

Foodie Freak: Considering genetically modified foods

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 Sunday, 16 November 2008
 Last Updated Sunday, 28 June 2009

THIS COLUMN HAS BEEN CORRECTED REGARDING A REFERENCE ABOUT TOFURKY CONTAINING GM SOYBEANS, WHICH IT DOES NOT.

I hope people reading today's column aren't all doing it at the same time because the collective gasp you are all about to make could very well change the barometric pressure around the lake.

I am not opposed to genetically modified organisms (GMOs) or genetically engineered (GE) foods.

In all fairness, I am not for them, either.

I may be in the minority here in the county but let me explain my stance. I have tried to look at the situation with an unbiased eye and I'm really neutral on the subject.

Genetically modified organisms and genetically engineered products made their first massive headlines in 1994 with the Flavr Savr tomato. Opponents of genetic engineering raised such an outcry that you would have thought that this new tomato was going to escape the genetics lab with opposable thumbs and a prehensile tail and kill us all in our sleep. Due to marketing, delivery and, some say, flavor issues, the Flavr Savr tomato failed and is no longer in production.

I tend to look at genetic engineering corporations and their products sort of like Dr. Frankenstein and his monster. Dr. Frankenstein believed he was doing good work, and in a way he was doing valuable research. But he did his work completely unrestricted and without a moral compass.

The villagers became a problematic factor in the situation, allowing their emotions to rule their actions, afraid of something that they didn't fully understand. They felt completely ignored and unassured by Dr. Frankenstein during the process, while he followed his ambition regardless of the repercussions. Even the original subtitle of the story, "The Modern Prometheus," provides innuendo of man playing God and of the consequences that happen when he does.

Genetic engineering is happening right now, and like Dr. Frankenstein it goes on with little regard to what we the villagers say. However, we the villagers most likely don't understand what is really going on in that dark castle/corporation on the hill. I'm not saying that either Dr. Frankenstein or the villagers were wrong, I just think they both failed to work with each other to understand each other's views.

How GE/GMO foods came to be

In all honesty, American consumers are the ones responsible for the demand for genetically engineered foods. We want that tomato to be perfectly shaped, uniformly colored and without bruises; we want it to be flavorful and we want it to be inexpensive. Well, I'm sorry to tell you this, but nature doesn't often make tomatoes that fit that list of criteria.

In response to the American desire for perfect produce the agricultural industry began the practice of picking tomatoes before they are ripe and ripening them in warehouses. The result is that the produce ships well and looks great, but as you know they don't taste garden fresh.

To fix that problem, researchers have come forth to try to create a genetically engineered tomato that has every one of the features that we want — shape, color, taste and cheap. And if this is truly what we want, we are going to have to live with the fact that in order to get that perfect tomato it had to be genetically spliced with a fish ... or we need to adjust our expectations back to what nature provides and purchase ugly but delicious produce at the local farmer's market.

Mankind has been genetically manipulating his food sources from the beginning of agriculture ... and that's a long time ago. Cavefarmer Fred noticed that Chicken A produced more eggs and Rooster B was larger than the others, so he bred them together to make superior chicks.

Fred applied this process to all his plants and animals, and as his neighbor caught on to what Fred was up to the practice of taking a hand in the natural process spread. It's why cabbage, broccoli, Brussels sprouts, and cauliflower all originate from the same grandparent plant but result in such a variety of end products. This process is called "selective breeding";

The thing that alarms people about this new type of genetically manipulating our food is that it is that it is no longer this pea with that pea to get a superior pea, but scientists are crossing this soybean with that salmon to get a bean high in Omega 3s (there is currently experimentation in this exact genetic cross).

It's not just selective breeding anymore. Although the end results could very well be accomplished through selective breeding, the process could also very well take hundreds of years. The argument for trying these types of cross-

breeding is: why should we wait hundreds of years when we have the technology to make it available next year?

GE/GMO in the marketplace

Most of the genetically engineered crops grown in the world today are manufactured to be "Roundup Ready." Any of you have weeds and killed them with Roundup herbicide? Roundup Ready soybeans can have the entire field sprayed with Roundup and it won't harm the soybeans at all. That makes weed control a piece of cake for farmers.

These soybeans currently make up around 90 percent of the US commercial crop. This genetic manipulation is now available in sugar beets and it is expected that 95 percent of 2009 commercial sugar beet crop will be these GE beets. Cross pollination between GE beets and common beets is a concern for some since they are wind-pollinated, as opposed to soybeans which are self-pollinated and occasionally bee-pollinated. This however isn't actually as great a concern if you take a step back and realize that most sugar beets are harvested BEFORE they go to seed, so the GE genes never get a chance to escape to neighboring crops. In case you are interested in the technical data, Roundup Ready crops are engineered with genes from a soil bacterium that makes it herbicide proof.

