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SHARIAH ATTITUDE TOWARDS GENETICALLY MODIFIED FOODS: AQLI AND NAQLI ANALYSIS

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Abstract

Genetically modified (GM) food issue has sparked the debate, particularly in the Western world, on its detrimental effects to public health and the environment. Among the GM food producers and companies, the claim for intellectual property rights arise for food products and seeds for the technology they are licensing to farmers. For some Muslims and other God-conscious people, tampering with nature by implanting genes from one organism into another which nature has not sanctioned through natural processes and such legal claims is considered to be intolerable. The 'terminator gene' introduced by the companies are likely to lead to monopoly and encroachment of the world agro-economics, predominantly held in the hands of conglomerates. This study examines the Shariah attitudes towards GM food using aqli and naqli approach analysis. The aqli approach used in this paper includes analysis of modern scientific research to determine the benefits and harms of GM food. The naqli approach includes examination of related legal evidences from Quran, Hadith and scholars' view. At the same time, the relevant Shariah principles are discussed to determine the validity of GM food.

Keywords: biotechnology, genetically modified food, Islam, Shariah, maslahah, public interest

INTRODUCTION

GM food issue has been subject to heated debates the Western and Muslim worlds. The controversies linger around the Halal status of the food, safety concern and possible adverse effects to the environment, change of ecosystem and ethical contestation. By definition, the World Health Organization (2015) describes a 'GM food' as something derived from organisms which experience modification of genetic material in a way it does not occur naturally, such through the introduction of a gene from a different organism. The term is used interchangeably with genetically engineered food and genetically altered food. Genetic engineering is the process by which scientists

combine the genes of dissimilar and unrelated species or manipulate the genes of existing species to change their characteristics, permanently altering their genetic codes and creating novel organisms. Genetic engineering differs from traditional breeding and allows biotechnology corporations to combine organisms that would never able to combine naturally, such as tomato and fish. The available GM foods come from plants, microorganism or GM animals. Because of the imprecise nature of gene insertion, these crops and foods may pose significant risk to human health and the environment.

By nature, we cannot cross a tomato with a fish as animals and plants have long been separate in evolution. However, there was a laboratory research that produced a "frost resistant" tomato by splicing into its genetic code a gene that protects a flounder from the cold (The Independent, 1999). This first transgenic plant is said to have been created in the early 80's when a gene from a bacterium was spliced into a petunia. Subsequently oilseed rape has had a bay tree gene spliced into it, to improve its oil, and a potato has been given a disease-resistant chicken gene.

The first commercially grown genetically modified food crop was a tomato created by Calgene called the FlavrSavr (Brainyencyclopaedia, 2004) Calgene submitted it to the U.S Food and Drug Administration (FDA) for testing in 1992; following the FDA's determination that the FlavrSavr, in fact, a tomato, did not constitute health hazard, and did not need to be labelled to indicate it was genetically modified, Calgene released it into the market 1994, where it met with little public comment. Genetically modified plant are already grown extensively particularly in the USA, South America and Canada. Initially, some of European countries banned the GM foods into their countries. However, in September 2004, the European Commission has finally permitted the first genetically modified seeds for cultivation and sale across the EU. After several years, we can easily find food contains GM ingredients such as vegetarian cheese and GM tomato puree.

Despite the approval of EU concerning GM seeds recently, the fear of GM food has led to the withdrawal of US Food Aid (USAID) by some African countries such as Sudan and Angola. The Sudanese government for instance in May 2003 issued a memorandum requiring that all food aid brought to the country must be certified as free from GM ingredients. However, in March 2004 the USAID, the main supplier of aid for the World Food Programme, announced that it would cut off food aid supplies to Sudan on the basis that USAID does not issue certificates confirming the GM status of its food aid. Consequently, the USA is accused of manipulating the humanitarian principles of food aid to further its political and economic objectives. African countries are facing dilemma either to accept GM food aid or to let the populations go hungry. Similarly, Ghana also urged to place appropriate regulatory mechanisms especially labelling and post-marketing surveillance

for possible health consequences in the long term (Ghana Public Health Association, 2014).

The potential benefits of GM are believed could bring a new dawn in agriculture and food production. GM foods offer a way to quickly improve crop characteristics; draught or the local pests resistance, herbicide tolerance, crops that give higher yields; or fish or livestock that grow bigger and feed more people like salmon fish with three times more growth; or GM crops that incorporated vaccines to prevent prevalent diseases (Monsanto, 2015). Through new innovation, healthier foods can be produced which incorporate extra nutrients or vitamins.

