Are Genetically Modified Foods Safe?

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Abstract

This paper provides a thorough research about the genetically modified foods and whether or not they are safe for human consumption as well as their impact on animals and the environment. The paper further provides an analysis about the health implication and environmental consequences of using and consuming the GMOs. Moreover, the paper explores both the arguments against and for the genetically modified foods; that is, weighing both the advantages and disadvantages of this method to reach a conclusion of whether or not the genetically modified foods are safe. After exploring and shedding the light on both arguments – the pros and cons – we can raise the question of whether or not the GMOs are safe for life and health.

Genetically Modified Organisms

As its name indicates, the term genetically modified foods or organisms (GMO) is used to describe the process by which the genes of the plants and other organisms are modified or manipulated by using advanced DNA technology. As Whitman (2000) put it, "These plants have been modified in the laboratory to enhance desired traits such as increased resistance to herbicides or improved nutritional content." In fact, there are a number of ways by which the plants are modified using different methods and techniques. "In crop plants, for example, the process begins with the identification of a new characteristic, such as larger size or faster ripening time, the farmers would like in a particular crop" (Phelan, 2013, p. 198). According to a research study conducted by Smith (2005), "The process of gene insertion, for example, typically results in hundreds or thousands of mutations throughout the genome. Insertion also changes the amount of protein that natural genes produce and can destroy natural genes altogether". Another example would be the gene transfer from a plant to another such as the use of Bacillus thuringiensis (Bt) which is a "naturally occurring bacterium that produces crystal proteins that are lethal to insect larvae. Bt crystal protein genes have been transferred into corn, enabling the corn to produce its own pesticides against insects such as the European corn borer" (Whitman, 2000).

Needless to say, there are many examples of corps and other organisms that have been genetically modified for different purposes towards achieving the same outcome. For instance, modifying foods to make them insect and herbicide resistant is the most famous method used by genetic engineers to fight insects and diseases affecting the corps. Another example is the

modification of plants and/or animals to make them grow faster and bigger. The Atlantic salmon, for instance, carries a growth hormone gene from another species (Chinook salmon), along with a region of DNA from a third species (ocean spout) that acts as an "on" switch, facilitating transcription of the growth hormone gene." (Phelan, 2013, p. 202) Moreover, sometimes the famers and/or the genetic engineers infuse vitamins to some corps to enhance their health and nutritional benefits such as the case of golden rice. "Golden Rice is a variety of rice engineered to produce B-carotene to help combat vitamin A deficiency, and it has been predicted that its contribution to alleviating vitamin A deficiency would be substantially improved through even higher B-carotene content" (Paine et al., 2005).

The Arguments Against Genetically Modified Foods

It goes without saying that genetically modified food (GMO) has been a controversial issue for quite many years and this controversy has increased recently due to the widespread of GMOs and their use in many corps and foods that people consume every day. Perhaps the most serious criticism of the GMOs is their impact on the health and well-being of human beings. For example, a recent research study conducted on rats revealed that GMO corn has caused them to develop cancer tumors. As a result of consuming genetically modified corn, the rats "suffered mammary tumors, as well as severe liver and kidney damage. The researchers said 50 percent of males and 70 percent of females died prematurely, compared with only 30 percent and 20 percent in the control group." (Adams, 2013) Furthermore, the use of a GE hormone (rBGH) may pose a serious risk to human's health when consuming the cows' milk injected with this hormone. As the US food campaigner Robert Cohen put it, "Using rBGH raises IGF-1 levels in cows' milk by 80%. IGF-1, Cohen warns, is a key factor in prostate cancer, breast cancer, and lung cancer." (Harris, 2004, p. 40)

Another health concern about the GMO is the potential risk of fatal allergy in people sensitive to Brazil nuts. “Animal tests of these Brazil nut-spliced soybeans had turned up negative.” (Miller, 2012, p. 16) For example, in a recent research study, “the scientists tested the protein and determined that it reacted with the antibody called IgE. This antibody in human blood plays a key role in a large proportion of allergic reactions, including those that involve life-threatening anaphylactic shock.” (Smith, 2007) Furthermore, the opponents of GMOs point out that some of the modified corps pose a high risk to human health due to the fact that they contain harmful genes such as Gene VI. They contend that “GMOs that contain Gene VI show significant, even lethal results in animal studies. Roundup Ready corn, for example, caused tumors, organ damage, and early death in rats.” (Smith, 2012)