The United States grows more genetically engineered crops than the rest of the world combined. According to the National Agricultural Statistics Service currently 88 to 90 percent of the nation's soybean acreage, 81 to 86 percent of the nation's corn acreage, and 81 to 93 percent of the nation's cotton acres are planted with genetically engineered plants. The number of acres planted with GE crops has at least doubled across the nation since the year 2000.

How many acres are planted with GE crops? In 1996 4.2 million acres were growing GE crops but in 2003 the U.S. had 105.7 million acres planted with GE crops and the number has significantly increased since then. In 2008 some statistics show that almost 100 percent of American soybeans are genetically engineered, prompting the ironic thought that vegetarians consume more GE foods than the general public at large. However, since commercially raised chicken feed is comprised mostly of soy and corn it is all but guaranteed that the chickens in our grocery stores were raised on GE feed, so everyone has had some contact in one form or another with GMO/GE products.

The Grocery Manufacturers of America estimated that up to 80 percent of the processed foods currently on our grocery store shelves contain GMO. Breads, cereals, corn syrup, crackers, cottonseed oils, hot dogs, frozen pizzas, milk, snack foods, sodas and soybean/vegetable oils all have been found to contain GMO. Farm animals that are fed GE feeds show no difference to animals fed non-GE feeds. So without a doubt most of us have eaten GMO many times and never even known it.

This has upset some people, and there are several petition Web sites against a couple of America's largest food manufacturers who are using GMOs in processed foods. There is even a movement currently promoting a GMO-free Thanksgiving, recommending people avoid certain items in order to have no GE foods at the Thanksgiving table. Unfortunately the turkey was almost assuredly fed GE feed. So, unless you pick up a shotgun, walk into the hills and find your own wild turkey ... you're having GMOs at your dinner table.

One problem with genetically engineering foods is that in order to make the highest profit off of a new product it must make it to the market as soon as possible. This usually happens with a minimum amount of safety testing; after all, testing costs money. And we all have seen in recent years items that get pushed onto the market only to be recalled later after further testing exposes problems.

GE/GMO in politics

Most of the world is against GMO and distinctly labels any foods containing them. Europe in particular has a partiality for locally grown foods from smaller farms. This is one reason that their agricultural industry was so quick to bounce back from the ravages of two World Wars, because smaller farms can produce faster than large industrial farms.

There is currently a proposed GE/GMO ban under consideration with the Lake County Board of Supervisors. I was proud of Denise Rushing's position on the latest GE debate, saying that the ban was divisive and had no middle ground. It was a very logical stance to take.

I've mentioned before that I respect a person's right to eat whatever they want, and it drives me crazy when a small group of people legislate what the rest of the population can eat. This newest proposed GE ban in the county has the air of being bum-rushed through the system without adequate discussion. In all of my research about GMO/GE foods it's only the radicals on the far extremes that seem to be heard, and they are preaching either the threat of annihilation or miracles that will save the planet. Neither is correct.

GE/GMO opponents give lists of quotes from scientists who fear the possible repercussions of GE/GMO crops, but then if you look carefully at the dates of these statements, they were made between 1991 and 1994, well before the first GE tomato was even released. Asking the scientists then what they thought about GE crops is like asking someone today what their position is on allowing non-Jedi to carry lightsabers.

Other GE/GMO opponents recount tales of "Thousands of Indian farmers committing suicide after using genetically modified crops," and the "GM genocide." This story has already been found to be junk reporting. True, 100,000 people committed suicide last year and the typical reason given for the action is due to the farmer falling into debt and/or crop failure. But this is an annual statistic in India, and no ties to GE crops have been found.

While it's nice to think that genetically engineered crops could someday feed starving nations the truth is that many people around the world starve primarily due to political and economic issues, not the lack of food. Relief efforts to Burma/Myanmar after last year's typhoon demonstrates this vividly: We had the food to give the starving people but their own government wouldn't allow its delivery.

The Food and Drug Administration, US Department of Agriculture and Environmental Protection Agency are the agencies responsible for the public's safety in consuming GE foods and they have all endorsed them. The FDA

does currently have scientists testing ways to make sure that a gene introduced into a GMO won't become an allergen.

