

BIOMEDICAL ETHICS: MUSLIM PERSPECTIVES ON GENETIC MODIFICATION

by *Fatima Agha Al-Hayani*

Abstract. Technology pertaining to genetically modified foods has created an abundance of food and various methods to protect new products and enhance productivity. However, many scientists, economists, and humanitarians have been critical of the application of these discoveries. They are apprehensive about a profit-driven mentality that, to them, seems to propel the innovators rather than a poverty-elimination mentality that should be behind such innovations. The objectives should be to afford the most benefit to those in need and to prevent hunger around the world. Another major concern is the safety of genetically modified food. Muslims, as well as those in other religious communities, have been reactive rather than proactive. Muslims must connect scientific knowledge and ethical behavior based on faith. In Islam, there is no divide between the two. God has commanded us to seek knowledge and make discoveries to better our lives and our environment. We are trustees of this world and everything in it. The poor, the sick, and the wayfarers have a right to be fed and cared for. God reminds Muslims continuously that the earth and all the heavens belong to God; therefore, no one should feel hunger, no one should suffer or be prevented from sharing this bounty.

Keywords: *insan* (person, human); *insaniyyah* (humanism, humanity, humaneness); genetic modification (GM); genetically modified foods (GMF); genetically modified organisms (GMO)

The age of technology and new discoveries seems overwhelming to many of us. From cloning to stem cell research, in vitro fertilization, space exploration, and genetic modification and engineering, much information

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has surfaced that intrigues, fascinates, befuddles, and scares us. My topic concentrates on genetic modification, or GM. This issue, along with other innovations in the last and present centuries, has been the cause of much discussion and confusion.

There is no doubt that the contributions to this science have been phenomenal. It is true that we have made great strides in our civilization, but questions remain: Who will be the beneficiaries? What process, what method, what criteria must be applied in order to most benefit the society at large? Must the new science be applied to achieve the highest margin of profit for large companies, disregarding any negative consequences of the innovations? Must the modifications and production follow the philosophy of supply and demand? Should we institute a policy of self-support instead of piecemeal handouts in order to eliminate hunger and need in the poor countries? Shouldn't the new sciences be applied to solve the economic, social, and ecological problems of the world? Should rich and poor governments alike, as well as the large producing companies, be guided by an ethical and moral base? What should the role of the religious communities be? Must they remain reactive rather than proactive? These are issues that we must address if we are to do justice to our theme.

It is a fact that poverty has been reduced more during the last fifty years than in the preceding five centuries. We have made great strides in alleviating pain and hunger and addressing diseases and plagues. Such strides should be used for the benefit of all humanity and not only for those who can afford it. Some see GM as a topic that is purely economic, agricultural, scientific, or progressive rather than ethical. If we address it from an economic point of view, we ignore the impact that such a stand has on the majority of the world's population. If we address it from a purely agricultural and scientific point of view, we ignore its impact on the possibility of eliminating hunger from our societies. We also may be ignoring the issue of safety, be it of humankind or of our ecological system.

Controversy surrounds the issue of genetically modified foods. This field has been growing by leaps and bounds throughout the world, and it is impossible to be aware of all of the benefits and the ramifications that are entwined with this science. We are bombarded with information on all sides, each advocating its position and supporting it with facts and figures.

I focus here on biotechnology and bioethics. What is green biotech? What is genetic modification? How do they work? I attempt to address but a microcosm of this science and briefly present the general stance of the positions in the discussion. The issue is not to condemn or to praise but to weigh the scientific innovations and discoveries, weigh whatever benefits or problems we are facing, and address them as religious-ethical communities who must be the conscience of our society. Together, we have a duty to work for decisions that can ease the suffering in the world without harming humankind and the world we inhabit.