Furthermore, critics point to other risks and dangers associated with genetically modified foods. They argue that GMOs may not be safe for the environment as well. The example given is the genetic pollution. They explain that “The pollen produced by these plants, carrying new genes, cannot be contained. As a result, genetic pollution of natural crop varieties and of wild plant relatives may occur.” (Henningfield, 2009, p. 15) In addition, the opponents of GMOs point out to the danger of antibiotic resistance caused by foreign genes. It happens when the genetic engineers “splice a foreign gene into a plant or microbe, they often link it to another gene, called an antibiotic resistance marker gene (ARM), that helps determine if the first gene was successfully spliced into the host organism.” (Miller, 2012, p. 19)

The Arguments For Genetically Modified Foods

On the other hand, the proponents of genetically modified foods argue that GMOs are safe and would not pose any health risk to human health. They contend that there is no scientific

evidence to prove otherwise. They argue that "There have been no documented health problems linked to GM crops and no evidence that genetic modification poses greater risks than crossbreeding and gene-splicing, which given us such products as the tangelo and seedless grape." (Henningfield, 2009, p. 19) They further argue that "Plant breeding often has been successful in producing plants with increased pest and disease resistance, while retaining high yields, taste, and processing attributes." Apple and pear production is constrained by the bacterial disease called file-plight, first described in the 1870's."(Harris, 2004, p.31) Moreover, they argue that there are some benefits of using the Bacillus thuringiensis (Bt) in certain crops to fight some harmful pests. According to a study conducted by the U.S. National Center for Food and Agriculture Policy, the authors concluded that "rapid adaption of this technology is directly tied to benefits of greater effectiveness in pest control technology and very competitive cut in farmer's costs." (Betz et al., 2000)

Another argument in favor of the genetically modified foods suggests that GMOs produces healthier farm animals. The proponents contend that "Advances in genetics and rDNA biotechnology make it possible to envision ways of improving the nutritional content of animal feed by directing the plant to produce a more nutritious product." (Harris, 2004, p. 33) In addition, they proclaim that GMOs improve food safety. For example, a research study conducted by the U.S. Department of Agriculture's (USDA) Agricultural research Service have revealed that "Bt corn had lower levels of fumonisin, a potential cancer-causing agent often found at elevated levels in insect-damaged kernels. In Bt corn, fumonisin levels were 30-to-40 fold lower than in non-Bt corn varieties." (Institute of Food Technologists) Furthermore, the advocates of GMOs proclaim that there are certain medical benefits associated with the use rDNA technology. They point out that "genetically- modified strains of probiotic

microorganisms are also possible vehicles for successful delivery of vaccines and digestive aids,…Recombinant DNA biotechnology-derived vaccines are potentially cheap, convenient to distribute, and simple and safe to administer." (Harris, 2004, p. 32)

Conclusion

Returning to our hypothetical question, it is now possible to state that the genetically modified food is a controversial issue primarily affecting the consumers, and it needs a thorough study and analysis to determine its impact on the human health, animals, plants, and the environment. After weighing both sides of arguments, we may conclude that the most obvious finding to merge from this study is that safety of GMOs is yet to be determined. That is, an independent and thorough research needs to be conducted on both the genetically modified plants and animals to provide clear and convincing evidence to the public that these foods are safe and will not pose any health risk to human beings. Although some studies and experiments revealed the dangers of consuming GMOs, farmers and genetic engineers still insist that GMOs are safe and have a number of benefits for human beings and animals as well as the environment.

Needless to say, genetically modified foods pose a high risk to our health and therefore we should never consume them. Without a doubt, unnatural and altered foods may have the potential to cause cancer, allergy, and other health implications for many individuals especially those who have a weak immune system. A good example is the lab rats that developed cancer tumors and other diseases when fed GM foods. Furthermore, the recent research studies have showed an allergic reaction to GMO as in the case of Brazil nuts. Hence, I think the best solution is to stop buying GM foods and opt out for organic and traditional ones. Another

solution is to compel the GMO companies to label their products so that the consumers could choose whether or not purchasing them.

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