



Advocates for genetically engineered food claim it's safe, reliable and a solution to world hunger, poverty and malnutrition. Others say we don't know the long-term effects of eating foods not of the Earth, but of the lab.

Kristin V. Johnson/EJ

# No food in the lab?

BY AMANDA PETERKA

Some major food and drink companies are switching over their dairy products from those produced with synthetic hormones to those produced organically. They fear the potential hazards of genetically engineered food.

Starbucks Coffee Co., a business that has been attacked for using genetically engineered milk in coffee products, recently announced that 37 percent of its milk was made hormone-free starting January 2007.

The issue with Starbucks involves the development of recombi-

nant, or synthetic, Bovine Growth Hormone (rBGH). The hormone occurs naturally in the pituitary glands of cows, but the recombinant version is injected into them to increase milk production.

The hormone can increase rates of udder infection in dairy cows and the levels of antibiotic residues in milk, which makes it harder to treat human illness, according to the Organic Consumers Association (OCA). The public interest organization also says rBGH is linked to increased cancer rates. ►



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The synthetic hormone, which is illegal in every industrialized nation except the United States, was the first major biotech food product approved by the FDA. The Organic Consumers Association claims the FDA's review of the product was flawed.

In January 2007, Monsanto, a major producer and researcher of genetically engineered food, released a news report defending its product, POSILAC, a form of the synthetic hormone. The company said any "marketing claims" implying that milk from cows treated with the hormone was any different than milk from cows not treated with the hormone were "misleading."

Monsanto also hired a third-party testing facility and independent auditing firm to conduct a study of milk from POSILAC-treated cows, and their findings "reinforced that milk marketing claims differentiating milk based on POSILAC use are meaningless."

The Organic Consumers Association quickly disputed Monsanto's findings.

"The article is more Monsanto propaganda on its hormones," said Honor Schauland, a campaign assistant for the association.

"This so-called 'study' is a joke; they didn't even do anything to determine the origin of the supposedly conventional 'BGH'-injected milk — so they have no way to know how much, if any, of that milk came from cows injected with rBGH," wrote Charles Margulis, Center for Food Safety, in a note on the OCA Web site.

According to Shauland, the OCA is thrilled that Starbucks is reducing the amount of milk they use from hormone-injected cows, "but it would be really nice if they would go all the way."

But some wonder if there is enough organic milk available for companies like Starbucks to completely end the use of hormone-enhanced products. And if there isn't, genetic engineering could still provide a safe answer.

Genetic engineering involves mixing genes to produce new organisms. While similar in concept to cross pollination, genetic engineering is different because it makes it possible to mix species. For instance, instead of using cross pollination to mix an orchid and a carnation — two types of flowers — genetic engineering can splice bacteria genes into some varieties of corn, two unlike organisms.

The goals of producing genetically engineered food range from reducing the use of pesticides to creating heartier, more fruitful crops of existing food products. Genetic engineering was first used to produce healthier papayas in Hawaii in response to a poor crop.

However, many groups, such as Mothers for Natural Law, contend that the technology is still being developed and that there is no way to know the potential effects on humans.

"Genetic engineering is the largest food experiment in the history of the world. We are all the guinea pigs," the group says on its Web site.

The main concerns surrounding genetically engineered food are ethical, scientific and social. Can genetically engineered organisms still be considered food? Can the technology help world problems like poverty and starvation? But more importantly, is the technology safe for both humans and ecosystems?

The genetic engineering of food for human consumption began before the 1990s, but the first commercially grown GE food to be introduced to the market was the Flavr Savr tomato in 1994, developed by California-based Calgene. The tomato's claim to fame was that it spoiled more slowly than organically grown tomatoes. The FDA approved the tomato for the market and mandated that GE food would not be regulated any differently than regular food, according to the GEO-PIE Project, a group dedicated to educating consumers on genetic engineering technology.

However, by 1997, due to a string

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## Mothers for Natural Law

of low tomato prices and high costs for developing the GE tomato, Flavr Savr virtually disappeared from the market.

In Calgene's place were two new companies attempting to get on the GE market wagon: DNA Plant Technologies (DNAP) and Monsanto, a company usually focused on researching, developing and selling pesticides. After suing each other over patents involving GE tomatoes, Monsanto came out the winner and has never looked back.

Since discovering the potential of GE technology, Monsanto has pushed its pesticide production to the backburner and risen to become the key figure in GE food. The equation was simple: Americans wanted cheap food, and farmers wanted the technology to get rid of pests. Monsanto could provide both with GE.

Monsanto's influence in the United States extends most widely in the production of corn, cotton, soy and potatoes and in protecting crops. To control caterpillar populations in corn crops, for instance, Monsanto spliced bacteria that are toxic to caterpillars into corn. The resulting "Bt corn" was approved in 1995 by the FDA, according to a Monsanto news release.

By reducing the amount of pesticides needed to grow a full crop, Bt corn also reduced the number of people who are exposed to the pesticides.

According to a PBS feature on GE food, within a couple years, the majority of soy and cotton and one-third of corn were GE.

Bt corn was brought to the forefront of public attention in 1999

when an issue of *Nature* "suggested that Bt corn could harm monarch butterflies when the caterpillars were given no choice but to feed on milkweed leaves heavily coated with Bt corn pollen," read that same Monsanto news release.