Let me begin by stating that I am not a scientist but that I have acquainted myself with the literature dealing with this topic. My purpose is to arouse in the reader a curiosity to further his or her knowledge concerning the issues presented here. In simple terms, green tech is a science whereby “biologists and crop breeders can now select a specific useful gene from one species and splice it into an unrelated species” (Pence 2002, 104). Previously, new genes were introduced in a limited form of crossbreeding species that were fairly close relatives. This process was time-consuming, breeding each new generation of hybrids with the original commercial variety over several generations. The new methods are more precise and efficient, and the plants produced are described as “transgenic,” “genetically modified,” or “genetically engineered.” Most of us probably know that people have used interbreeding among plants and animals for many thousands of years. Therefore, genetic engineering and modification is an extension of traditional practices rather than a radical new method.

According to Helen Norberg-Hodge, Peter Goering, and John Page, the method of GM requires extreme caution and strict rules. Traditional forms of breeding to achieve variety is done through a selection “from genetic traits of already existing genes within a species’ gene pool” (Pence 2002, 202–3). Although breeders can cross varieties, or even species, these would not necessarily reproduce if left to themselves, because nature imposes strict limits on this practice. Mules, for example, are infertile. Genetic engineering goes beyond these limitations of nature. Scientists have made it possible to “introduce genes taken from bacteria, viruses, insects, animals or even humans into plants” (Pence 2002, 203). We may transfer a sequence of genes from arctic fish (such as flounder) that leads to the production of a chemical with antifreeze properties, which is then spliced into the genetic material of a tomato or a strawberry to make it frost resistant. This certainly would benefit farmers and merchants. Mae-Wan Ho warns that genetic engineering, unlike conventional breeding techniques, uses artificially constructed vectors “to multiply copies of genes, and in some cases, to carry and smuggle genes into cells.” According to her, such insertion of foreign genes into the host genome may be harmful and may have fatal effects (Pence 2002, 83).

Today, many foods are genetically engineered: corn, soybeans, potatoes, squash, tomatoes, and many other foods. Milk comes from cows treated with a genetically engineered growth hormone called BST. One-third of dairy cows are injected with this hormone to increase milk production. This may be considered a good development because it makes milk plentiful and may even reduce the cost of milk (Pence 2002, 203). However, scientists have discovered that BST causes a fivefold increase in the protein IGT that passes into milk and is linked to breast and prostate cancer (Pence 2002, 104). Here we have the dilemma of benefits versus disadvantages that seems to haunt every aspect of this science.

Other results of the new technology include a class of highly successful insect-resistant crops that do not need to be sprayed with the soil bacterium *Bacillus thuringiensis* (*B.t.*) spores, which have been used on crops as an effective insecticide for decades, because the new biotechnology produces varieties of corn, cotton, and potatoes that make their own insecticides. Although *B.t.* is destructive to caterpillars, it has not harmed birds, fish, mammals, or people (Pence 2002, 104). Another result of scientific discovery is a herbicide-resistant gene that is especially useful in growing soybeans, because the herbicide kills weeds without harming the crop plants. An example of this is Monsanto Roundup, which has been deemed environmentally benign by toxicologists, who claim that it degrades rapidly (Pence 2002, 104). This chemical eliminates the need to plow the fields for weed control, therefore lessening soil erosion.

There is evidence, however, that genetic engineering does affect our ecosystem, with the potential to threaten biodiversity, wildlife, and sustainable forms of agriculture. Mae-Wan Ho states that "GM constructs are designed to invade genomes and to overcome natural species barriers" (Pence 2002, 109). There also is a possibility that genetically modified organisms (GMOs), once released into the environment, may transfer their characteristics to other organisms in an uncontrollable way. But GMO and GMF (genetically modified foods) are imprecise terms that refer to the uses of transgenic crops, that is, those grown from seeds that contain genes from different species (Pence 2002, 76). Originally, genetic modification took place through natural processes. For example, wheat crops came about as a result of unusual but natural crosses between different species of grasses. Wheat bread is thus the "result of the hybridization of three different plant genomes, and could be classified as transgenic" (Pence 2002, 76).

