

The Rise of Genetically Modified Foods

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Abstract: If every part of a crop – its leaf, stem, root – is genetically engineered to produce its own insecticide, then what effect will these chemicals and changes have to humans, insects, soil or plants that consume and surround it? The demands and expectations of society force food companies and farms to rely on alternative tactics in the production of food. This high demand has led one to neglect the unknown effects of genetically modifying the foods we eat, and the therefore creates an ethical dilemma. There are ethical theories, such as utilitarianism and minimax theory, which confirm that the benefits of feeding a growing nation through genetically modified foods are just. However, with the thorough analysis of Steven Pinker and Kwame Appiah's theories on the freedom of harm, purity and loyalty to the community, deontology, and the role of emotion, I will conclude that due to the many unknown hazards and the difficulty of government regulation, it is ultimately unethical and unnecessary to administer genetically modified foods in our society.

Introduction:

As global population has been on the rise, the opportunity cost of feeding the world has increased dramatically as well. Until this point, there was not much concern of searching for innovative and more efficient tactics in the production of food. Now, in the twenty-first century, pressing issues of world hunger have flooded the news and have forced individuals to look into cutting corners to maximize output, such as the engineering of genetically modified foods. At a glance this may seem like a very promising development, but upon further investigation, one will find that there is much long-term uncertainty and underlying skepticism associated with genetically tampering a food for human consumption. The costs to the natural species and the threats of unknown health effects and allergens from a lack of substantial research

pose potential harm to society. The main concern is whether or not it is ethical to administer GM foods to society. It is necessary to analyze various ethical theories in order to answer the ethical questions this dilemma arises. Kwame Anthony Appiah's relevant theory to these concerns is the role of emotions and how they play an important role when one makes a decision. Steven Pinker's most relevant theories to this topic will be freedom from harm, purity, community, loyalty, and deontology. GM foods are administered all over the world and therefore affect many diverse communities. There are obligations of remaining loyal to these communities, and we must explore the implications of the role of government. In addition to these theories provided by Pinker, the theory of utilitarianism and the theory of Maximizing provide a counter argument in deeming the production of GM foods as ethical. Although there are theories showing the counter arguments of administering GM foods, it is ultimately unethical to administer these products due to the increased dangers to the human body, the hazards to the environment, and the inadequate government regulation in labeling these GM products.

Background:

GM foods are foods in which the original DNA structure has been altered. This leads to a change in characteristics and quality of each altered organism. GM foods became available in the United States in 1996. At this time, foods that were being genetically engineered were mostly crops, beans, or corn. The original goal of genetically modifying plants was to make them resistant to herbicides that result in killing all the weeds and surrounding pesticides, but still not affecting the actual crops. In these cases, it is favorable for farmers because they are able to grow more crops while still preventing any damages from the surrounding weeds and herbicides (Windley 2). The United States is now the world leader in genetically engineered crop production. The United States' GM crops grew from only seven percent of soybean acres and one percent of corn acres in 1996, to ninety-four percent of soybean and eighty-eight percent of corn acres in 2011. Now there are nearly 165 million acres of crop fields around the nation.

Currently, GM organisms are not just popular among crops, but now there is also growing trend to genetic engineered animals. Today, at least sixty percent of food products in the United States' supermarkets contain GM organisms (Ahmed 215). GM production is growing rapidly in the United States, Canada, and the European Nations. These nations have been including genetic transformation through the use of biotechnology to develop new plant varieties for the production of food. The world's leading supplier of GM seeds is Monsanto. Not only does it produce GM seeds, but it also produces herbicides. Monsanto has taken over a huge part of the agricultural economy leading to the downfall of traditional farming. "The chemical giant recently turned 'life science' giant," Pollan states (Pollan (a) 1). Due to the large amount of GM products distributed by Monsanto, many consumers began to raise questions about the safety of these products. If every part of a crop – its leaf, stem, root – is genetically engineered to produce its own insecticide, then what effect will these chemicals and changes have to humans, insects, soil or plants that consume and surround it?