Monsanto denied monarch butterflies were being harmed by Bt corn and launched its own investigation. The project was funded and carried out by the Agricultural Research Service, led by entomologist Richard L. Hellmich with the Corn Insects and Crop Genetics Research Unit in Ames, Iowa.

Hellmich's study found that less than 30 percent of the pollen corn produces ends up on milkweed leaves, which the butterflies feed on. "And most of that gets deposited on milkweed within the cornfield," Hellmich said.

Monsanto also argued that the alternative to GE technology — massive spraying of pesticides and insecticides on fields — kills more butterflies.

Subsequent articles in *TIME* and other publications did more than just report the threat to monarch butterflies. Known throughout the country for their dashing colors, monarchs have been a symbol of nature's beauty. The fact that these butterflies could be in danger gave anti-GE groups a symbol to rally around and brought GE technology and its dangers into public light.

Most anti-GE groups, like Greenpeace and the Union of Concerned Scientists, make the argument that since GE technology is relatively new, there is no possible way to test the long-term effects

*continued on page 43* ►



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# Lab food: Continued from page 21

on humans and the environment. That's not due to a lack of testing, but a lack of the means to test long-term effects until the product has been around longer.

Another issue anti-GE groups focus on is the threat of contaminating non-GE crops with GE-produced organisms. When that happens, farmers producing food for human consumption might not realize they are using GE technology not yet approved for humans.

For example, in September 2000, a type of GE corn considered unsafe for humans wound up on the shelves of grocery stores across the United States. Starlink corn, as it was named, contained an insecticidal protein intended only for use as animal feed.

Friends of the Earth, a group concerned with the effects of genetically engineered food, had a number of corn products tested for the protein. The genetics ID lab found traces of the substance in the Kraft Foods brand of Taco Bell shells, reported the GEO-PIE Project.

The group suggested Starlink corn found its way into more than half of the U.S. corn supply."

According to Shauland of the Organic Consumers Association, incidents like the Starlink corn contamination and the very existence of GE food can be blamed on the government. Shauland believes that the government needs to enact strict legislation on the labeling of GE products.

"In Europe, all that had to happen to get rid of GE food is that the government demanded it had to be labeled," she said. With labeling, "consumers [will] refuse to buy the products. Then the companies that produce them have no choice but to come up with something better to accommodate the customer."

If the OCA has its way, that "something better" will be produced without GE technology.

The OCA conducts its protests online, but other groups like the Earth Liberation Front (ELF), a terrorist organization, take protesting GE technology to another level. On New Year's 1999, the group used arson to make its stand against GE research. The group started a fire in the Agriculture Hall at Michigan State University, causing \$900,000 worth of damage in the offices of genetic engineering researchers.

ELF protested Monsanto providing funding to an ongoing research project meant to help developing countries. Developing countries are where GE food can be put to the ultimate test: stemming world hunger by giving food to millions in need.

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**Hugh Grant,  
chairman, president and CEO,  
Monsanto**

"We've brought better seeds and new choices to farmers in developed and developing countries to help them grow more food, spray fewer pesticides and improve their economic opportunities," said Hugh Grant, chairman, president and CEO of Monsanto, in a 2006 letter posted on the Monsanto Web site.

Monsanto has recently helped developing countries in Africa produce a GE sweet potato. The GE potato was large and healthy compared to the organic one, according to Monsanto scientists. Monsanto also helped develop an aluminum toxicity-resistant corn to combat poor soil in South America.

But anti-GE groups argue that although GE technology increases the amount of food in circulation, it doesn't tackle the distribution of food, which often leaves the poorest families hungry.

"It doesn't matter how much can be produced if you can't get it to where it needs to be," Schauland said.

In 2000, "golden rice" was supposed to be the next big thing in preventing world hunger. Genetically altered to contain Vitamin A, the rice was supposed to help reduce malnutrition and Vitamin A deficiency in developing countries. Widely touted as a miraculous product, many say the rice failed, creating a stir in the field of "functional foods" — foods modified to contain medicinal cures to a variety of afflictions, such as chronic diseases like diabetes.

"Three-hundred grams of golden rice can only provide, at most, 20 percent of an adult's daily Vitamin A require-

ment," reported Genetic Resource Action International, or GRAIN. To receive the nutritional benefit, citizens of the "golden rice" countries would have to eat 10 ounces — almost a pound — of the rice every day.

There is still much to be learned about GE technology and its ability to help developing countries. But companies like Monsanto will continue to provide products to those countries in the quest to end world hunger.

Future uses for GE technology are seemingly endless.

In 1991, researchers at DNA Plant Technology developed an experimental genetically engineered variety of tomato that expressed a gene identified in an Arctic flounder. This was done to protect the tomatoes from frost.

Although the idea never came to fruition, the idea of "fishberries" is only one of the potentialities of genetically engineered food. A recent debate centers around the idea of cloned animals being used as food. Also in the picture is nanotechnology, which would put nano particles in products to create entirely new organisms.

"It boggles my mind to even think it's quite possible to have a cloned genetically engineered nanotechnology product in the future," Schauland said.

But is all this a good thing? It may take years of experimenting to find out. 🌐

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