How to Avoid GMOs – And Everything Else You Should Know About Genetic Engineering

It’s slowly getting harder and harder to avoid genetically modified foods, but it’s still not that hard, especially if you do your own cooking. As of 2018, GMOs remain unlabeled in the US despite mounting consumer desire to know what exactly we are eating and drinking. Some companies have begun a voluntarily labeling process, but the protocols tend to leave much to be desired. Now we have gene editing capabilities using “CRISPR technology.” We now live in a time when practically anyone can manipulate the genes of practically any living organism.

While science has taken GMOs to whole new levels, the original intent was largely to create vegetation which would be naturally pest-resistant. Prior to the development of GMOs, chemical pesticides were much in the news. Scientists strove to find a way to keep crops free from pests without the need to spray carcinogenic pesticides often, but then GMOs came under attack as being harmful as well. Along the way, GMOs evolved as science found other benefits from modifying the underlying plant in question. Bigger, larger crops were possible which, in turn, was supposed to be a financial boon.

Most of the United States largest trade partners have boycotted GM crops from the U.S, including China, Japan, and much of Europe. Sixty-four countries have enacted GMO labeling requirements. Thirty-eight countries, including 19 in Europe, prohibit GMO cultivation.

Contents

How Are GMOs Made

Genetically modified organisms are created by combining genes from one species into the DNA of a food crop or animal to produce a new trait. Because living organisms have natural barriers to protect themselves against the introduction of DNA from a different species, genetic engineers must force the DNA from one organism into another. Their methods include: Using viruses or bacteria to "infect" animal or plant cells with the new DNA. Coating DNA onto tiny metal pellets and firing it with a special gun into the cells. Injecting the new DNA into fertilized eggs with a very fine needle. Using electric shocks to create holes in the membrane covering sperm and forcing the new DNA into the sperm through these holes. Why is this done, you might ask? By inserting certain bacterial genes into crop seeds it allows farmers to spray otherwise deadly doses of weed-killer directly on the crop without killing it. Other seeds are inserted with soil bacterium Bacillus Thuringiensis (Bt) to produce an insect-killing pesticide within every cell of the plant." – Vessles

That Thrive

Recommended: ***Best Supplements To Kill Candida and Everything Else You Ever Wanted To Know About Fungal Infections***

GMOs vs Gene Editing vs Hybrid vs Heirloom

- **Heirloom** plants have been grown and saved by generations of gardeners because of specific traits.
- **Hybridization** is when two different varieties of a plant cross-pollinate.
- **Genetic engineering** is the direct manipulation of an organism's DNA using any number of methods.
- **GMO** is the genetic modification of organisms. It's been around for a while and uses imprecise methods of genetic engineering.
- **Gene editing** is now a more precise method of genetic engineering which hopes to avoid any bad associations with GMO. **CRISPR** is one such technique.

If you are anti-GMO, you've heard the argument, "All of our food has been genetically modified for years," too many times. It's true but the argument is irrelevant and flippant. Let's clear up the differences between how genes evolve, how genes are manipulated over time, and how we modify the genes.

Heirlooms

The way fruits and vegetables have been grown and propagated for thousands of years is that the seeds get saved from plants with favorable characteristics, like color, shape, size, and flavor. Besides picking seed selection, which favors certain traits, the plant's genetics are not manipulated. Today we call these plants "heirlooms." Since these seeds can be harvested and planted year after year, a farmer does not have to purchase the seeds again.

There are downsides to heirlooms. They tend to have a relatively small gene pool. They often lack disease resistance. These reasons are why we discovered and started utilizing hybridization.

Hybrids

Hybrid plants happen in nature when two different varieties of a plant cross-pollinate, and we can do this with many plants fairly easily. Seed companies will cross two specific varieties of plants in an effort to produce a plant that has the best traits of both parent plants.

Hybrids enable more people to grow more food in a variety of climates while decreasing pesticide usage and increasing crop yields, and other desirable traits. The one major downfall of hybrids is that the seeds do not generally result in plants that are identical to the parent, and the seeds are often sterile, so the seeds are typically not saved.

Genetically Modified Foods – GMOs

GMOs are created in laboratories. These plants are the result of specific, manual genetic engineering, done by artificial means. GMO stands for “genetically modified organism.” This process alters the plant’s DNA in a way that cannot occur in nature. Genetic modification usually includes the insertion of genes from other species.

Gene Editing

CRISPR-Cas9 is a new technology that enables geneticists to remove, add, or alter sections of the DNA sequence by introducing molecules into the DNA that can cut the DNA at a specific location in the genome so that bits of DNA can then be added or removed. This method of genetic editing has many advantages over genetic engineering. It is currently the simplest, easiest, most versatile, and most precise method of

genetic manipulation available, and the technology continues to get more reliable. The method doesn't introduce foreign genes to the crop. It's also relatively cost-effective, so not only are more scientists are gaining access to the technology (compared to GMO), but there are even do-it-yourself CRISPR genome editing kits for the home hobbyist.