Human Health:

It is important to consider the many known health risks when consuming genetically engineered foods. A few of these are allergens, toxins, and antibiotic resistance. GM products can lead to an allergic reaction by injecting the genes from allergenic foods to non-allergenic foods. Michael Homer states that "Allergic consumers might then unsuspectingly ingest allergens, creating a serious safety risk since consuming mere trace amounts can cause death" (93). This is a serious concern because by genetically engineering food products, there are specific genes that have not yet been seen in human food, making the detection of allergens difficult to trace. A clear example is an incident that occurred through the intake of GM soybeans that was engineered using protein from nuts. There was a study that showed that people who were allergic to nuts also experienced extreme allergic reactions to these soybeans. In addition to allergens, toxicity is also an important aspect to consider when analyzing the safety of GM products. Laxmikanta Nayak

shares that “in 1989 a genetically engineered brand of L tryptophan, a common dietary supplement, killed 37 Americans and permanently disabled or afflicted more than 5,000 others with a potentially fatal and painful blood disorder” (114). Genetically engineered products are insect resistant and upon consumption, there is a great risk that these toxins have detrimental effects to the human body. With the increase of GM food production, there is also a large amount of GM food intake leading to a population with a much greater health risk. Finally, the transfer of antibiotic resistance genes to the human body can also pose serious health risks. Homer states that by consuming these GM products, it is “render[ing] commonly used antibiotics less effective by inhibiting their uptake” (95). When making GM products, antibiotic resistance genes help determine whether gene transfers have successfully taken place. Upon consumption, they have the potential to be transferred to the human body, thus causing antibiotics to be defective.

As Steven Pinker points out, people need to follow several moral codes, and one of them is purity. In this case, Pinker’s moral code of purity claims it is unethical to violate our right to pure, uncontaminated food. By genetically engineering these foods, the genetic component within the food is altered and leads to a product that is un-pure and genetically different from its origin. Also, it is causing harm to the community with the variety of different health risks it brings to the human body. By not following these ethical rules, administering GM foods lead to an unethical act.

In contrast to the different health risks GM foods result in, there are also some advantages, in the case of 3rd world countries. In certain cases, GM foods are beneficial to poor, developing countries. Howarth Bouis states that “nutritionists working in developing countries have demonstrated conclusively that, during times of relative economic and political stability, many children and adults, particularly women in their child-bearing years, suffer more from a lack of essential vitamins and minerals in their diets than from a lack of energy” (82). Since there is already a growing rate of malnutrition in some countries, relying on

inexpensive GM products can actually benefit them more than harm them. In this case, the difference between wealthy countries, such as North America or Europe, and poor countries, is what fraction of one’s income go directly to food. In developing countries, families spend an average of seventy percent of their total income on food. Their diets “consist primarily of staple foods, which lack the vitamins, minerals, and very likely other food components necessary to sustain good health and minimize the risk of adult onset diet-related chronic diseases” (Bouis 79). This is important because consumers in these developing countries rely heavily on the nutrition these products provide. Bouis talks about the potential diseases that could arise, but people with such low incomes usually result in an inadequate health care – as opposed to the affordability of health care provided in certain wealthy countries. Jennifer Clapp also adds that it “appears that economic considerations are reemerging as explanatory factors for food aid policy” (479). This affects both poor developing countries as well as wealthy countries, such as the United States. Countries are now in need of a surplus amount of food and it becomes difficult to obtain these products in a quick, efficient way. Over time there is a higher demand of food in all developing countries and GM products allows for a different outlet in receiving these needed essentials.

With that in mind, one can analyze if, in this case, it is ethical to administer these GM products. Pinker provides an ethical theory on utilitarianism that states we must do the greatest good for the greatest number of people. This theory is very important for the idea of obtaining a more efficient and quicker way to feed people. Because there is a rise in the global population, there are more people in need of food, leading to an increased cost in mass production. The quality of food is being sacrificed in order to do the greatest good for the greatest number of people. Another relevant theory in this topic is minimax theory. This Veil of Ignorance theory suggests that if people were to wear such a veil, we would be able to maximize benefits to those who have the minimum number of goods in society. In this case, by providing a more nutritious

food supply to countries with increased malnutrition, administering GM products would be an ethical act.

Effects on the Environment:

