Genetically Modified Food: Balanced Regulation

Should governments alter their existing regulations of genetically modified food?

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Genetic modification is the scientific process by which the genome of an organism is purposefully adjusted by humans with modern biotechnology. The carefully accomplished procedure involves the precise insertion of an organism's DNA into the genetic makeup of a separate species. This transformation is manufactured in effort to provoke all replicating cells of a newly mutated organism to exhibit foreign qualities by producing the unique, desirable proteins of other animals. Recent developments within agricultural corporations like Monsanto and DuPont have allowed for the current, globalized availability of genetically manipulated consumables and industrial materials. Today, approximately 94% of soybeans, 90% of cotton, and 88% of corn produced in the United States have been genetically modified to better suit the economic interests of corporations, agriculturists, and consumers (Should You Worry About GMOs?). These cheaper, more efficient, biotechnological alternatives averagely produce greater crop yields and larger net profit as opposed to conventionally grown produce or crops requiring the expense of chemical pesticides, making them the premium choice for agricultural development. The resulting positive, economic benefits not only demonstrate the impact GMOs can have on the United States economy, but also the plausible potential for relaxing food security concerns in developing nations. While there exists no singular consensus amongst the world's varying religious societies, many theocratic leaders have voiced the common claim that GMOs, having the potential to inexpensively replenish dangerous food shortages, are not discouraged by their respective religious texts. With proper awareness and the labeling of GMO products, theocratic governments should utilize the benefits of GMOs and manage the religious, dietary restrictions of their citizens accordingly. Moreover, the growing demographic of consumers distressed by the potential health and safety hazards of genetic engineering would also enjoy the

ability, provided through labeling, to choose between GMO and non-GMO products wisely. Such labels and safety regulations would be best developed under an international group of participating countries. It is imperative that the United States and foreign nations develop their economies and support their populations through a globally regulated distribution of experimentally safe, properly identified GMOs.

Genetically modified organisms, having consistently yielded lower production and source costs, have the potential to continually benefit a nation's consumer economy. The United States Department of Agriculture, a government agency, found that "Bt corn yields were 17 bushels per acre higher than conventional corn yields in 2005 and about 26 bushels higher in 2010"(USDA, 2014). This statistical increase in annual yields illustrates how American agriculturalists are turning a larger profit each year that they invest in genetically modified corn seed. In addition to earning greater annual revenue, farmers that successfully invest in GMOs are able to significantly reduce their usage of toxic pesticides. As Bt corn seed is already equipped with "pesticidal" DNA, insects are naturally repelled from the produce without the need for systematic distributions of expensive, chemical deterrents (Welgemoed, 2007). Because of this efficient, genetically modified alternative, farmers in the United States alone were able to reduce pesticide integration by 46 million pounds (Krainin, 2004). This illustrates the amount of resources and money that can be saved when farmers switch to GM alternatives which require less labor due to their improved resistance to insects and harsh environments. Farmers are also able to secure a smaller labor force and further reduce their expenses. In 2001, farmers using GMOs had saved $1.2 billion by lowering production costs (Krainin, 2004). Farmers who had invested in GMOs had saved billions in their net production costs. The increase in crop yields,

mentioned by the USDA, and decrease in labor and production costs, as discussed by Krainin and Welgemoed, leads to lower retail prices for GMO consumers. Due to the lower costs of production for genetically modified crops versus organically cultivated crops, they have vast price differentials. According to the organic price tool from a pro-organic institution, which delivers nondiscriminatory information supporting the opposing side, in the markets of Los Angeles, California on the week of January 6th, 2015, various organic fruits and vegetables had increased price differentials by 42 to 53 percent, compared to GMOs (Rodale, 2015). This projects a demand for genetically modified organisms from consumers of low economic classes. With the increased crop yield and lower production cost of GMOs, biotechnology has proven to provide economic benefits for nations and consumers.

The economic benefits of GMOs provide potential to aid underdeveloped nations by increasing crop yield, improving crop nutritional quality and tolerance to environmental conditions. The claim that GMOs can help lessen malnutrition and food deficits in underdeveloped countries, and in doing so improve the quality of life has been argued by many scholars including Lucy Carter from the Center for Integrative Legume, an internationally-renowned research network of plant scientists and Daniel Drezner, an American author and professor of international politics at The Fletcher School of Law and Diplomacy at Tufts University. In Carter's peer-reviewed paper, *A Case for a Duty to Feed the Hungry: GM Plants and the Third World*, she claims that GMOs have significant benefits over traditionally grown crops. One of those benefits is that it increases the yield quantity since GMOs have traits such as pest resistance herbicide tolerance, salinity tolerance and viral and fungal resistance. Drezner attributes these benefits to the cost reduction of genetically modified (GM) crop