We do know that science through GM can improve production of crops and animals for the highest possible yields. The United States Ambassador to the Holy See, James Nicholson, believes that the fear driving some countries to refuse GM foods is unfounded and unscientific. And biologist Martina McLaughlin remarks that the biotech foods "on our plates have been put through more testing than conventional foods ever have been subjected to" (Pence 2002, 105). A National Research Council panel issued a report in April, 2002, emphasizing that it had not found "any evidence suggesting that foods on the market today are unsafe to eat as a result of genetic modification" (Pence 2002, 105). The FDA agrees and says that millions of Americans have been eating biotech crops for the last eighty years. The estimate today is that 60 percent of the foods on U.S. grocery shelves are produced with ingredients from transgenic crops.

A GM food that continues to be controversial is "golden rice," a crop engineered to produce the nutrient beta carotene, which is a precursor to vitamin A. Eating this rice could prevent blindness in up to 3 million poor children a year. It also could alleviate vitamin A deficiency in some 250

million people in the developing world. Still, many countries refuse to accept this and other GM products from the United States, and many oppose such research and refuse to eat any GM foods. Others reject all types of engineering to crops, considering it dangerous to humans and to the environment. Examples of such rejections abound. Vandana Shiva (2000), director of the New Delhi-based Research Foundation for Science Technology and Ecology, called upon the government of India and the state government of Orissa to withdraw the corn-soya blend from distribution to the victims of a cyclone that hit Orissa leaving 10 to 15 million homeless. She also opposed the use of golden rice, stating that more than fifteen greens rich in vitamin A are grown and eaten by the women in that area. Indians prepared to riot and Pakistan withdrew its venture with Monsanto when it admitted that it went too far and too fast in planting 100 million acres of modified crops on four continents. Such fears keep many from benefiting from the new sciences.

Exacerbating the situation, of course, is the admission by many scientists that the ramifications of genetic engineering of plants will not be known for generations to come.

From a purely economic stance, GM foods have made great strides in addressing poverty. The biotech industry claims that technology will help alleviate world hunger. Some analysts say that the problem is not scarcity of food. Physicians and Scientists for Responsible Application of Science and Technology (<http://www.psrast.org>) state that "World hunger is extensive in spite of sufficient global food resources. Therefore, increased food production is no solution. The problem is that many people are too poor to buy readily available food." Another reason why feast turns into famine is that most innovations in agricultural biotechnology are profit-driven rather than need-driven. The number of people living in extreme poverty is now about 1.3 billion, and the number is growing of those whose income per capita is less than \$1 per day. Economist Ansel M. Sharp (2005, 4) estimates that two-thirds of the world's population is hungry.

One major problem is the concentration of farmland into larger and larger holdings and fewer and fewer hands (Pence 2002, 23). This is easily observed in the United States and South America. Crash programs and handouts will, in the long run, cause starvation, says Wendell Berry (Pence 2002, 13). Studies show that the farmers and farm workers who are the main producers of food lack bargaining power relative to suppliers and food marketers, so they get a shrinking share of the rewards from farming. "The alternative is to create a viable and productive small farm agriculture using the principles of agro-ecology which has the potential to end rural poverty, feed everyone and protect the environment and the productivity of the land for future generations" (Rosset, Collins, and Lappe 2000).

John Robbins states, "If biotech corporations are really addressing world hunger through genetically engineered food, then they are only attacking

symptoms and not causes of world hunger. And it is a poor offensive too, because it does not recognize the root causes, which include poverty and the inability to afford food or distribute it because of things like certain international politics and economic policies." He adds, "ending hunger requires doing away with poverty, or, at the very least, ensuring that people have money or the means to acquire it, to buy, and to hence create a market demand for food" (in Rosset, Collins, and Lappe 2000). Even with GM foods, people must still be able to afford them. In fact, some say that GM foods may create more profits for the biotech and chemical companies because the farmers depend on these companies for their supplies. This does not mean that there is no positive potential in biotechnology and that it should be shunned; instead, biotechnology and research need to be challenged to benefit a larger portion of society. The availability of reasonably priced seed and fertilizer for poor farmers would go a long way to alleviate dependency and hunger in the world.