In my research for this column I spoke to some doctors who specialize in allergies (look how much I research for you) and asked them, "Can a person be allergic to a gene?" I explained that I was talking in the context of GMO and splicing genes between "critters" They all agreed a person can't be allergic to a gene but they can be allergic to what a gene can produce. If a GE food produces a certain protein from the introduced genes that your body doesn't like then it is possible for an allergic reaction to happen, but most likely your body would digest the matter without incident.

In 2002 Oregon voters defeated a measure that would have required all GMO foods to be labeled as such. There was worry of increased food costs, concerns about the effect on the farming community and that mandatory labeling in Oregon would unfairly affect the food manufacturers' marketing throughout the country. These concerns were coupled with reassurances from the FDA that GMO foods are safe and so the measure was voted down.

This ballot measure was one of the few times we have ever seen a federal government agency give an opinion on a state measure. A poignant quote mentioned during the Oregon ballot debate was made by Donna Harris, who launched the campaign with the question, "If they're the same as everything else, then how come they have a patent on them?"

The GE lobby has given itself a personal limitation, claiming it will not alter the genetics of an organism more than 1 percent. But how shocking a difference that amount that can make is vividly demonstrated in the fact that there is only a genetic difference of 1 percent between humans and apes. So it's feasible that they could genetically engineer a chimpanzee into a human and still stay within their own limitations.

This of course is a case of "Reductio ad absurdum" (reduced to the absurd), or arguing to the point where the outcome is ridiculous, but it shows how a self-imposed regulation can sound impressive and reassuring yet still might not be enough.

If you have strong feelings against GE/GMO food and want to take some form of action against their continued production, let me just say that showing up at the genetics research companies as a mob with pitchforks and torches won't stop a multibillion dollar industry. Most of our federal politicians have pockets full of money from the GE lobby. If you want to protect yourself from genetically engineered foods then you must look at it from a fresh angle: look for a way that the politicians can keep their money yet still serve the public.

Contact your senators, members of Congress and the president and tell them you understand that GMOs are here to stay and that although you don't like it, all you want is a law requiring that every food product in the country that contains a GMO is labeled with an easy-to-see GMO logo. That way, whether you are for or against GMO products, you can purchase as an informed consumer. If your dollars are spent on products that are GMO-free, that sends a message louder than any protest with picket signs can muster.

Japan started testing GE foods back in 2000, and in recent years the Japanese consumer has shown a definite shift towards purchasing non-GE products. Since most of the GE products are produced in the US, in 2000 an international trade agreement signed by over 130 countries (including the US) required all GE foods to be labeled by the exporting nation. This has allowed many countries to reject shipments of food before they are even seen by the public. This trade agreement makes the identification and labeling of GMO foods marketed and distributed here in the states a much easier job than the government would like you to believe, because in essence it's already being done.

Man's fearful tendencies

Fear of genetically engineered food falls right into our natural psyche. After World War II, fears of the atom bomb and atomic clouds filled our nightmares. Movies showed us how atoms shrunk men, grew them to giants and mutated them into unimaginable creatures. In response people made bomb shelters in their basements and backyards, and ordained themselves into roles of post-apocalyptic Adams and Eves to repopulate the planet after the bombs dropped. Fear of communists fueled an entire era of alien invasion movies, but since the fall of the Berlin Wall that fear of being invaded has made those movies less terror-inducing.

Now we look inward and fear the unseeable. Movies like "Outbreak" and "Virus," video games/movies like "Resident Evil" and "Doom," the entire genre of zombies spreading their viral curse, and even the recent remake of "The Andromeda Strain" seemed to speak to someone. Genetics, bacteria, viruses and super-viruses are our fear inducers of the day, and just like the panic that ensued during the Halloween broadcast of "War of the Worlds" the words "genetically modified organisms" inspire a violent reaction in scores of people.

And when we are finished scaring ourselves at the movie theater we go home and see the farmer next door planting the very pods that took over the planet in his fields ... surely we aren't going to survive the night.

The anti-GE foods lobbies try to scare you by calling them "Frankenfoods," or employing Orwellian comments such as "A brave new world" and "genetic pollution." They cite studies that show how GE corn pollen kills monarch caterpillars, but this study was later found to be flawed and the results incorrect.

There is, however, a lot of anecdotal evidence of GMO products having harmful effects on humans. For instance, soy allergies in Great Britain doubled when GE soybeans were introduced, but while this is amazing evidence it is circumstantial at best. There is a lack of study connecting the two facts together as cause and effect.