GMO News

Scientists have found that insects have become resistant to the resistant GMOs, just as many viruses and bacteria have become resistant to the medications once used to treat infected individuals. GM corn, in particular, is designed to stop caterpillars from eating the corn, and caterpillars have evolved to withstand the technology. Now GM corn is being sprayed with more and more pesticides to combat the ever-evolving pests.

There's a new kind of GM corn that may be coming soon. Researchers have discovered a way to add a single E. coli gene to corn that enables the corn to be grown with an essential amino acid otherwise that is only found in meat.

The EPA quietly approved Monsanto's New Genetic-Engineering Technology called RNA interference:

> *DvSnf7 dsRNA is an unusual insecticide. You don't spray it on crops. Instead, you encode instructions for manufacturing it in the DNA of the crop itself. If a pesky western corn rootworm comes munching, the plant's self-made DvSnf7 dsRNA disrupts a critical rootworm gene and kills the pest.*

GMO Labeling

The USDA released a proposed rule outlining the ways in which it may implement the mandatory labeling law for GMOs, called the National Bioengineered Food Disclosure Standard (NBFDS). It was passed by the US Congress and signed into law back in the summer of 2016 by Barack Obama. This is still a proposed rule and public comments are accepted until July 3, 2018.

Food manufacturers have been fighting expensive battles against GMO for years. The concern is that they would deter customers, giving an advantage to organic food producers (organic food is not allowed to be genetically modified).

Forgoing the stigmatized terms “G.M.O.’’ and “genetically engineered,” new guidelines propose labels that would say “bioengineered” or “BE.” Food manufacturers would be able to choose one of three disclosure methods:

- Spelling out the information, like “contains a bioengineered food ingredient”
- Place a QR code on a package that directs consumers to a website with more information
- Label with a standard icon, like one of these:

GMO labeling advocates are concerned with the friendly, "smiley" nature of the images.

Will GMO Labels Include All Genetically Modified Foods?

No.

From The New York Times:

> *New gene-editing technologies let scientists tweak the DNA of plants and animals with great speed and precision, often by deleting a snippet of genetic information, or by inserting a desirable trait from one breed into another of the same species. Crops that contain such changes, which could theoretically be achieved through conventional breeding, or occur through a natural mutation, are excluded from the proposed labels.*
>
> *The labels may also exempt highly refined sugars and oils, like those made from genetically modified sugar beets and corn, which typically contain no genetic material after being*

> *processed. Consumer groups oppose that move, which could significantly curtail the number of foods that carry the label, saying that it's not just what we ingest that matters but how food is produced. Foods whose primary ingredient is non-G.M.O. meat, like beef stew, also don't have to be labeled, even if they contain other genetically engineered ingredients.*

Vitamin C derived from GM corn, vitamin E derived from soy, and vitamin B2 and B12 derived from GM yeast would also be exempt, and so would CRISPR genome edited foods and Monsanto's new genetically engineered RNA interference foods as well.

Do GMOs Increase Crop Yields?

At the time of this publication, there is a meta-study being pushed by the pro-GMO media titled, *Impact of genetically engineered maize on agronomic, environmental and toxicological traits: a meta-analysis of 21 years of field data*. Articles touting the review read something like:

> *The analysis 6,006 peer-reviewed studies covering two decades of data found that GM corn increased yields up to 25% and dramatically decreased dangerous food toxins.*

While 6,000 is a big number, only 72 studies were used in the review, and only 32 of the studies were deemed acceptable for the analysis of increased crop yields.

> *The first step of the selection procedure yielded 6,006 publications. Te subsequent refinement, by adopting the stringent criteria above described, gave 32, 5, 32 and 10 eligible publications, covering, respectively, the following categories: grain yield and quality, TOs, NTOs (non-target organisms), and biogeochemical cycles (e.g. lignin content in stalks and leaves, stalk mass loss and biomass loss, CO2*

emission).

Also, it's important to note that this is a review of many other studies over a 21 year period, not a 21 year study. The individual studies that were accepted into the analysis were comparatively short.

The reality is that GMOs, like pesticides, will increase crop yields for a period of time, but the increase is followed by an eventual and inevitable decrease in yields. Pesticides do their job until pests evolve, and the same is true of GMOs. The only way to keep crop yields high would be to develop GMOs at such a high rate that there would be no time for any reasonable testing, though many argue the tests that are done on GM food now are not adequate. With how easy and inexpensive CRISPR technology is to use, this may be how big agriculture will try to keep up with pest evolution.

