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Professor Smith

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English 122

Trick or Treat?

"Trick or Treat?" Every Halloween we hear this common saying. It is followed by the handing out of candy, and the smiles of excited children. The sweet joys that come from candy convince us of its innocence, but as we know, candy can have many health problems associated with it. Like with candy, many are concerned with the safety of genetically modified (GM) foods. While they seem innocent, studies have tested the theory that genetically modified foods are harmful to human health. Despite the reassurances by the FDA that genetically modified foods are safe, these studies have found both potential and known risks to human health in relation to GMOs. So are genetically modified foods a trick or a treat?

In recent years, GMOs have become known as a miracle crop. Advertisements made the GMO agricultural technique sound wonderful. The idea of more for less was intriguing. As Ashutosh Jogalekar wrote in his article, "Scientific American Comes out in Favor of GMOs, and I Agree," GMOs have the potential to help prevent world hunger by giving more crop yields for the same work as previous crops. Along with extra yields, GMOs were also said to reduce the need for toxic herbicides and pesticides prevalent in agriculture. Although these were strong reasons to accept GM agriculture, the companies who manufactured GM seeds continued by stating that genetically modified crops could have the potential to cure diseases by adding a sequence of DNA resistant to a particular disease (Jogalekar). With this method, lives could be

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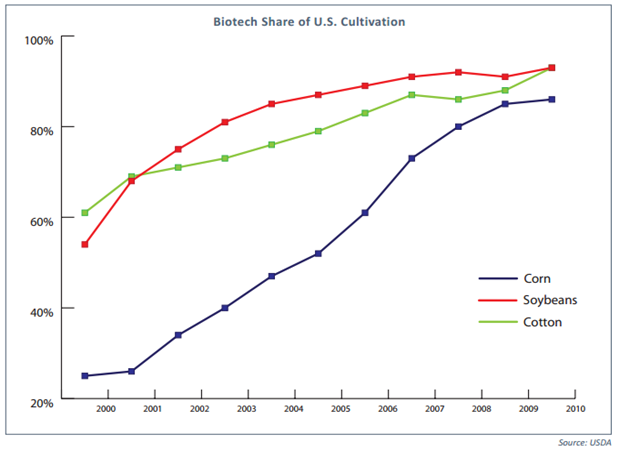
saved (Jogalekar). Advertising quickly led GMOs to their role as a major player in agriculture. Ryan Beville demonstrates this in his [](http://cdn4.gmoinside.org/wp-inside/uploads/2013/07/Biotech-Share-of-U.S.-Cultivation.png)blog, "How Pervasive Are GMOs in Animal Feed?," when he provided a graph (see Fig. 4). In this graph, Beville shows that, since before 2000 until now, there has been a large increase in certain GM crops. The alarming rate of increase in the production of corn, soybeans, and cotton demonstrates that GM crop's popularity has almost replaced non- GM forms of these plants (Beville).

Figure 4: Beville, Ryan. "How Pervasive Are GMOs in Animal Feed." gmoinside. org. Ryan Beville. 16 Jul. 2013. Web. 12 Mar. 2014.

GMOs' popularity as a crop has not been supported by everyone, however. In recent years, GMO production has become the subject of controversy. Whether it be the known or the proposed risks of GM agriculture, genetically modified foods have come under attack. People who are for or against GMOs seem to be at odds with one another, making the subject of genetic modification seem more of a political struggle than a cause for humanity. As Jogalekar writes, "I always find it depressing to hear citizens of developed countries railing against the supposed evils of GMOs from the luxury of their air- conditioned living rooms while a farmer in the developing world would likely donate an arm for a GMO crop if it's going to bring him

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greater yields and put food on his family's table." Some do treat the subject of GMOs as a political argument. People who are for or against genetically modified foods tend to want to gain support for their cause rather than focus on the needs of individuals, or the health concerns associated with GMOs. The necessity for seriousness, however, is important. There are many legitimate concerns in regards to genetically modified foods. If GMOs are to be accepted, society needs more reliable evidence supporting their safety.

In today's culture, GM crops play a major role in agriculture. It is reported that 88% of corn grown in the U.S. is genetically modified (Beville). However, although GM crops make up a large percentage of crops grown, the majority is used for uses other than human consumption. Beville writes that "Of the two largest GMO crops in the United States, 98% of soy and 79.5% of corn goes directly into feeding animals and fueling cars in the US." The remaining percentage used for human consumption is very basic. The Federal Drug Administration states in their article, "Questions & Answers on Food from Genetically Engineered Plants," that most of these products are used as basic ingredients such as: "cornstarch in soups and sauces, corn syrup as a general purpose sweetener, and cottonseed oil, canola oil, and soybean oil in mayonnaise, salad dressings, cereals, breads, and snack foods" (FDA).

