Genetically Modified Organisms: Are they really so bad?

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When the term “genetically modified” comes to mind, many are quick to dismiss the thought and change the subject. When talked about, it is as if poison has just dribbled through the lips of the person brave enough to speak “that word.” More recently, the label, “NON-GMO” can be found on many food products throughout stores nationwide, however, many Americans do not seem to fully understand what that term means. It is on certain food labels in stores, it is talked about on news channels, and commercials for certain food products promote the fact that their food is in fact, “NON-GMO.” I was in that category of many Americans. I found myself quickly looking for another item if the one I picked up said “genetically modified” on it. I can specifically remember one instance.

I was housesitting for a family friend, and I had just run out of coffee creamer. Knowing they usually kept some around, I began my search. I started rummaging through their coffee supplies and came across a smaller sized one. The kind that are normally found in restaurants, except this specific kind did not have to be refrigerated. I turned over the box to read some of the ingredients, and there in bold letters it had said, “Made partially with genetically modified ingredients.” I was appalled. There was no way I was going to put something genetically modified into my body! I immediately put it back, swearing I would never make that mistake again. I want the food with the non-genetically modified label on it. I want to know that what I am eating is safe to eat. I fell into the category many Americans presently fall into. The category

of knowing just enough information to be dangerous with, yet, not fully understanding what that information is. Thousands of studies have been conducted on genetically modified organisms, all stating that there have been zero health effects from consuming GMOs. Yet, many people are still very skeptical on consuming them. So, what exactly are Genetically Modified Organisms, or, GMOs?

Many of those who have completed science classes within their lifetime have heard, and or understand what the term, “genetics” means. Everyone has certain genetics that make up who they are. According to The Science of GMOs (2019), genes are made of DNA, which tells the cells in a person’s body how to grow and develop. Whether a person has brown, or blonde hair, blue, or green eyes, how tall, or how short they will be. All those traits result from a gene sequence in a person’s DNA. However, when it comes to altering genes in certain food products, it often makes those uncertain of what kind of foods they are consuming. When something is modified, it is altered in a different state than it originally was. Clothing can be modified if there is a certain aspect about it the owner does not like. Houses can be modified by adding on a new addition, or having old siding replaced with new. When food is modified, however, it appears to be a little more concerning.

Gregor Mendel is famously known for his cross pollination of pea plants. He took the pollen of one pea plant and used it to fertilize the other, thus, creating a new species of pea plant. Conventional breeding, which is a mixture of all of the genes from two different sources, has been happening for centuries (The Science, 2019). When it comes to “pollinating” GMOs, the science behind it is more focused, and precise, compared to traditional conventional breeding of different organisms. The beginning process of creating GMOs starts out very small. Scientists begin by inserting a single gene, or two, into the DNA in a nucleus of a single cell. The DNA

used in this process, allows those plants to grow without risk of pests, fungi, and other harmful environmental factors. After the DNA is inserted into the cell, the cell itself then begins to divide, which is a naturally occurring growth process of any organism (The Science, 2019). The end product then takes on the specific functions and grows into a plant. For example, the cells used for certain crops to reduce the amount of pesticides, grow into just that. They are modified in a way that the consumers who buy them, will end up using a much lower amount of pesticide on their crops, because of that specific modified gene that has been inserted. Compared to the consumers that do not use genetically modified seeds; those individuals may have a much harder time growing certain crops if pests are a persistent problem in the area. Certain vaccines, such as insulin, also come from a genetically modified source.

While there are other products that are produced by way of genetic modification, foods that are genetically modified appear to receive the most scrutiny. A recently aired TV commercial comes to mind. A woman is reading a box of Triscuits, and is attempting to sound out, “nongenemodiscuit.” A combination of the words, “not genetically modified” and “Triscuit.” The commercial ends with the actress saying, “I am also not genetically modified.” Certain foods are exploiting the fact that they are non-GMO, however, many of the foods society currently eats today, have been genetically modified in some form or another. The average person eats about 1996.3 pounds of food each year (Sloat, 2019). Divided by the number of days in a year, an average adult consumes about 5.46 pounds of food per day. Which, without a doubt, might make individuals reconsider how much food they will be consuming from now on. Taking into consideration the average person follows the recommend food pyramid diagram; 5 to 7 servings per day of vegetables, salad, and fruits, 3 to 5 servings per day are whole meal cereals, breads, potatoes, pasta and rice, and so on. Within the vegetable category, 92% of corn is

genetically modified (About GE, 2019). Although many think genetically modified food is something that should not be taking place when it comes to food consumption, there are benefits to the modification of certain food products.