From the same study:

> *Despite the high effectiveness of IR crops, the evolution of resistance in pests and a consequent reduction of the GE crop efectiveness can not be excluded. Actually, resistance and cross-resistance to Bt maize were recently detected in Spodoptera frugiperda (J.E. Smith) (Lepidoptera: Noctuidae) in Puerto Rico, Busseola fusca (Fuller) (Lepidoptera: Noctuidae) in South Africa and in the Coleoptera D. virgifera in Iowa.*

From another paper published in Oxford Research:

> *Repeated use of a single pesticide over time leads to the development of resistance in populations of the target species. The extensive use of a limited number of pesticides facilitated by GM crops does accelerate the evolution of resistant pest populations (Bawa & Anilakumar, 2013). Resistance evolution is a function of selection pressure from*

> *use of the pesticide and as such it is not directly a function of GM HT crops for example, but GM HT crops have accelerated the development of glyphosate resistant weeds because they have promoted a tremendous increase in the use of glyphosate (Owen, 2009).” – Pros and Cons of GMO Crop Farming*

Recommended: *How to Detox From Plastics and Other Endocrine Disruptors*

The problem with GMO studies

There have been some long-term studies of GMOs on animals, but these studies only compare animals in factory farming conditions where their health is already poor compared to free range livestock. Long-term GMO studies generally mean the study looks at a few years, which does not yield adequate time to see the differences in which of the unhealthy groups of animals are less healthy.

Initially, the goal of GM crops was to reduce crop loss from pests and reduce toxic pesticide and herbicide usage. Washington State University researcher Charles Benbrook demonstrated that the net effect of GMOs in the United States has caused a rise in the use of toxic chemical inputs. As the pests adapt to GMOs, more and more pesticides are needed to maintain crop yields.

Humans are the true long-term study participants, and many argue that it’s not looking good for GMOs. Autism rates are skyrocketing, as well as food allergies and other health issues, but the problem is that this can be (and should be) attributed to a wide variety of accumulated toxins, from the air we breathe to the water we drink as well as the medicines we take and inject ourselves with.

But none of this addresses the real problem with GMO studies.

The real problem is that are agriculture system is all wrong in a multitude of ways. Good health is not profitable to U.S. industry with the way we have things set up now. Food is grown for high yields, uniform appearance, and shelf-life, not health.

We don't need a study that compares the benefits of GM soybeans to non-GM soybeans. There may be little difference between GMO corn and conventionally grown corn, and there may even be little difference between GM corn and large-scale "organic" corn, especially considering how organic rules continue to be eroded by agriculture lobbyists.

We need small-scale farming that includes crop rotation and other sustainable practices, and we need to research and see which of these beneficial practices can be scaled up and how.

Current GM Crops

The most prevalent of GM crops grown today are sugar beets, soy, canola, cotton, and corn. In the United States, 93 percent of soybeans and 88 percent of corn is genetically modified, but only a few GM whole foods are available in the produce section, for now. At this time, look out for sweet corn, squash, alfalfa, and the latest addition, Arctic apples. GM potatoes are coming soon. AquAdvantage salmon has been sold in Canada and is coming to the U.S. any time now. Plenty more are on the way.

I've color coded the crops. Red means they are prevalent, and one must be vigilant to avoid them. Orange means they are not very common and easily avoidable. Black means that they are not available for consumption at this time. Click each one for more information.

- **Yeast** – This is approved in the United States for making wine and is used for making vitamins and other things.
- **Tomato** – The Flavr Savr is no longer available.

- **Squash** – GM zucchini and summer squash are not very common, but they are available, and they are impossible to detect.
- **Flax** – Not commercially produced, but GM flax has been found in Canada's flax crops.
- **Soybean** – The second-largest US crop after corn, more than 90% are GMO.
- **Cotton** – 94% of cotton grown in the U.S. is a GMO.
- **Corn** – Is most prominent GM crop in the world, includes field corn and newly introduced sweet corn.
- **Papaya** – GM papaya accounts for about 75% of the all papayas produced in the U.S.
- **Canola** – An estimated 90% of U.S. canola grown is genetically modified. Canola oil is used in cooking and biofuels.
- **Plums** – The GM plum, called c5, has not yet been approved. It is genetically altered to resist the mutation of the Plum Pox Virus.
- **Alfalfa** – It's only supposed to be grown to feed livestock, but there are reports of the GMO contaminating other crops.
- **Sugarbeets** – The root is white, contains high concentrations of sucrose, and is grown commercially for sugar.
- **Pineapple** – It's not available yet. If it is approved, it will be in canned pineapple.
- **Wheat** – Not commercially available yet, but there have been some reports of GM wheat infiltrating non-GM crops.
- **Potatoes** – The only GM potato for sale is the White Russet, but other GM potato varieties are coming soon.
- **Apples** – Non-browning fuji and granny smith apples are available at a few stores, in packages labeled as "Artic Apples".
- **Salmon** – Right now they are just sold in Canada and none have escaped confinement that we know of.
- **Rice** – Two varieties have been approved, but they are not being produced commercially, and are not for sale in

the U.S.

- **Bananas** – They are not on the market yet, but they are expected soon.
- **Microbes** – Enzymes, Hormones, and bacteria have also been genetically modified. Aspartame is produced from the excreta of GM E. Coli.

Recommended: ***Detox Cheap and Easy Without Fasting – Recipes Included***

Genetically Modified Microbes – Yeast, Enzymes, and Bacteria

When thinking of genetically modified organisms, usually the plants and animals come to mind. Genetic modification of plants and animals are used to enhance taste, shelf life, nutrition and crop losses from pests and disease.