Scientific advances have helped but have not eradicated poverty. We may have a feast in crops, an overabundance of food, and great advancement in technologies, but these do not help when we ignore the ethical and moral dimensions of bounty. Paul Bairoch (1997) points out the "contrast between the performance and the potentialities of our system of modernity and the growing needs of our societies which remain unmet." Many live oppressed and powerless, in unsanitary conditions, with a low life expectancy and high infant mortality rate. Fatima Neer stated in 2002, "Our social organization negates our scientific and technological achievements by restricting their benefits to selected sectors of our people." Science is a great tool through which we could enhance our own lives and help us address the misery and the suffering of all. However, when science operates in an ethical vacuum, when it fails to assess whether its achievements will be detrimental to the many or beneficial only to the few, we have a serious situation. The biotech industry must accept its share of responsibility to care for our ecosystem and our health, to ascertain that the drive for monetary gain does not eclipse wider benefits, to take care that the results of scientific gains via GM foods are not detrimental to the needy and at their expense. It should also assume its humane responsibility so that the prices for food are commensurate with the economic level of the poor countries.

The religious communities must not stand idly by but must be involved in the ethical aspects not only of the genetic engineering process and its impact on society, the animal world, and the environment but also on the economic and equitable use of such process.

Where does Islam stand vis-à-vis the issue of genetic engineering, of humankind's role and responsibility toward the world's poor and toward the preservation and care of our ecosystem? To answer this, we need to

address the concept and purpose of the creation of the world and the responsibility that God, Allah, has imposed on humankind.

In Islam, all aspects of behavior are regulated by the precepts set in the Qur'an and the Sunnah. Muslims are the keepers of their brothers and sisters. The world, including any advantages presented by nature or science, belongs to the bounties of God. It is God's bounty, not ours. It must be shared so that no one goes hungry, no one suffers illness when there is a cure, and no one abuses the gifts that have been entrusted to us.

There is nothing in the creation that was created for naught. The Qur'an states, "And know that We have not created the heavens and the earth and all that is between them in mere idle play" (21:16). There is a purpose for the creation, and it includes a large responsibility that has been entrusted to humankind, a trust that humans have accepted: "Verily, we did offer the trust to the heavens, and the earth, and the mountain; but they refused to bear it because they were afraid of it. Yet man took it up" (33:72). God considered this trust a heavy responsibility, and, once accepted, humankind must bear the burden and apply the knowledge that God has given us for carrying on God's plan and achieving God's favor.

One of the central emphases in the Qur'an is the faith that God has that humankind can and will achieve goodness on earth. When humankind was created, both the angels and the jinn protested this creation, stating that it would commit evil and bloodshed on earth. But God had faith in Adam and called him *insan*; the root for the term is *insaniyyah*, meaning humanism, humanity, with a further meaning of humaneness. Furthermore, God gave the human creature knowledge that was not imparted to the other creatures—knowledge to benefit humankind as a whole, regardless of race, color, or social status. The knowledge we acquire comes with God's "help, guidance and will." God "knows all that lies open before men and all that is hidden from them, whereas they cannot attain any knowledge except that which He wills [them to attain]" (2:255).

Thus, there exists no conflict between science and Islam. However, this acquired knowledge is a responsibility and a trust, given and accepted by the human, to be applied to the betterment of humankind: to do good deeds and to prevent evil. It must be accompanied by compassion, kindness, and generosity. We are the keepers and the custodians of this trust. The earth and all creation belong to God almighty. We own nothing; we are born with no worldly goods, and we leave this life without them. "To God is all that is in the heavens and all that is on earth" (2:255). We are on a journey toward the Almighty, a journey that is perpetual and eternal; this is the connotation of being *insan*. We must live up to this responsibility. It is a religious duty, an act of worship and a fulfillment of a promise.

Addressing the needs of the poor takes high priority in Islam, as the Qur'an says: "And give unto the needy who, being wholly wrapped up in

God's cause, are unable to go about the earth [in search of livelihood]. He who is unaware [of their condition] might think that they are wealthy . . . and God knows it all" (2:274). God expects us to seek the needy who are too ashamed to show their poverty. It is not enough to help those who stretch their hands in need; we must go beyond that. Another verse states, "The offerings given for the sake of God are only for the poor and the needy, and those who are in charge thereof" (9:60). Again, "Behold [O believers], it is you who are called upon to spend freely in God's case" (59:8), and it is "for the poor fugitives who have been driven out from their homes and their belongings, who seek favor from Allah and His goodly acceptance, and who aid the cause of Allah and His messenger, it is they who are true to their word" (59:8).

