GMOs Questions and Answers

http://www.usatoday.com/story/news/nation/2012/10/28/gmo-questions/1658225/

Q: What's a GMO?

A: It means genetically modified organism, a common term for genetically engineered foods.

Q: What are genetically engineered foods?

A: These are plants that have had a gene from another plant inserted into them to give them some ability they didn't have before. Today there are two common genetic modifications. One is for herbicide tolerance: Plants are given a gene that protects them from harm when a farmer sprays them with herbicides to kill weeds. The other commonly added trait is a gene from a soil bacteria called *Bacillus thuringiensis* that allows plants to produce their own insecticide.

Q: How long have genetically engineered foods been on the market?

A: The first in the United States was the Flavr Savr tomato in 1994. It did not sell well because it didn't taste any better than other tomatoes.

Q: How much of our food is genetically engineered?

A: In the United States today a huge proportion of the most commonly grown commodity crops are genetically engineered: 95% of the nation's sugar beets, 94% of the soybeans, 90% of the cotton and 88% of the feed corn, according to the 2011 International Service for the Acquisition of Agri-biotech Applications report.

About 90% of the papaya grown in the United States, all in Hawaii, has been genetically engineered to allow it to withstand the ringspot virus, which virtually wiped out papaya production in the islands in the 1980s.

Very small amounts of genetically engineered zucchini, yellow squash and sweet corn are also sold in the United States.

Q: What about other foods?

A: There are genetically engineered versions of tomatoes, potatoes, wheat and rice. (See top 10 list below!)

Q: Do most of the foods I eat contain genetically engineered ingredients?

A: It depends on what you eat and what you mean by "contain."

Most unprocessed or little-processed foods, such as peanut butter, blueberries, wheat bread, milk, cheese and vegetables contain no genetically engineered ingredients.

Although it's frequently stated that 40% to 75% of the food in a typical supermarket contains genetically engineered ingredients, the actual percentage of genetically engineered material in those products is usually quite small.

Many processed foods can truthfully be said to contain genetically engineered ingredients because most contain sugar (42% of the sugar Americans consume comes from genetically engineered

sugar beets, the rest from sugar cane), vegetable oils and high-fructose corn syrup. However, in those ingredients, the processing that turns them from corn, beets or soy beans into high-fructose corn syrup, sugar or soy oil also eliminates the DNA and proteins that contain the genetic modification. They are "chemically and biologically identical" to non-GE ingredients, says Gregory Jaffe, who directs the Biotechnology Project at the Center for Science in the Public Interest, which has a neutral stance on the initiative.

Q: Why do farmers plant genetically engineered crops?

A: Although genetically engineered seed costs more than conventional seed, for many farmers the time saved and reduced use of insecticides and pesticides make them economical.

Q: Are there benefits for consumers?

A: Not really. Genetic engineering hasn't created anything that's "cheaper, tastier or nutritionally enhanced" for customers to buy, says food writer Michael Pollan. Some vegetable oils from canola, safflower and soy that have lower polyunsaturate levels are in development.

Q: Why do many people oppose genetically engineered foods?

A: There are four main reasons people oppose them:

-- Concerns about unknown dangers to human health.

-- The concentration of corporate control over agriculture by the few companies, mainly Monsanto, DuPont, Bayer and Dow, which own the technology and patents to create these crops.

-- An increase in the use of herbicides in conjunction with herbicide-resistant crops.

-- The evolution of herbicide-resistant weeds and Bt-resistant insects because these crops are so widely planted.

Q: What's the federal government's stand on genetically engineered foods?

A: Using the Coordinated Framework for Regulation of Biotechnology finalized in 1986, the Food and Drug Administration has ruled that genetically engineered foods are substantially equivalent to conventionally produced foods. In 1992, the FDA said genetically engineered crops are generally recognized as safe. FDA, in effect, said that those foods are no different from other foods and shouldn't be held to any different standards.