The very first GMO created was done in the 1970s, and it was bacteria, specifically, E. coli. Researchers created GM bacteria that produced human proteins like as insulin and blood clotting factors. A wide variety of drugs, hormones, and other medical products are created with the use of genetically modified microbes.

Genetically modified enzymes are used to make cheese, bread, alcohols, sugars, and more. Food additives are also made by GM microbes, including, but not limited to vitamin E, B2, B12, C, amino acids (aspartame), xanthan, and nisin (a food preservative). These items typically do not contain any GMO material in the final product.

> *Since the 1980s, GM bacteria have even been purposefully released into the environment, after approval by the U.S. Environmental Protection Agency (EPA). In 1985, researchers took bacteria that normally encourage ice formation on plants, and got rid of a gene that they needed to do this. Consequently, plants with the modified bacteria don't form*

> *frost until around 23°F, saving the plants from damages brought upon by an early frost, or unusually cold weather. Soon after that, researchers made and released bacteria that were even better at nitrogen-fixation to help legume plants (like beans, lentils, peanuts, soy, and more). Bacteria have even been made to clean up the environment – some have been modified to break down a compound related to TNT. Ongoing work is being done to see how long the bacteria persist in the soil (often they're undetectable after a few weeks or a year, but sometimes they persist for more than two years based on some studies) to address any complications from releasing them, such as interactions with the "normal" bacteria and other organisms." – Biology Bytes*

In recent news, enzymes have been modified to break down plastics, but we also heard this about bacteria a couple of years ago, and our plastic problem is only getting worse, and fast.

Genetically modified yeast is used in making wine, and researchers have recently developed a genetically modified yeast that mimics the flavors of hops for beer production.

Genetically Modified Tomatoes

The FLAVR SAVR tomato was the first commercialized GM crop. It was first sold in 1994. It was only available for a few years before production ended in 1997. There are no GM tomatoes in production at this time. There was a disease-resistant GM tomato that designed to eliminate the need for copper pesticides, but researchers were unable to find a partner to commercialize the technology thanks to public fears.

Genetically Modified Squash

Zucchini and yellow summer squash became commercially available in the late-'90s and is grown on an estimated 24,000

acres today. Genetically modified zucchini has an added toxic protein that makes it more resistant to insects. The protein has recently been found in our blood, including pregnant women and their fetuses. To avoid GM squash, always buy organic when buying yellow summer squash or zucchini. Other varieties are not GMO.

Genetically Modified Flax

Canada's flax crop has been contaminated with trace amounts of a GMO flax, known as Triffid, named after the 1960s horror flick that starred a villainous breed of carnivorous plants. This is proving to be a big problem for Canada's flax market since Europe has banned further imports of flaxseed from Canada. The contamination is likely to slowly spread. If your flax doesn't come from Canada you should be safe from the GMO version, but buying organic from a reputable source is the safest option.

Genetically Modified Soybeans

Known as the Roundup Ready soybean, the seed was first introduced in 1996 by Monsanto to make soy crops resistant to Roundup so that farmers were able to spray large amounts of the herbicide on the soy to kill weeds and other unwanted plants without killing the crop.

It's the second largest U.S. crop after corn is the GM soy. It's grown for animal feed and soybean oil production, which is widely used for processed foods and is also common in restaurant chains. Reports say that soybean oil makes up 61% of Americans' vegetable-oil consumption. Soybean oil is used to make an emulsifier called soy lecithin, prevalent in lots of processed foods and health supplements. Any time you see soy listed as an ingredient, make sure it's certified non-GMO or it's organic. It's also important to purchase from a reputable company that tests for GMO contamination since GM soy has been discovered in organic foods, especially processed

foods coming from Asia and Latin America.

Genetically Modified Cotton

Non-organic cotton is one of the most chemically-laden crops in the world. Over 90 percent of the cotton grown in the U.S. is GM, designed to make the plant produce a protein that kills insect larva like the bollworm, and it’s also engineered to survive heavy doses of Monsanto’s Roundup herbicide. This genetic modification involves adding a bacterium called Bacillus thuringiensis, hence the name Bt cotton.

GM cotton is turned into cottonseed oil, commonly used for frying in restaurants and in packaged foods like potato chips, oily spreads like margarine, even things like cans of smoked oysters. Much of the plant is also used in animal feed, and what’s left over can be used to create food fillers such as cellulose.

Many consumers are careful to purchase organic cotton clothing, citing concerns of cotton picker’s welfare, environmental issues, and the prevalence of toxic residue on the clothing, but this crop is extremely resource-intensive, and organic cotton crops yield about half of the cotton in the same amount of space compared to GM cotton. For the sake of our ecosystem, please avoid cotton as much as possible, forgo the latest trends in fashion, keep your clothes as long as possible, and shop for used clothing at consignment stores.

Recommended: *Doctors Against GMOs*

Genetically Modified Corn

Corn, also called maize, is native to Mexico. At the time of publication, there are 142 varieties of genetically modified corn.