Many desire to know which foods do contain genetically modified DNA. To obtain this knowledge, the FDA says that people can contact them to find which foods do contain GM products. Although the FDA will inform customers which foods contain GM products, they also encourage "voluntary labeling that provides consumers with this information" (FDA). The

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information provided in these labels is only skin deep, however. The risks from GM agriculture extend much greater than can be explained by just putting a label on a product.

The chemicals used in GM agriculture (primarily glyphosate and Roundup) are a topic of great debate, as they could present a significant health risk. Those who support genetic modification do not deny that herbicides and pesticides are unhealthy. However, those who favor GM agriculture insist that genetic modification can benefit society by decreasing the need for herbicides and pesticides. Ben Miflin, author of "Arguments in Favor of Genetically- Modified Foods," writes that by adding DNA that makes a plant resistant to herbicides and pesticides, there has been a decrease in the use of the chemicals. While less is better, these chemicals are still toxic. On the other hand, those who are anti- GM believe that GMO agriculture increases the need for these toxic chemicals. Joseph Mercola is one who believes that GM crops increase the need for these chemicals. He states in his video, "Genetically Modified Organisms- Myths and Truths" that, because of pollination, the increase of chemical resistant weeds has brought about an increase in herbicides and pesticides.

Whether the chemicals used in GM agriculture have increased or not, they have been linked to several health problems. In their article, "GMOs & The Case for Precaution," Green America presents the compelling story of Viviana Peralta and her experience with the chemicals used on GM crops. "Argentinian mother Viviana Peralta had to rush her daughter Ailen to a hospital after agrochemicals were sprayed on GM soy from planes near her home. The baby had turned blue and Peralta was suffering from respiratory problems" ( Green America 15).While this story centers around the chemicals used on a GM soy field, the risks are the same for

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any genetically modified crop using these chemicals. The respiratory problems linked with these chemicals offers a strong argument, but there are still other concerns about the effects of these chemicals. Robin Mather adds in her article, "The Threats from Genetically Modified Foods," that "eight international scientists cited study after studylinking glyphosate to birth defects in birds and amphibians, as well as to cancer, endocrine disruption, damage to DNA, and reproductive and developmental damage in mammals, even at very low doses." One of these studies was conducted by Argentinean Professor Andres Carrasco. In his study, Professor Carrasco found that when he "injected frog and chicken embryos with 2.03 mg/kg of the chemical glyphosate" they developed "malformations of the craniofacial and neural crest type, which affect the skull, face, midline, and developing brain and spinal cord" (qtd. in "Roundup and Birth Defects"). Although his study is not excepted as valid evidence, due to the fact the glyphosate was injected into the animals, it does provide frightening evidence of the potential risks (Robinson). It is especially concerning, because of the fact Professor Carrasco injected a dose that was "ten times lower than the maximum residue limit allowed for GM plants" (Robinson). This is concerning because, according to the law, the maximum limit of chemicals allowed to be on a GM plant at any given time is significantly larger than that used in the experiment of Andres Carrasco (Robinson). These findings are enough to make anyone nervous. Why would we want to risk subjecting ourselves and our children to the kind of deformities that could result from such potentially dangerous chemicals? If this damage could happen to animals, it is not unreasonable to assume it could also happen to humans.

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Several studies, however, have exposed many potential health risks to be associated with genetically modified foods. While some of these studies have been performed with other crops, many have used genetically modified corn and soy. Due to their place in our culture's food supply and their position as two of the main GM crops, corn and soy provide useful tools in judging GMO's future effects on the health of our society.

Many of these studies result in depressing findings. Those studies performed on animals have found many serious health problems. Green America found that studies performed on animals showed that GM corn could cause organ damage (15)**.** Jeffrey Smith continues this argument in his article, "Protect Yourself from Genetically Modified Foods,” when he writes that "rats fed GM corn had problems with blood cell formation."Smith also states that mortality rates in farmyard animals increased in those animals fed genetically modified corn. While these studies only show the effects of non- human study subjects, there has also been a study performed on human test subjects. Smith writes that "The only human feeding study ever conducted showed that the gene inserted into soybeans spontaneously transferred out of food and into the DNA of gut bacteria." In the same study, scientists tested these findings further. They found that the promoter, the power switch of a gene (Jaimison-McClung), of genetically modified foods may "unintentionally switch on other genes in the DNA- permanently" (Smith). The study also theorized that this promoter could "switch on dormant viruses embedded in the DNA or generate mutations" (Smith). This idea is continued by the theory that DNA injected into a plant has the ability to react with the human body creating a genetically modified human

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cell (Smith). This theory presents a concerning topic. If GM products are so prevalent in our food, then how does this idea of a GM human cell bode for our culture's health? Do we all have GM cells in our bodies?