production compared to non-GM crop production as result of reduced chemical use as in the case of BT corn (Drezner, 2008). GMO crops can also be genetically altered to have higher quantities of certain nutrients. This could bring an end to micronutrient malnutrition that causes poor child development and is responsible for most hunger related deaths. An example of such is Golden Rice, that has been genetically modified to help produce Vitamin A in the body that could help prevent blindness for those who have a very singular diet based on rice (Carter, 2007). In addition Eduardo Blumwald, a researcher at University of California, Davis, has been able to make a genetically modified rice that can survive during droughts, posing a solution for the famine occurring in hot and overpopulated countries (Ostrander, 2014). The lower cost of production, higher nutritional value, and increased climate resistance of GMOs provide the potential to improve the quality of life within developing countries.

The potential of GMOs to improve the quality of life within underdeveloped countries has led many religious scholars and leaders to support their production, but despite this support there still exist much controversy over religious acceptance of GMOs which provides reason for the labeling of GM products. As validated a multi-year study published in "Altering Nature: How Religious Traditions Assess the New Biotechnologies" and involving over 40 scholars from various religious orders, religious people support the technological improvement of our world that GMOs offer (Lustig, 2004). This statement is exemplified in proclamation delivered by the Senior Vatican of the Roman Catholic Church in which he announces that GMOs are acceptable according to Catholicism because they are representative of a collective, humanitarian effort to end world hunger (Allen Jr., 2007). Esra Galun, a reputed Jewish professor at Weizmann Institute of Plant Sciences who has conducted research to create genetically modified cucumber,

argues that the GMOs are permissible under the Halacha (Jewish law) because it offers a chance to prolong human life and increase food supply (Omobowale, Singer, Daar, 2009). Though there exists much acceptance of GMOs from religious scholars, many religious leaders and scholars of the same religions believe that GMOs are against their religious ethics. This claim is supported by religious leaders such as Majid Katme, a very reputed figure in the British Muslim community, on behalf of the United Kingdom Islamic Medical Association, wrote a letter to the British government saying that in the Qur'an it is strictly forbidden to alter God's creations, as GMOs do. Similarly, a Jewish environmentalist group in the US called Teva Learning Center argue that in the Torah (Hebrew Bible) it is forbidden to genetically modify organisms because it violates the *Kilayim*, or the prohibition of the mixing of species (Omobowale, Singer, Daar, 2009). In Brazil, Comissão Pastoral da Terra (CPT), a group of Christian and Catholic farmers, has voiced anti-GMO sentiment that has made a great impact on politics. CPT argues that GMOs break their religious rules of farming, which were given to prophet Isaiah from God. Also Pope John Paul II of the Roman Catholic Church said that "using GMOs to increase production is against God's will" (Pellegrini, 2009). According to *Acceptable Genes? Religious Traditions and Genetically Modified Food*, an anthology written by various scholars who are reputed in their religious studies, many people have dietary restrictions that are broken by GMOs such those followed by devout Hindus, Muslims, and Jews (Brunk, 2009). Genetic modification often requires the insertion of an animal's genes into the genome of a plant, making GMOs animal byproducts. Much of the religious opposition stems from the belief that GMOs alter God's creations or it gives the scientist the power to play God. As there are so many diverse views on

the acceptability of GMOs in various religions, labeling would allow individuals to discern for themselves the acceptability of controversial products.

An effective implementation of GMO labels would additionally appease to physiologically skeptical consumer demographics. With the rise of the globalized GMO food supply, the controversy over the safety of a GMO-inclusive diet has grown exponentially. Despite The United States Food and Drug Administration having consistently approved GMOs for human and animal consumption, multiple contrasting studies, scientific journals, published works, and reports of life threatening products have revealed potential dangers with the patented produce.

Genetically modified organisms have been officially responsible for human health emergencies in the past and may continue to be the direct cause of medical complications until regulating agencies in federal governments suspend their untested production. The most critical dissent over the health and safety of GMOs began with a series of spontaneous illnesses in 1989, culminating in the permanent neurological injuries of over 1,500 diseased victims and the eventual fatalities of 38 Americans. It was officially determined by the FDA that a commercially produced, genetically modified amino acid supplement, called L-tryptophan, was the direct cause of the health anomalies. In most cases, the only commonality between the victims of Eosinophilia–myalgia syndrome was the recent ingestion of the nationally available L-tryptophan supplement. The drug was immediately recalled by the FDA, but the blame was placed on corporate negligence rather than the underdeveloped process of genetic modification (Khan, S. J., Muafia, S., Nasreen, Z., & Salariya, A. M.). This event serves as the most lethal recorded example of the physical harm improper genetic modification can inflict on human

beings. The collective tragedies also represent the FDA's catastrophic failure to prevent genetic modification, a yet untested science, from damaging unwary consumers. To prevent further GMO inspired diseases, the FDA or any regulatory agency must thoroughly evaluate future GM supplements before they reach the marketplace and properly label all consumables containing genetically modified material.