About 90% of all the corn grown in the United States goes to feed livestock and to produce biofuels. About 9% is processed

into high-fructose corn syrup, corn starch, corn oil, or used as the source material for some alcohols and citric acid. Recent additions of GM corn have been developed for drought tolerance, improved ethanol production, and to increase the lysine.

A few years ago corn on the cobb was safe for GMO opponents, but now we have Performance Series Sweet Corn produced by Seminis and Roundup-ready sweet corn by Monsanto, available on store shelves, and becoming more and more prevalent quickly.

GM corn contamination is becoming more and more prevalent in organic corn crops. If you eat meat or a typically modern diet of processed foods, it's probably impossible to avoid GM corn without changing your eating habits. If corn is an ingredient on the package, you'll need to know that the company is very careful to eliminate potential contamination. If you're eating meat, we suggest only buying from small, local, free-range farms that take great care to ensure that any feed they use is never contaminated. GM corn seems to be taking over the industry, and at this time it seems to be inevitable. Corn is also an extremely resource intensive crop to produce, so we recommend avoiding it whenever possible.

Incidentally, corn is one of the reasons e. Coli can infect and harm us humans. Corn is inflammatory and acidic, especially GM corn. Conventional cows and other livestock are fed lots of GM corn and given lots of antibiotics, and this inhospitable environment mutates the naturally occurring e. Coli into the dangerous food-borne illness we all know and fear, and contaminates nearby waterways via the animal's defecation and urine.

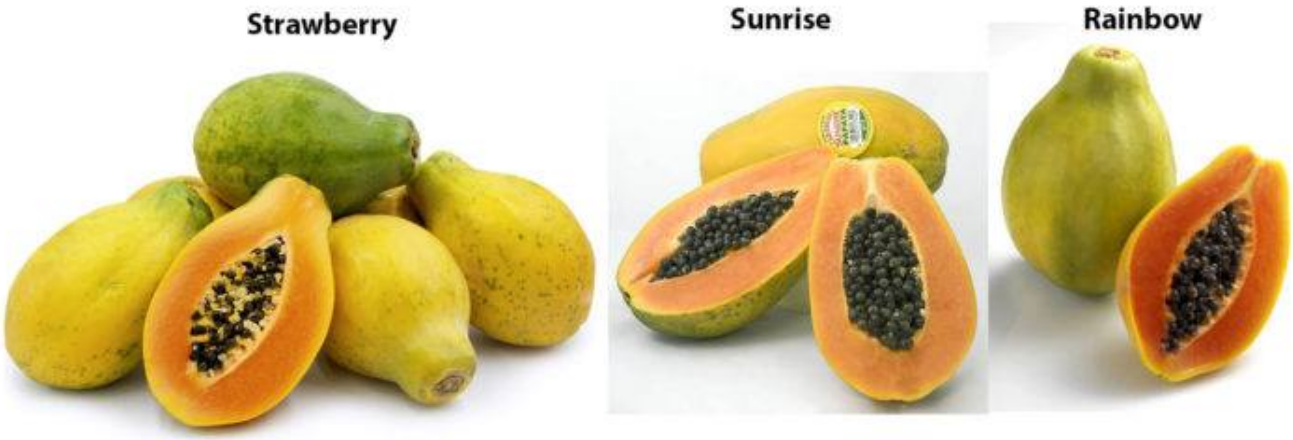
Genetically Modified Papaya

GM papaya was bred to withstand the ringspot virus, which destroys papaya plants and poised a huge problem for Hawaii's papaya crops. Some say the GMOs saved Hawaii's papaya crops,

which were near extinction, but now there is a new problem. Consumers no longer want GMOs, but the gene has spread to the extent that the island has virtually no more GMO-free papaya left. GM papayas account for about 75 percent of the 30 million pounds produced in the United States, almost all coming from Hawaii. And papaya is rarely produced to be certified organic. But there is good news.

Strawberry Papaya, also known as Sunrise papaya, is a Hawaiian grown and is the sweetest and juiciest of all the papayas. Unfortunately, it's also genetically engineered. It is pear-shaped and weighs about a pound, making it much smaller than the Mexican varieties.

Other GM papayas include the SunUp and Rainbow varieties. They look a lot like the Strawberry Papaya. Check out this link for a better description of these three and the non-GMO Kapoho Solo. The Kapoho solo is the original Hawaiian papaya; it's not a GMO or a hybrid.



Kapoho solo, Mexican Red, Caribbean Red, Maradol, Royal Star, Singapore Pink, and Higgins papayas are non-GMO.

Non-GM papaya

Genetically Modified Canola

Canola was developed in the 1970s through hybridization of the rapeseed plant. Genetically modified versions of canola came to be in the late 1990s. The plant is primarily insect pollinated, but the pollen is also able to travel by wind for great distances. GM canola is grown for cooking oil, margarine, and to for emulsifier production. It's estimated that 90% of canola grown in the U.S. and Canada are GMO Organic crops are highly susceptible to windblown contamination if they are anywhere near GM crops. We recommend avoiding canola oil altogether, GMO or not. Studies show it's not a healthy fat, organic or not.