Islam advocates the concept of equality and freedom for each individual and enjoins each Muslim to guarantee the rights to a decent life of each individual. Freedom in this sense incorporates freedom from oppression and poverty. Because our bounty is the bounty that God has showered on us, it is not ours to hoard. It is to be shared with the needy. For this reason, the Qur'an does not specify a percentage of one's wealth to be shared with others but states that we must give from God's bounty, not ours.

Whereas science was the quintessence of the early Muslim society, today many Muslim scholars seem to remain oblivious to the scientific changes surrounding them. Often forgotten is the first revelation of the Qur'an, which began with the word *iqra*: read. This term was meant to propel and to encourage Muslims to seek knowledge to better comprehend the power and the glory of God through research and equitable application of the results. "Not without purpose did We create heaven and earth and all between!" (21:16) There is a reason, a purpose, to our behavior and to our life on earth. It is to obey God, do righteous deeds, and lift humanity to a higher spiritual level. The Qur'an is clear about our task on earth and our duty. We are told that

It is not righteousness that ye turn your faces towards East or West, i.e., in prayer; But it is righteousness to believe in Allah and the Last Day, and the Angels, and the Book, and the Messengers; to spend your substance, out of love for Him [God], for your kin, for orphans, for the needy, for the wayfarer, for those who ask, and for ransom of slaves; to be steadfast in prayer, and practice charity, to fulfill the contracts which ye have made; and to be firm and patient, in pain and adversity, and throughout all periods of panic, such are the people of truth, the God-fearing. (2:177)

Clearly, Muslims must understand that "righteousness" is to help the needy and to be "kind, firm, and patient" if we desire to be considered the people of truth. Our interest should not be a monetary one or even a scientific one unless the goal is directed toward the road to righteousness. We must not acquiesce under pressure to new innovations without ad-

dressing the possible repercussions. The religious and ethical dimensions must never be neglected or ignored. And we must become vocal in our position. There is a balance in nature that we cannot ignore: "He Who created the seven heavens one above another: No want of proportion wilt thou see in the Creation of Allah Most Gracious. So turn thy vision again, do you see any flaw?" (67:3) There is balance and perfection in the creation. Thus, it is imperative that we address any alteration of creation with the utmost care. Moreover, we must remain vigilant so that the market for "altered creation" through GM may remain mercy-driven, not profit-driven.

There are those who will sit back and give way to pessimism, to futility and defeat. However, the Qur'an reminds us that the righteous are those who are "steadfast" in pain and adversity. Steadfastness is a sign of righteousness. Religion can motivate humankind to that which is good and beneficial. It is not by accident that helping the poor and the needy is more important in Islam than turning one's face toward Mecca in prayer. Our purpose on earth is to do good deeds and to prevent evil. We have a duty to maintain the balance of nature that God has perfectly created. We are not to abuse the trust and the gifts given to us.

What can we do as a religious community? Symposia such as this are a beginning. We must expand this process throughout our communities. We must keep up with the new research and discoveries and make connections within the scientific fields, with government agencies dealing with these issues, and with the public at large. We must continually remind ourselves of our ethical and moral responsibilities and do our utmost to uphold the trust bestowed upon us by God Almighty. Let us remember the injunctions of the Qur'an: Righteousness is not to pray throughout the day and the night. Righteousness is to carry God's work, alleviate hunger and suffering, secure justice and equity for everyone, maintain the natural balance in the world, and abide by the sacred laws revealed to us by God.

Muslims and other religious communities today face a crisis of knowledge, or, rather, a crisis in connecting knowledge and faith. Together we must maximize our commitment to addressing the problems at hand and to working together toward guiding those with conscience in order to minimize the damages that may result from a science driven mainly by a profit ideology. This challenge must be undertaken without compromise.

NOTE

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