GMO regulation in the United States has a comprehensive framework constituting of multiple federal organizations who pass laws concerning the production and distribution of GMOs. To ensure the safety of each GM product, the federal agencies in charge of regulation are required to conduct scientific reviews before releasing them to the public market as required by the National Environmental Policy Act. The FDA regulates GMOs with no differentiation from the method used to regulate non-GM products (Federation of American Scientists, 2011; Office of Science and Technology Policy, 1986). A statement verified by both the OSTP and the non-profit organization the Federation of American Scientists which works to provide science based solutions to defend against threats to national security and well being. Though GMOs are required to receive a thorough analysis of safety by a framework of agencies, as there are several adverse health effects that are associated with GMOs proven by independent scientific research, it is clear that GMOs need their own regulatory system.

Solutions

As a result of a lack of legislative acceptance of GMOs in countries other than the United States, it has been the objective of the US to promote international cooperation in the development of biotechnology for the improvement of human health and the environment and to remove the economic barriers on the international trade of GM products. Within the report by an

Ad Hoc Group of Government Experts, including the US, convened by the international Organization for Economic Co-operation and Development (OECD) on "Recombinant DNA Safety Considerations," the group expresses that any overly restrictive legislation that hinders the development of biotechnology should be foregone (Office of Science and Technology Policy, 1986). To gain a greater perspective of the international consensus on GMO regulation it is imperative to include the international scientific consensus, which is what the OECD hopes to accomplish, whose purpose is to foster international collaboration between governments to solve social and economic issues and headquartered in Paris, France but funded by its 34 member countries.Regulatory bodies should help circulate scientific information to edify the public on the safety of GMOs to ensure the proper regulation of GMOs (Nelson, 2001). The decisions and views of the public will be founded on factual evidence and not biased sources. In hopes of accomplishing this goal the World Trade Oranization implemented the Agreement on the Application of Sanitary (human and animal health) and Phytosanitary (plant health) Measures (the SPS agreement). The SPS agreement establishes international regulations for food, animal, and plant safety while allowing countries to modify the base regulation but requiring all additions to their individual regulation to be founded upon science and to be applied only to the extent needed for human, animal or plant health as stated in paragraph 2 of Article 2 of the measure (WTO, 1998). Though the US strives to improve GMO acceptance worldwide, there exists great reluctance from many countries, due their usage usage of usage of the precautionary principle, approach to risk management states that if an action or policy has a suspected risk of causing harm to the public or to the environment, in the absence of scientific consensus that the action or policy is not harmful. Though it is very difficult to get several countries to agree on the

regulation of GMO, it is essential for the global economy to create a regulatory similar to that of the SPS, in order to at least provide a scientific consensus on the safety of GMOs, facilitating the end end of the precautionary principle.

Consumer sovereignty, the idea that the customer should be allowed to make a decision to buy the product on the basis of being provided full information. Jagadeesan Premanandh, the Acting Head of the Molecular Biology Unit in the Laboratories Division of the Abu Dhabi Food Control Authority, has found that the consumers want mandatory labeling, 88% in Canada, 83% in Taiwan and 70% in Australia (Premanandh, 2010).According to several online polls taken by various news channels, 93-96% of Americans want mandatory labeling (Acosta, 2014). Labeling the GMOs will reduce the demand for the GMO products and the cost of labeling is high for producers (Burgess,Walsh, Painter-Morland, 1999) . Unfortunately this makes it very difficult to pass the mandatory labeling law because the big companies have the lobbyist powers to manipulate the bureaucratic system to their benefit. Though consumer sovereignty is too important to be hindered by the companies that profit from the production of GMOs. The consumers have the right to know what is in their food, so that the consumers can decide for themselves if the food is acceptable according to their own ethics and religious beliefs.

Since GMOs have presented several health risks, some even leading to deaths, it is very clear that the FDA needs to follow stricter regulatory procedures based on unbiased, scientific research. Even as GMOs have shown reason for health concern, their benefits economically have been substantial, as it increases yields and lowers prices for consumers. Also GMOs have shown great potential to help impoverished and underdeveloped nations, showing a moral obligation that cannot be ignored. In order to ensure that the consumer's rights of making informed choices

and following their religious beliefs, mandatory labeling should be addressed. In resolve to the issue of GMO regulation it is apparent that to effectively regulate GM products domestically and internationally all decisions of regulatory bodies must be founded on science, these bodies must impose only the necessary amount of regulation needed to ensure public health safety, and these bodies must also establish adequate labeling systems that provide the public the opportunity to self-discern risk associated with controversial products.

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