Aside from these studies, there are many other theorized risks to GM foods. While these are just theorized, if they become reality they could have a major impact on human health. In recent years, there has been a concern that genetically modified DNA can be passed to humans without them eating GM foods directly. It has been proposed that genetically modified food traces can be passed from the animals fed GM food to humans through meats and dairy (Beville). This suggests that the products of animals who have eaten GM animal feed contain genetically modified DNA (Beville). Therefore, the humans consuming these products also consume genetically modified DNA without even knowing it (Beville). The most concerning part about this argument is that, if GMOs do prove to be dangerous, there is no way of knowing which food products contain genetically modified DNA.

Although most of these studies try to prove the harmful qualities of genetically modified foods, some do not. Jon Entine wrote in his article, "2000+ Reasons Why GMOs Are Safe to Eat and Environmentally Sustainable," that studies have shown that DNA from genetically modified foods cannot be integrated with the DNA of a human." One study supporting this, was that of Alessandro Nicolia. Nicolia, an "applied biologist at the University of Perugia" and his team studied the theory that genetically modified DNA can integrate with human DNA (Entine). The findings of this study stated that it was impossible for this to happen. Nicolia's team recorded

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that all genetically modified DNA is broken down at some point in the digestive process; making it impossible for any GM DNA to combine with that of a human (Entine). This provides comforting results. Many supporters of genetic modification also argue that these findings have no grounds. As Saul Of -Hearts said in his blog, "A Hippie's Defense of GMOs," nature has the potential to alter a plant's makeup, but because it happens naturally it does not receive the criticism of GMOs.This idea demonstrates that perhaps there is more to this controversy than just food, and suggests that this is an attempt by both sides to discredit the other. The FDA has stated that all foods must pass the same safety laws as any other non- GM food, and that they check the food carefully before releasing it to the market. They also assert that nutrition and the risks from genetically modified foods are no different than those foods not genetically modified (FDA). Entine supports this when he wrote, "All GM crops are tested against a database of all known allergens before commercialization and any crop found containing new allergens is not approved or marketed." Combined, these arguments greatly support that genetically modified foods are safe. Perhaps there is less to worry about than we have been led to believe.

While there is disagreement in all areas of genetic modification, the subject of pollination is one of the biggest controversies. Those who support and oppose genetically modified foods agree that pollination is a problem. Vancouver Sun states in their article, "What Are GMOs and Why Are They Here?," that genetically modified traces can be passed to other plants by pollination. Entine says that pollination has been recognized as a problem, but that

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steps are being taken to prevent this from happening. He also states that DNA being passed from one plant to another through pollination is nothing new, and that it has been seen in the past with plants that are not genetically modified (Entine). While this seems harmless enough, There are many disadvantages to this. For example, a genetically modified corn crop could transfer that altered DNA sequence via pollination to an organic corn crop. However this is not the only concern. Vancouver Sun also states that genetic modified pollination leads to chemical-resistant weeds. If the weeds in a farmer's field become resistant to the chemicals used to control them, then there is a chance that the weeds could overwhelm a farmer's field. Through this process Vancouver Sun says that genetically modified traces can contaminate food not thought to contain genetically modified ingredients. However, this is not the only concern. Vancouver Sun also states that genetic modified pollination leads to chemical resistant weeds. If the weeds in a farmer's field become resistant to the chemicals used to control them, then there is a chance that the weeds could overwhelm a farmer's field.

Because pollination can contaminate non- GM crops, all our food could soon be genetically modified. If GMOs are proven to be harmful, then nature could be destructive to human health. Pollination offers a useful tool, but it can also cause harm if something dangerous is introduced into nature. Our culture must be cautious when using GMOs.

Despite the many reassurances of its safety and potential for good, many cannot help but feel that genetically modified foods are a threat to society. Perhaps they are. The majority of the evidence seems to scream that GMOs are a threat to human health. However, GMOs require several long term studies before we can condemn the idea. After all, there are people in

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third world countries who view these crops as a godsend. However, the health risks that are possible from these foods are great. Even if they can feed millions, what are the benefits if they will cause intense suffering and fatal illness in the future? We need time to conduct studies to judge whether these foods are safe. If these studies show GMOs to be completely safe, then and only then should we use them. Without this data, we are as Dr. Robin Bernhoft puts it, "conducting the biggest, most uncontrolled feeding experiment in the history of humanity" (qtd. in "GMOs & the Case"). Genetically Modified foods are not the treats we were led to believe. Perhaps there is a place for GMOs in the future, but now is not the time. There are other safer ways of feeding the world.

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