As mentioned before, crops were originally altered for certain agricultural benefits that they provide, such as a resistance to herbicides or insects. These pose many beneficial impacts on farmers as well as the environment. Homer shares that “the crops have allowed farmers to substantially decrease their use of pesticides and herbicides, thus decreasing the release of these toxins into the environment, and the amount of pesticide residues and contaminant digested by consumers” (90). This is important because these types of crops can increase the efficiency in the farmers’ crop production. Another way that this type of farming is beneficial is that it can decrease the usage of oil products. Since most of these spraying products are primarily oil based, decreasing the amount that the farmers have to use these products can lead to a significant decrease in the oil usage. There is a high demand for oil in this economy, and it would be beneficial to reduce the amount of oil products used, such as these herbicides. With the use of these GM crops, the farmers are also able to maintain their weeds as well as decrease the overall use of herbicides. As an example, Nayak shares the significance of these crops to a community. Currently, India is the second largest producer of brinjal, also known as eggplants, which is prone to being attacked by many insects, pests, and diseases. Nayak states that “the Mahyco MLT field tests in 2004 to 2006 confirmed a 42% reduction in total insecticides used for control of all insect pests in Bt brinjal versus the control” (113). Bt brinjal is the genetically engineered version of the brinjal and in this study, there is a significant drop in the number of insecticides that affected the crop as opposed to if the crop had not been genetically engineered. In these cases, there are positive effects of genetically engineering crops, not only to the environment but also to the farmers. Genetically engineering crops is a way for them to produce more profitable results, leading to a higher yield in crop production.

In contrast to tolerance of herbicides, there is a loss of

biodiversity in the crops, which is a negative effect of GM foods in the environment. As the farmers continue to grow these genetically engineered crops, the crops self-deposit different types of pesticide residues into the soil in which they grow. Homer mentions “this heightened exposure to pesticide increases the likelihood that insects will develop pesticide resistance, rendering both GM pesticides and the natural pesticides used by organic farmers less useful” (97). A great example of this is the phenomenon of the bollworm, which is a pest insect that developed a resistance to an insect-resistant, genetically engineered crop. In addition, research at Cornell University revealed that pollen from genetically engineered Bt corn was poisonous to Monarch butterflies (Nayak 115). This study just continues to show evidence that GM crops are affecting a number of insects. In addition to this, studies continue to show that the herbicide-resistant GM crops propose more of a hazard to the environment. Nayak adds that “pests and weeds will inevitably emerge that are pesticide or herbicide-resistant, which means that stronger, more toxic chemicals will be needed to get rid of the pests” (115). This presents a serious danger for the organic farmers whose pest management practices are not sufficient enough to cope with the increasing numbers of super pests and super weeds. This is a contributing factor in ultimately harming the surrounding environment more so than helping it.

Kwame Anthony Appiah’s theory can apply with respect to benefits of the environment. He argues how people are risk averse and want to avoid losses. Upon choosing to plant GM crops, farmers are making the choice in order to avoid the risk of losing profit. In addition, through the use of Appiah’s theory of emotion, these farmers choose to grow GM crops because farming is something that is integral into their daily lives, thus making the act ethical. However, this act leads to the loss of biodiversity in the soil, which can cause harm to the surrounding environment. Pinker states that we should not betray or harm our community. GM crops not only harm the surrounding environment to which they grow, but they also harm surrounding insects, animals, and

people. Growing GM crops poses more of a hazard to our community, which does not comply with Pinker's ethical theory about freedom of harm. This outweighs the claim brought up with respect to Appiah's theory and ultimately leads to an unethical act.

Role of the Government:

In order to fully inform the public about GM foods, the government must investigate thoroughly into the safety regulations of these products. In reality, this does not seem to be the case. Anton Wohlers states that there is "optimism about progress in the natural sciences and related technological innovations on the conviction that society would benefit more from GM technology if governments would interfere as little as possible and avoid the introduction of specific legislation" (20). The Food and Drug Administration issued a regulatory statement policy in 1992, which stated that the role of the government should be minimum for the overall benefit of society. This led to a problem when it came to delivering factual information to the public. Following this change in regulation, the FDA announced that GM foods posed no safety concerns to society because many of the foods that are being genetically engineered do not contain substances that are significantly different from those already in their diet. Grossman mentions, "The FDA governs GM foods under its authority to regulate food additives" (277). This could be biased information because the FDA believes that a food is only contaminated if it contains an added poisonous substance, which would make it dangerous to the health. The FDA's emphasis on consumer benefits leads to a positive public opinion on genetically modifying foods. Through this regulation, the public will remain unaware of the technological changes in food production, uninformed regarding negative environmental effects, and with little understanding about the potential dangers of GM foods.

Steven Pinker shares the idea of fairness to others around us. He mentions, "Moral goodness is what gives us the sense that we are worthy human beings" (34). This is important because our moral awareness is embedded in everyone. The FDA knows that it is intentionally

withholding valuable information to the public, which goes against Pinker's theory of following moral goodness. This dilemma also leads to Pinker's idea about remaining loyal to the community. Pinker illustrates that "we should give people what they need and we should give people what they deserve" (36). The community deserves to know more about the foods they eat and the truth about them. It is unethical for the FDA to deceive the consumers into believing false information about GM products as a benefit for themselves.