There are many concerns when it comes to genetically modified foods. One of which being, how much is it going to cost to the consumer, most of whom are farmers? In an interview by *Journal of International Affairs,* Mark Lynas begins by talking about his days as an activist against GMOs in which he would intentionally destroy crops that were genetically modified. A major turning point in his career came when he began to focus on writing about climate change and the science behind it, thus forcing him to become more scientific in his thinking. He no longer believed his own arguments against genetically modified (GM) foods. “I thought there were potential safety concerns about GMOs. But it turns out that after hundreds of studies and some trillions of meals containing GMO ingredients having been consumed, there has never been a single substantiated health concern” (GMOs, 2014). The cost of buying genetically modified seeds was another issue Lynas discussed. While the seeds may be beneficial to poorer countries, in terms of being able to withstand harsh environments, they don’t always have the means of being able to purchase those seeds. He discusses the options of being able to purchase genetically modified seeds including a genetically modified eggplant. The eggplant is insect-resistant and will be available at very low costs by public-sector scientists. While it is only one of many types of seeds being genetically modified, it is the beginning of great advancements being made by scientists.

Although Mark Lynas now promotes the beneficial uses of GM foods, there are those who do not. William G. Moseley (2017) does not believe that GMOs will feed the hungry of the world. He argues that the technology needed to make GMOs is expensive, therefore making it

inaccessible to those in poorer countries who may need the technology the most. According to Moseley (2017), “GM seeds play two roles in the supply-side approach to addressing global hunger.” An increase of agricultural production is the first role. Small scale farmers tend to rely on local technologies failing to realize their full potential. Certain donors, such as New Green Revolution, donate to these farmers, arguing that they need to advance their technologies in order to help their farms grow, which may include GM seeds. Their farms then become more commercial, connecting them to national, regional, and global markets, greatly increasing their productivity. Moseley (2017) states that because of this, household food security increases.

The second role GM seeds play, would be that they are argued to possibly be more nutritious and resilient to harsh environmental elements, with two of the dominant traits being insect protection and herbicide tolerance. The issue, Moseley (2017) argues, is that the precision of the pesticides used, because of it being in the plant, only limits the pesticides runoff, and it does not restrain insects from evolving or even becoming immune to the pesticides. While insects becoming immune to certain pesticides is a pressing issue, science is continually advancing. Scientists have also been able to produce GM foods with resistance to pesticides, harsh climate conditions, as well as different kinds of fungi that may harm the plant. Jane Brody (2018) gives an example of genetically modified corn grown in Pisa, Italy. The GM corn grown produced a higher yield compared to that of non-genetically modified corn. By genetically modifying products like that, not only does it produce a higher yield, it also decreases the use of pesticides needed to keep bugs and fungi away. Pesticides may still be a problem when they are genetically modified to be resistant, as mentioned by William G. Moseley, however, by genetically modifying the plants, it reduces the use of having to use spray on pesticides to keep bugs and fungi from harming the plant. There seems to be a much higher margin of using spray on

pesticides, compared to those that are inserted by genetic modification, for insects to become immune to such pesticides.

The stigma placed around GM foods not only takes place in America, but other countries as well. Some of the countries in sub-Saharan Africa are afraid to accept that GMOs are safe to eat until some of the rich countries accept the safety of GMOs, like those in the European Union (Daniel, 2016). Crops that can withstand harsh conditions, such like those in sub-Saharan African countries, would greatly benefit those societies. As argued by Moseley, GMOs will not feed the hungry of the world, however, they will be able to help those living in difficult climates with continual of changes in weather, flourish. While some GM foods are resistant to different pesticides, bugs, and fungi, research is being done for certain GM foods to be able to withstand droughts. By genetically modifying certain crops, those crops are now able to grow in environments they would not normally be able to grow in, such as African and Asian countries. Until the stigma that genetically modified organisms are bad for consumption, many countries, like those in sub-Saharan Africa may continue to suffer.