Q: Does the FDA test these foods before they're allowed on the market?

A: No. Instead there is a voluntary consultation process. Genetically engineered foods are overseen by the FDA, but there is no approval process. Foods are presumed to be safe unless the FDA has evidence to the contrary, Jaffe says. The FDA "has to show that there may be a problem with the food, as opposed to the company needing to prove it's safe to FDA's satisfaction before it can get on the market," he says.

Q: What about genetically engineered animals?

A: There are currently no genetically engineered animals or animal products in the U.S. food supply. However, unlike plants, the Food and Drug Administration has a mandatory premarket approval process for genetically

engineered animals. There is one genetically engineered salmon now in the approval process. It grows faster than other salmon. It has not yet been approved. Genetically engineered pigs, goats and cattle have been produced in laboratories but are not in production and have not been approved for sale.

Genetically modified food http://www.livescience.com/40895-gmo-facts.html

The range of GMOs can boggle the mind. Geneticists have bred GMO pigs that glow in the dark by inserting into their DNA a gene for bioluminescence from a jellyfish. Tomatoes have been developed that resist frost and freezing temperatures with antifreeze genes from a cold-water fish, the winter flounder (*Pseudopleuronectes americanus*). As with many early GMO experiments, that one was less effective than hoped and was never brought to market.

By far the biggest use of GMO technology has been in large-scale agricultural crops: At least 90 percent of the soy, cotton, canola, corn and sugar beets sold in the United States have been genetically engineered.

The GMO crops that are widely used have, for the most part, been genetically engineered to control pests in one of two ways: They either produce a pesticide within their tissues, or they are resistant to a pesticide like Roundup (manufactured by Monsanto Corp.).

One widely used method of incorporating insect resistance into plants is through the gene for toxin production found in the bacterium*Bacillus thuringiensis* (Bt), according to the World Health Organization. GMO crops that are modified with the Bt gene have a proven resistance to insect pests, thus reducing the need for wide-scale spraying of synthetic pesticides.

In addition to pest resistance, GMO crops can be engineered for disease resistance, drought tolerance, added nutrients, hot or cold temperature resistance and other beneficial traits. These genetic enhancements, however, aren't universally welcomed, and there's been widespread resistance to the development and marketing of GMO crops and other organisms.

How safe are GMOs?

It depends on whom you ask. A large number of anti-GMO activists — who refer to GMO crops as "Frankenfoods" — believe GMOs can cause environmental damage and health problems for consumers.

"Genetically modified foods have been linked to toxic and allergic reactions, sick, sterile and dead livestock, and damage to virtually every organ studied in lab animals," according to the Institute for Responsible Technology, a group of anti-GMO activists.

"Most developed nations do not consider GMOs to be safe," according to the Non-GMO Project. "In more than 60 countries around the world, including Australia, Japan and all of the countries in the European Union, there are significant restrictions or outright bans on the production and sale of GMOs."

However, many scientific organizations believe the fear-mongering that runs through discussions of GMO foods is more emotional than factual. "Indeed, the science is quite clear: crop improvement by the modern molecular techniques of biotechnology is safe," the American Association for the Advancement of Science (AAAS) said in a 2012 statement.

"The World Health Organization, the American Medical Association, the U.S. National Academy of Sciences, the British Royal Society, and every other respected organization that has examined the evidence has come to the same conclusion: Consuming foods containing ingredients derived from GM [genetically modified] crops is no riskier than consuming the same foods containing ingredients from crop plants modified by conventional plant improvement techniques," according to the AAAS.

"Since GM crops were first commercialized in 1996 … regulatory agencies in 59 countries have conducted extensive scientific reviews and affirmed the safety of GM crops with 2,497 approvals on 319 different GMO traits in 25 crops," according to a statement on the website for Monsanto, the world's largest manufacturer of GMOs. "The majority (1,129) of approvals on GM crops have been on the food safety of the product."