Genetically Modified Plums

The USDA may soon approve a genetically modified plum for commercial use, which would make it the second GM fruit, following papaya. The GM plum, called c5, is engineered to resist the mutation of the Plum Pox Virus, common among stone fruit trees. This virus is said to have the potential to devastate stone fruit production. The company says approval

will open the door for other stone fruits like peaches, apricots, cherries, and almonds, which are all susceptible to the virus.

At this time the Center for Food Safety opposes the GMO approval, saying that the virus is not found in the U.S.

Genetically Modified Alfalfa

Alfalfa is grown on 22 million acres in the US, which makes it the fourth largest crop. To much controversy, the FDA approved the commercial use of GM alfalfa in 2007. The addition of a gene makes it resistant to herbicides like Roundup. GM Alfalfa is grown primarily for hay for cattle feed. This RoundupReady Alfalfa did exactly what anti-GMO advocates knew it would do; it has contaminated other alfalfa crops. A recent study by the USDA shows that this feral GE alfalfa is contaminating fields all over the Midwest, costing American alfalfa growers and exporters millions of dollars in lost revenue. Unlike corn, soybeans, or cotton GM alfalfa is pollinated by bees and other insects that travel great distances, and it grows wild near roads, ditches, and yards.

At this point, it’s very difficult for meat eaters to avoid GM alfalfa, and it’s only getting harder. Goats, pigs, cows, horses, chickens, and sheep base their diet on alfalfa, either in fresh, hay or pellet form. Livestock food producers and farms using alfalfa are not regularly testing for GMO contamination. Alfalfa has amazing health benefits, but if you’re buying it for your salads, to avoid the GMOs you’ll need to make sure it’s produced by a company that regular tests for contamination, or is otherwise able to ensure you that contamination is not possible, like with small farms that grow it indoors from organic seed.

Genetically Modified Sugarbeets

The US sugar beet industry coordinated an industry-wide

> *conversion to genetically modified sugar beets, thus eliminating a non-GMO alternative for food manufacturers and consumers. Meanwhile, production of GM sugar beet seed is likely to contaminate organic and conventional vegetable seed production in Oregon's Willamette Valley. – Non-GMO Project*

This is where I'm supposed to tell you how to make sure your sugar isn't GMO (which is to buy organic), but instead, I'm just going to say, STOP EATING REFINED SUGAR! It doesn't matter if it's organic, raw, sugar cane juice, sugar cane crystals, sugar in the raw, brown sugar, etc. Refined sugars are doing far more damage to us than any GMO on the market.

Recommended: *Sugar Leads to Depression – World's First Trial Proves Gut and Brain are Linked (Protocol Included)*

Genetically Modified Pineapple

Del Monte's new pink pineapple has been genetically engineered to produce lower levels of the enzymes that convert lycopene to the beta-carotene. If you are a fan of pineapple, you know that the enzymes are the what makes pineapple such a healthy food. Lycopene is a pigment that makes tomatoes red and watermelons pink, and beta-carotene makes pineapple yellow. Pink pineapple disease is a perplexing problem for the pineapple canned-fruit industry because the disease's symptoms almost always manifest itself after the fruit is canned, leaving the consumer to discover it. The thinking is that if the pineapple is pink to begin with, problem solved! The pineapple is slated to be grown in Costa Rica and labeled "extra sweet pink flesh pineapple."

This product is not commercially available yet. When it is on the market, it will likely be sold canned or otherwise processed, as opposed to fresh, at least at first.

Genetically Modified Wheat

Genetically modified wheat developed by Monsanto was never approved for consumption, but the GMO has escaped, it has been found growing wild in Washington State. It's only going to get worse. While contamination is still fairly rare, the only way to completely avoid it is to avoid any wheat grown in the Pacific Northwest.

> *GM wheat contamination is somewhat of a sore subject for Monsanto. In 2014, the agritech giant paid $2.4 million to settle a lawsuit filed by U.S. wheat farmers over the GM wheat scare in Oregon. Last year, the company paid another $350,000 to farmers in seven states over the same issue.*
>
> *The latest discovery of GM wheat could also impact global trade, as many countries have strict regulations over GMOs and GMO imports. — EcoWatch*

Genetically Modified Potatoes

The potato is the United States' most frequently consumed vegetable. The only GM potato currently sold is the "White Russet" potato, engineered by the J.R. Simplot Company. They have designed the potato to reduce browning and bruising and to reduce the amount of a asparagine, a naturally occurring chemical that converts to acrylamide under heat, which is believed to be a cancer-causing carcinogen.

Simplot has also received approval for other GM potatoes which are resistant to late blight, the disease that caused the Irish potato famine. They also last longer in storage through slower conversion of starch to sugars.

The company says they've grown only about 6,000 acres of the potato to be sold in 2017. There were more than 955,000 acres of potatoes grown in the U.S. in 2015. McDonald's chose not to use the potato, for now at least, but other restaurants are

buying them. They’re rare right now, but they’re still new.

