent of the volume in American landfills, according to the Environmental Protection Agency (about 25 percent in California), that number could double by century's end. As more and more recyclable materials are siphoned from the waste stream and reused, plastic may well dominate landfills by the turn of the century.

Some environmental purists contend that the solution is to eliminate plastics altogether—especially after last year's debacle over sham "degradable" trash bags sold by Mobil and other corporations. But a nation hooked on plastic isn't likely to kick its habit overnight.

The answer might lie in *truly* biodegradable plastics produced by genetically modified bacteria. Biologists have known for decades that under the right conditions, bacteria will convert sugar into polymers. With a little genetic tweaking and the right diet, bacteria can generate plastics suitable for everything from condoms to six-pack yokes. ICI Americas, for example, recently created the first totally degradable shampoo bottle for Wella Corp. of Germany. Once production costs drop, by the mid-1990s, biodegradable plastics could sweep the packaging industry, especially if an environmentally sensitive Congress mandates their use.

But how easily these new wonder plastics degrade—and when they should be used—is already being debated. "These plastics only degrade in a controlled environment with the right bacteria and lots of water—something that landfills lack," says Dr. William Jewell, a Cornell biologist who has studied biodegradable plastics.

Tom Galvin, a consultant to ICI and the company's former business manager for biopolymers, admits that bacterial plastics won't degrade in landfills. But university research and ICI's studies show that bacterial-generated plastics will break down as long as water is present, making them ideal for agricultural composting. "Put biodegradable plastic in the soil and it can disappear in a matter of weeks or months," says Galvin.

This is the sort of talk that makes a company like Proctor & Gamble drool. Biodegradable Pampers would not only sell by the ton, but make consumers feel good about themselves. Although P&G is mum on the details, it's apparently testing ICI's products. Says spokesman Steve Collier: "In the future, if our diapers end up in a landfill, they've ended up in the wrong place. We're looking for compostable solutions." How big the market is for composting, however, is still unknown.

All this makes solid waste specialists like Lisa Collaton of the Environmental Action Foundation a little uneasy. "We're not discounting bacterial plastics, but with products like diapers, there are plenty of good reusable alternatives," says Collaton. Biodegradable plastics won't solve our trash crisis either, says Dr. Jan Beyea, a senior scientist at the National Audubon Society: "Overpackaging is still the problem—it's 30 percent of the waste stream and half could easily be eliminated." In short, waste reduction and recycling are still Job 1.

Nonetheless, the future of biodegradable plastics looks promising. Although they're expensive, by most accounts, they work as advertised. Dr. Oliver Peoples of MIT adds: "People forget that these plastics are totally renewable. As long as there's sugar, we can make plastics—and forget about oil". In fact, says Peoples, researchers are already growing biodegradable plastics in plants—the ultimate renewable resource.

Still, it's companies like ICI that have to make it work. Tom Galvin warns that biodegradable plastics aren't a silver bullet—and that the plastics industry can't revamp its technology overnight. "When you get right down to it," says Galvin, "the answer gets back to reduction, recycling, composting, and like it or not, incineration and landfilling."

—ROBERT LUHN