Labeling of Genetically Modified Foods:

GM foods are currently not labeled in the United States. The Food and Drug Administration (FDA) placed policies as to why these foods are not labeled. They announced that GM foods are not "materially" different from foods that are not genetically modified. Grossman mentions that "the FDA is not aware of any information showing that foods derived by these new methods differ from other foods in any meaningful or uniform way" (279). The FDA believes that "material" refers to food products that should only require different food labels if they cause health or environmental risk to the consumer. For example, if a tomato had a specific peanut protein that could cause an allergic reaction, the presence of this protein would be a "material" fact and leaving this information out would cause the label to be misleading (Grossman 279). There is also no difference in taste or smell; therefore, FDA declares genetically modified foods "equal" to other conventionally produced foods. GM foods do not need to be identified unless the specific food itself differs significantly. The main request from most consumers is that these products be labeled in order to prevent deception. Colin O'Neil's argues "FDA's continued failure to mandate labeling is an abdication of its duty to protect consumers from deception" (32). Consumers do not expect their foods to be genetically engineered without labeling, thus leading them to believe wrongly of the actual facts.

Recently, in California, there has been a first time voting option whether to label GM foods for the consumers. Not only does this issue have a huge impact on the question of labeling, but it also brings out the

awareness to the public about the United States food industry and its continued ban from labeling these products. On November 6, 2012, when it was taken to a vote, unfortunately the public denied the issue. Michael Pollan shares “there is growing sentiment in favor of reforming American agriculture and interest in questions about where our food comes from and how it was produced” (Pollan (a) 1). Many concerns have arisen from withholding these safety data from the public. Consuming GM foods may pose health issues as well as environmental hazards, thus many governments around the world are taking steps in minimizing GMO production in their country. Richard Dahl states “in Europe, six nations (Austria, France, Germany, Greece, Hungary, and Luxembourg) have enacted bans on the cultivation and import of GM products, and nearly 50 nations worldwide” (359). This is important news because the awareness of GM products is surfacing in many countries around the world. It has been slower to surface in the United States but this voting option in the fall of 2012 can change how GM foods are administered not just in California, but throughout the United States. Pollan continues to add that “what is at stake is not just the fate of GM crops but the public’s confidence in the industrial food chain” (Pollan (b) 2). Since the food industry plays an important role in consumers’ everyday lives, they have begun to question the validity on the labels of foods that they eat.

Not labeling genetically engineered food leads one to consider the ethical dilemma it presents. Steven Pinker’s ethical theory about loyalty to the community is important in this situation. They should know if what they eat is a GM product and from here have the decision of whether eat it or not. Regardless of the consumer’s decision, they would at least have the knowledge of facts about the foods they eat. O’Neil also mentions that by withholding this information from the consumers, they “abuse the public’s trust” (32). The public relies on the government and the food industry to give them facts on the labels of foods. By violating the public’s trust, they are not complying with Pinker’s ethical idea of remaining loyal to the community. Another ethical theory that applies to this situation is the theory of Deontology that was thought up by

Immanuel Kant. This theory stresses the duties of each citizen, and their obligation to fulfill them. He mentions that we shall always do our duty, as human beings, and this includes never telling a lie and never using others as a means to an end (Pinker 34). The companies and the FDA have a duty to inform the consumers of what is in the food that they eat. By refusing to label these products, they are not complying with this ethical theory.

Conclusion:

In conclusion, a thorough analysis of ethical theories proves that administering GM foods is ultimately unethical because of potential dangers to the human body, hazards to the environment, and inadequate government regulation in labeling these GM products. GM foods have been growing rapidly in the past few years, and it is important to consider the relevant ethical ramifications. GM foods bring specific genes that have never been seen before by humans, leading to risky allergens, toxins, and antibiotic resistance. This violates Pinker’s moral code of purity and our right to uncontaminated food. Although creating the most food for the greatest number of people supports Pinker’s theory of utilitarianism, the loss of biodiversity in the soil and the onset of super pests and super weeds proves the negative side-effects GM foods have on the environment. Pinker states that we should not betray or harm our surrounding community. Finally, it is unethical for the FDA to deceive customers into believing false information about the benefits of GM foods, and instead the government should serve the public’s best interest by taking a bigger stand by pushing for labeling of GM foods.

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