Update: *Potatoes Are Here – How To Avoid Them*

Genetically Modified Apples

Another newly approved crop is an apple from a Canadian biotech company that does not brown even after it’s been sliced. It recently received FDA approval for three varieties, Golden, Granny, and Fuji. Gala is coming soon, and more to follow. At this time, they are selling these apples in plastic bags labeled as “Arctic Apples,” so, for now, they are easy to spot.

Genetically Modified Salmon

AquAdvantage, the genetically engineered Atlantic salmon, is now being sold in Canada. Wild salmon is big business for Alaska, so Sen. Lisa Murkowski and other Alaskan officials got Congress to hold up the sale of the GM fish in the U.S. The FDA blocked AquAdvantage imports until new GMO labeling regulations are in effect for food labels. FDA is mandated to

issue that regulation by late July but has not indicated when to expect the rules.

Scientists inserted into the fish's DNA a growth-hormone gene from Chinook salmon, along with genetic regulatory elements from the ocean pout. We expect to see GM salmon in America after new GMO labeling laws take effect.

Genetically Modified Rice

There are two types, but neither are commercially available.

Golden Rice

Millions of people in Asia and Africa don't get enough vitamin A. Golden rice has been genetically modified so that it contains beta-carotene, the source of vitamin A. Bu the rice has not been successful in test plots.

> *A few months ago, the Philippine Supreme Court did issue a temporary suspension of GMO crop trials. Depending on how long it lasts, the suspension could definitely impact GMO crop development. But it's hard to blame the lack of success with Golden Rice on this recent action." — Glenn Stone, professor of anthropology and environmental studies in Arts & Sciences*

Huahui Rice

The rice, known as Huahui 1, was developed by Chinese researchers, and designed be to pest resistant. It has been approved to be exported to the U.S, but China has not approved it to be sold or even cultivated. China does not allow commercial cultivation of GMOs.

Genetically Modified Bananas

Scientists in Australia have developed a banana with a genetic manipulation to increase the vitamin A content. The flesh is

described as golden-orange. This project received a $5 million grant from the Bill Gates-funded Grand Challenges in Global Health Initiative.

It’s not available for consumption yet. Other GM bananas are being developed for disease resistance.

> *Banana is an important staple food crop feeding more than 100 million Africans but is subject to severe productivity constraints due to a range of pests and diseases. [Xanthomonas wilt disease] is capable of entirely destroying a plantation while nematodes can cause losses up to 50% and increase susceptibility to other pests and diseases.*

How to Avoid GMOs in the Grocery Store

This list is as complete as I could make it, but it’s likely missing quite a few, and there are more and more coming every year. won’t last long, as new GM food varieties are approved every year. Let me know if I missed any, please!

List of Ingredients That May Be GMO

- Aminosweet
- Aspartame
- Baking Powder
- BeneVia
- Canderel
- Canola Oil (Rapeseed Oil)
- Caramel Color
- Cellulose
- Citric Acid
- Cobalamin (Vitamin B12)
- Colorose
- Condensed Milk

- Confectioners Sugar
- Corn Flour
- Corn Masa
- Corn Meal
- Corn Oil
- Corn Sugar
- Corn Syrup
- Cornstarch
- Cottonseed Oil
- Cyclodextrin
- Cysteine
- Dextrin
- Dextrose
- Diacetyl
- Diglyceride
- E951
- Equal
- Erythritol
- Food Starch
- Fructose (Any Form)
- Glucose
- Glutamate
- Glutamic Acid
- Glycerides
- Glycerin
- Glycerol
- Glycerol Monooleate
- Glycine
- Hemicellulose
- High Fructose Corn Syrup (HFCS)
- Hydrogenated Starch
- Hydrolyzed Vegetable Protein
- Inositol
- Inverse Syrup
- Inversol
- Invert Sugar
- Isoflavones

- Lactic Acid
- Lecithin
- Leucine
- Lysine
- Malitol
- Malt
- Malt Extract
- Malt Syrup
- Maltodextrin
- Maltose
- Maltose
- Mannitol
- Methylcellulose
- Milk Powder
- Milo Starch
- Modified Food Starch
- Modified Starch
- Mono And Diglycerides
- Monosodium Glutamate (MSG)
- Nutrasweet
- Oleic Acid
- Phenylalanine
- Phytic Acid
- Protein Isolate
- Shoyu
- Sorbitol
- Soy Flour
- Soy Isolates
- Soy Lecithin
- Soy Milk
- Soy Oil
- Soy Protein
- Soy Protein Isolate
- Soy Sauce
- Starch
- Stearic Acid
- Sugar (Unless Specified As Cane Sugar)

- Tamari
- Tempeh
- Teriyaki Marinades
- Textured Vegetable Protein
- Threonine
- Tocopherols (Vitamin E)
- Tofu
- Trehalose
- Triglyceride
- Vegetable Fat
- Vegetable Oil
- Vitamin B12
- Vitamin E
- Whey
- Whey Powder
- Xanthan Gum

Aisle by Aisle

In the produce section, to avoid GMOs, you'll need to be careful of conventional summer squash (yellow and zucchini), sweet corn, alfalfa sprouts, and the smaller pear-shaped papaya. These foods should be organic, and hopefully, the company tests their products for contamination. Also, avoid the Arctic apples, which are at this time being sold in easily identifiable plastic bags (see previous image). They will likely be out of their bags and sold individually soon, and conventional apples are sprayed with tons of chemicals, so we recommend yougo organic whenever possible.