Over the past 20 years, genetically modified organisms have been a challenging, and highly debated topic. There are those who think they provide great advancements in not only technology, but agriculture as well. Then there are those who think GMOs are bad and contribute nothing to society, despite the years of scientific data stating otherwise. Dylan Daniel (2016) talks about the negative public scrutiny surrounding GMOs, and discusses the benefits greatly outweighing the negatives.

> There is no evidence of the existence of unique hazards either in the use of recombinant DNA techniques or in the movement of genes between unrelated organisms. The risks associated with the

> introduction of recombinant DNA-modified organisms are the same in kind as those associated with the introduction of unmodified organisms and organisms modified by other methods. (National Academy of Sciences 1987).

Many articles have mentioned the same outcome. There have been no reported accounts of GM foods causing major health concerns. One of the main reasons' society thinks genetically modified foods are bad, is because they believe their foods are being modified in a way that is harmful to them, when that is simply not the truth. Scientists genetically insert a gene from another product into the gene sequence of the product they wish to use. The combination of the two products gene sequence then creates a new DNA sequence entirely, thus making the plant resistant to certain type of harmful elements. Science classes throughout most of America, perhaps even the rest of the world, have taught that gene mutations can, and do happen, naturally. However, when it comes to scientists physically creating new gene mutations, many are quick to slam the breaks.

When something new is presented to the general population, in most cases, one of two things tend to happen. Number one: They are quick to learn everything good about the newest trend, even electing themselves as the "experts" of this information. They spread their newfound knowledge like wildfire to everyone, including those who do not wish to engage. Number two: They are quick to learn everything bad about the newest trend, even electing themselves as the "experts" of this information. They spread their newfound knowledge like wildfire to everyone, including those who do not wish to engage. Needless to say, no matter what the information is, people are quick to find the good, the bad, and ugly, and exploit it with little regards to the scientific data behind it. Jane Brody (2018) beings her article talking about just that. When it

comes to change, humanity panics and becomes afraid of what comes next. It is the fear of the unknown. Like the stigma surrounding vaccines being the cause of autism, genetically modified organisms have been no exception to criticism.

GMOs have come a long way since they were first introduced to the population. The science behind the advancement in alternative food production has faced many challenges in attempting to help those worldwide. As Moseley (2017) had stated, GMOs will not feed the hungry of the world, however, they will help reduce the use of pesticides by being genetically modified to resist the sprays used intended for insects. They will help yield higher amounts of food product. They will help keep certain fungi from growing, and the science and technology behind them will continue to advance to help those around the world. Feeding the entire world is a task entirely too large for any one being. With advances in genetically modifying foods continuing to occur, perhaps it is the beginning of a remarkable new advancement in the world today. Crops that are genetically modified to grow in harsher environments already exist, as well as those that are pesticide resistant. With technology advancing every day, advancements made in genetically modified foods are soon to follow.

Change can be hard. Change pushes individuals out of their comfort zone, and into a new realm of possibility. The fear of the unknown can sometimes be dreadful, but it can also bring great success and knowledge, especially when it comes to food consumption. Many are hesitant, or afraid that something harmful has been done that has changed, or modified, the food they consume. Mark Lynas was in that category. I was in that category. Many Americans are in that category. The category of being afraid, based simply off the word, “Genetically Modified Organisms.” However, when the data and facts are placed first and foremost, maybe, opinions can be changed for the better. Nelson Mandela once said, “Education is the most powerful

weapon which you can use to change the world" (Strauss, 2013). He was not lying. Education is the key when it comes to learning new information. Instead of reading the headline of a news story, seek out more information about that topic. Research everything on that topic and be open to criticism that may not directly relate. There are always two sides to a story and listening to them both is crucial. Not only will more doors open into the world of the educated, doors will open into the world of knowledge, and from there, the possibilities are endless.

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