Attempts at genetically engineering a strain of quinoa that didn't have a bitter outer (saponin) coating severely failed when the plants went to seed and the birds easily ate the entire crop while still in the field. This is a startling look into the priorities of companies trying to modify foods, and an area that needs tighter guidance and regulation. Quinoa is already a perfect food and the bitter seed coating a valuable by-product (evidence shows it to be a powerful organic fertilizer), but researchers still felt the need to fiddle with it some more to try to make it more marketable to the average

household. Send it to marketing, and leave it out of research and development.

Benefits versus risks

If you look at the GMO/GE issue with an unbiased eye you will see that neither side of the issue has really proved their case regarding either the safety or hazards. Both sides have their zealots and anecdotal "evidence." Many GMO/GE foods advocates over-promise what GE foods can do for us, while the GMO/GE foods opponents over-demonize them.

Potential benefits of genetically engineered foods include better taste, better nutrition, disease-resistant plants, cold-tolerant plants, drought- and salt-tolerant plants, less pesticides used in growing crops, produce that ships better and lasts longer before spoiling, trees that can absorb pollution from the soil and make it pure again, and even crops that grow with vaccines inside them. These GE crops with built-in vaccines are amusingly nicknamed "pharmed."

Potential risks of GMOs include adding allergens to otherwise safe foods, cross pollination of GE crops to wild plants and home gardens, herbicide-resistant "super pests," and possibly creating new allergens that nobody has come across before. There's also the potential for the genetic eradication of natural species, trees that release poisons that indiscriminately kill pests and animal life, corporations controlling farmers' rights by dominating the seed market, and making weeds poison-proof. And possibly the most serious risk is that they could be creating something that we haven't even thought of yet.

A major issue, Pleiotropy, is almost never mentioned in the GMO debate, which is a shame since it is potentially the biggest defense against GE/GMO and can change the entire argument.

Pleiotropic genes are ones that control both one primary genetic function and an unknown secondary function, and the different functions may be completely unrelated. For instance, the gene that gives you blue eyes may also give you a tolerance for lactose.

The potential effects of pleiotropy can be demonstrated by saying that DNA is like a schoolroom — if you add or remove one student the other students, although not necessarily related to that student, will be affected by the new dynamic. Possibly the new dynamic is barely noticeable, but if the student added or removed is a disruptive influence, the change can be quite dramatic one way or another.

If you were to liken pleiotropy to a chemical experiment, imagine adding two chemicals together that appear safe to combine, but you didn't know that one of the chemicals also had an unknown additive in it. In the case of GE/GMO, it's possible that this pleiotropic "sleeping gene" won't affect the plant or animal that has it, but when that plant or animal breeds, the genes from the other parent plant or animal awakens the gene to create ... Hey, we could write a comic book about this.

In summary

So I can hear you asking, "What do you think Ross? Are GMOs good or bad for the planet?"

The honest answer is ... We just don't know. Genetic engineering as a science is in its infancy and that's the problem — we don't know if that infant in our hands is going to grow up to be the next Hitler or the next Dalai Lama. And just like with an infant, what we do as a culture will largely decide that child's outcome.

My personal opinion on GMOs is both for and against. In my personal practices, I'm an heirloom vegetable gardener and seed saver. I don't even grow the hybrid vegetables in my garden that most people do. For this reason I am against GE plants because I'm interested in saving our culinary heritage, and a lot of that has to do with the genetics of a plant. So if my neighbor was growing GE vegetables I would definitely put some thought into the chances of cross pollination.

But when it comes to GMOs in my food, my body doesn't absorb genes at any time during the digestive process, it deals in chemicals and nutrients, so I'm not all that concerned about it. Besides, I already consume the gene that makes Roundup Ready soybeans what they are, and since I treat my plants with the organic caterpillar control *Bacillus thuringiensis* (Bt), I already inadvertently consume the genes that make Bt corn what it is, so I don't see how combining them into one critter is going to adversely affect me.

I also don't like putting a muzzle on research, but then I'm in favor of caution and common sense. So I am still for and against GMOs. I'm choosing to make my decisions on this issue the way that they grade figure skating: they throw out the highest and lowest scores and then average the remaining results.

I am throwing out the opinions of the zealots that think GE crops caused the deaths of over 100,000 Indian farmers, and also the opinions of the extreme scientists with "Monsanto" tattooed on their foreheads saying they are trying to feed the planet. I am going to be making my decisions from the information in between the two extremes.

I'm not Dr. Frankenstein, I'm not one of the villagers ... I am Gene Hackman's blind hermit with the soup and cigars.

Ross A. Christensen is an award-winning gardener and gourmet cook. He is the author of "Sushi A to Z, The Ultimate Guide" and is currently working on a new book. He has been a public speaker for many years and enjoys being involved in the community.

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