In the bulk section, you'll need to make sure any grain that could be a GMO is certified as not GMO, via USDA Organic, Kosher, or Non-GMO Project Verified. The same goes for the packaged and processed foods that we shouldn't really be buying. There are other labels as well, and you should be able to trust packages that say they are GMO-free, but these are the three most popular certifications to look for:

Forget the PLU Numbers!

The PLU numbers won't help you. Articles still circulate on the web stating that PLU numbers indicate GM foods, but this is not true. Organic produce has a 5 digit PLU number, beginning with 9. Conventionally grown produce has a 4 digit PLU number. GM food was supposed to have a 5 digit PLU number beginning with 8, but this labeling is optional, and rarely if ever used.

At the Farmer's Market

The farmer's market is usually the best place to shop for produce for a multitude of reasons, but you'll often that the best food at your local farmer's market is not certified organic or GMO-free. The organic label, while still strict regarding GMOs, is allowing more and more chemicals to be sprayed on crops every year. I prefer small farmers, and they typically don't have the time, money. or inclination to get such certifications. Just ask. Farmers are proud of their growing methods and you're more likely to get a lecture about the benefits of GMOs than you will get someone lying to you. The trick is to go to the farmer's market every chance you get and get to know your favorite stalls. Ask good questions, take your time, and develop relationships.

Foods Often Mistaken for GMOs

Seedless watermelons are not GMO, their genetics are modified through hybridization methods, but I don't recommend them.

> *Seedless watermelon is grown two ways. Usually, watermelons are diploid, meaning they have two sets of 11 chromosomes. Seedless watermelon is a triploid because they have 3 sets of chromosomes and are sterile. In order to produce seedless watermelons, a diploid watermelon is pollinated by a tetraploid (4 chromosomes) watermelon. In the process of reproduction, the new watermelon gets one chromosome from the diploid parent and two from the tetraploid which makes it triploid. Since the triploids have three sets, the eggs inside the watermelon are never formed and thus, seeds don't grow. The second way to grow seedless watermelon is by using a drug called Colchicine, a chromosome-altering chemical. This US drug is toxic (though people have been using it for the treatment of rheumatism and gout without FDA approval). Colchicine changes the chromosome number in the seeds from 2 to 4. After which, the seeds are pollinated with the natural 2 chromosome watermelon. The product – a genetically modified watermelon with 3 chromosomes." – LA Healthy Living*

Seedless watermelons have too much sugar as well.

Large apples are often assumed to be GMOs, but they are not, unless they are of the new non-browning variety. Neither are purple carrots or blood oranges, any other produce that's not listed above as a GMO crop regardless of how large or funky they look. As stated above, we do modify the genetics of foods through hybridization, but that's not what we call GMO, or genetically engineered, even though they are in a sense. Also, a lot of the funky looking produce is actually heirloom fruits and vegetables that you're not used to seeing.

Popcorn is made with a kind of corn that is not genetically

modified, though it’s not the healthy snack many people think it is. Healthy corn is raw, organic corn on the cobb grown on a small farm that doesn’t spray chemicals. I find the inflammatory properties to be unnoticeable with raw sweet corn, but when cooked it feels different. I have no scientific evidence for this theory yet, but maybe you can compare the two and see for yourself.

To recap, within the produce section, at this time, the foods you should be concerned with in order to avoid GMOs are summer squash (including zucchini), corn, papaya, alfalfa, Arctic apples. We may see the White Russet potato and GE salmon in stores soon with plenty more to follow.

Conclusion

I’m not opposed to the idea of genetic modification of food, but until food companies are not primarily profit-driven and science has a much better understanding of health, I won’t trust the GMO companies. And they should be better controlled so as not to be allowed to contaminate other crops, and not grown in uncontrollable environments at all. There is likely no turning back for alfalfa and corn, and soon, others will likely follow. I’ll never be a fan of genetic modification designed to kill pests, or designed to allow heavy dosages of chemicals to be sprayed on them. These GMOs disrupt our gut’s ecosystem and consequently, they are never going to be a good idea. If the GMOs are designed to kill anything, it’s nearly certain they will kill gut microbes as well. I’m also not a fan of genetic modification to increase shelf-life, but I certainly do appreciate the motives, as we waste massive amounts of food. The problem with this approach is that our distribution is flawed due to corruption because of greed. We also have a serious lack of education that is keeping consumers in the dark. People should be taught natural health and how to grow their own food. On that note, are you growing your own food yet?

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