GMO labeling debated

These assurances, however, do little to appease opponents of GMO development — and there have been cases where GMOs have caused harm. Potatoes engineered with a lectin gene (for resistance to pests) were linked to stomach damage in rats that consumed the potatoes, according to a report from the University of California, Davis. And in 1989, 37 people died and about 1,500 were sickened after ingesting L-tryptophan (a nutritional supplement) that was manufactured by a strain of GMO bacteria.

In both of these cases, however, it could not be determined that the GMO food itself was the cause of the problems: The L-tryptophan, for example, may have been contaminated with an impurity that arose from the manufacturing process, not from the L-tryptophan.

The argument over the development and marketing of GMO foods has become a political hot potato in recent years. In 2012, voters in California were asked if food made from GMOs should be labeled as such. The initiative was defeated — but only after GMO proponents like Monsanto, General Mills, Pepsico, DuPont, Hershey, Cargill, Kellogg, Hormel, Kraft, Mars, Goya, Ocean Spray, Nestle and other industrial food marketers spent millions on advertising to convince voters to vote against the measure. Opponents in several states and countries continue to push for GMO labels on foods — if not outright bans on GMO foods — but industry and science insists the foods are safe, labels aren't needed and they'll just confuse consumers. Only one thing is certain: The battle for and against GMO crops, and the foods containing them, isn't likely to end soon.

Top 10 Most Common GMO Foods

1. Soy

Up to 90% of soybeans in the market have been genetically modified to be resistant to an herbicide called, **RoundUp**. This increased resistance to the herbicide allows farmers to use more RoundUp to kill weeds. However, this results not only in a genetically modified food product, but also a food product loaded with more chemicals.

2. Corn

Half of the US farms growing corn to sell to the conglomerate, **Monsanto**, are growing GMO corn. Most of this corn is going to be used for human consumption. Genetically modified corn has been linked to health problems, including weight gain and organ disruption.

3. Canola oil

Canola oil is derived from rapeseed oil. It is considered one of the most chemically altered oils sold in the US.

4. Cotton

Even cotton has been genetically modified to increase yield and resistance to disease. Most concern relates to the cotton oil which is a is a high-value cooking or frying oil and is sometimes used to make margarine. Cotton originating from India, and China, in particular, is considered higher risk for personal health.

5. Milk

One fifth of the dairy cows in the United States have been given growth hormones to help them grow faster and increase their yield. These hormones can be found in some of the milk produced by these cows. These growth hormones have been shown to act inside the human body.

6. Sugar

Genetically modified sugar beets were introduced to the US market in 2009. These sugar beets are modified to resist Roundup, like corn.

7. Aspartame

Aspartame is an artificial sweetener used instead of sugar by many people. There is some question concerning the the safety of aspartame in the body, including its possible link to certain cancers. Aspartame is manufactured from genetically modified bacteria.

8. Zucchini

Genetically modified zucchini contains a toxic protein that helps make it more resistant to insects. This introduced insecticide, has recently been found in human blood, including that of pregnant women and fetuses. This indicates that some of the insecticide is making its way into our bodies rather than being broken down and excreted.

9. Yellow squash

Yellow squash has also been modified with the toxic proteins to make it insect resistant. This plant is very similar to zucchini, and both have also been modified to resist viruses.

10. Papaya

Genetically modified papaya trees have been grown in Hawaii since 1999. These Papayas are sold in the United States and Canada for human consumption. These papayas have been modified to be naturally resistant to Papaya Ringspot virus, and also to delay the maturity of the fruit. Delaying maturity gives suppliers more time to ship the fruit to supermarkets.

These are just 10 of the most prevalent GMO foods found in the supermarket. There are many others currently for sale and being grown for the market. If you want to stay away from GMOs, always keep an eye out for a label that indicates food is organic or non-GMO.

Top 10 genetically modified foods

Corn

Soy

Cottonseed

Papaya

Rice

Rapeseed (Canola)

Potatoes

Tomatoes

Dairy products

Peas

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