Biotech conglomerates such as Monsanto[1] (2015) claim GM food and GM crops are crucial in order to feed and provide balanced nutrients to the chronically hungry people especially in the third world countries. There are more 842 million people across the world are hungry and remain chronically undernourished. Bo Lonnerdal (2003) in his article has contended that the GM technology can combat the lack of deficiencies of iron and zinc. The said biotechnology can improve trace element nutrition of staple foods such as cereal and legumes. He further stresses that this way may be achieved by introduction of genes that code for trace-element binding proteins, over expression of storage proteins already present and/or increased expressions of proteins that are responsible for trace element uptake into plants. However, there is still a major concern among Muslims when the researchers tend to use human breast milk to improve the ion content of rice due to the fact that human lactoferrin binds specifically to receptors in the human small intestine. Some GM foods may also contain newly expressed protein that are described as "intractable" protein that have potential benefits a broad range of valuable traits such as disease resistance, drought tolerance, nitrogen use efficiency, and enhanced nutrient value (Bushey et al., 2014).

In addition, scientists such as Eduardo Blumwald also argues that GM foods and products can be a better solution to feed 9.5 billion people. GM foods that can better withstand drought is an alternative when dry spells may be more frequent and the solution for climate change (Ostrander, 2014). On the other hand, the development of GM crops also brings a great benefit to the environment. The GM technology enhances conservation of soil, water and energy that are three critical and endangered components of the ecosystem. The efficiency in land use can save the rainforest, reduce the pollution emission and save precious habitats from exploitations. Furthermore, the crop

[1] Monsanto is a biotechnology company, founded in 1901. Nowadays, as a leading worldwide provider of technologybased solutions to farmer around the world, it has committed to innovation in plant biotechnology, genomics and breeding to improve productivity and to reduce costs of farming. One of its worldwide used products is the herbicide Roundup. The original Monsanto's first plant biotechnology products, Roundup Ready soybeans, canola and Bollgard cotton, are planted commercially in 1996.

yield in the farmland could be tripled and could increase profit margin per acre (Khan, 2003; Ostrander, 2014). Meanwhile for crops, the GM technology can reduce the maturation time and reduce reliance on pesticides and herbicides, which damage the environment.

Despite several benefits to human being and environment, genetically modified foods technology is not free from controversy and harsh criticism. Many argue that this technology was invented by greedy scientists and conglomerates. At the same time, GMF technology possess great danger to human health and the environment. In order to protect the interest of customers and farmers, legal frameworks, policies, guidelines and regulations have been developed (Clark, 2013; Ghana Public Health Association, 2014). Clark (2013) for instant has developed a framework that considered the perception of risk and uncertainty of GM foods. Policies and guidelines are crucial in order to minimise risk and to help the public aware of the uncertain effects of GM foods despite of its potential benefits.

Tampering with nature, changing God's creation to create another 'invented' creation and finally claiming legal ownership over GM products in the production of genetically modified foods raise ethical and religious concerns. By using several undisputable primary sources of Islamic rulings (*hukm*) namely al-Qur'an, al-hadith (the Prophet traditions) and a disputable tool that is the principle of *masalih al-mursalah* (public interest), the paper tries to shed light on the consistency of GM food technology with the Shariah principles. The first part provides *aqli* analysis which analyses benefit and harm assessment based on current research findings. The second part provides the Shariah discussion on GM food. This part adopts *naqli* approach by examining related legal evidences from the Quran, Hadith and scholars' view. Finally, the third part concentrates on the possibility of the application of principle of *masalih al-mursalah* to justify the necessity of changing God's creation in GM food technology and of claiming legal ownership over such foods and products.

RESEARCH METHODOLOGY

Harm and benefit analysis: An aqli analysis

Health issues and food safety

The safety of GM foods is still in a grey area. Until nowadays, there is no guarantee concerning the long term safety of GM foods and we cannot predict how human health will be affected over a long time period. Western countries has subjected GM foods to an extensive range of analytical tests for food safety including chemical analysis, allergencity tests, evaluation of nutritional composition and others. On the other hand, the alternative argument put forward by anti-GM lobbyists is that GM is still new that the full effects on human health have not yet been tested adequately. Various reports also

highlight some risks that may occur from the biotechnology engineering. There may be health risks from allergic reactions to GM food or from the bacteria and viruses used to transfer genes from one organism to another. Someone with a peanut allergy could have fatal reaction to a plant engineered to carry a peanut protein. Problems could also arise if biotech companies transferred traits from antibiotics into crops. The anti-GM groups also view that funding for truly independent research at many universities, research faculties and institutes compare unfavourably to the billions of dollars spent by the companies who want to sell GM foods and crops. A research conducted by Oraby, Shaffie & Ghaly (2015) suggests GM food may possess danger to human being. In other words, there are health hazards linked to the ingestion of diets containing genetically modified component.

However, the other argument that we should bear in our mind is that human had practiced genetic modification since we first domesticated animals and plants over 8,000 years ago. The alternative argument is that in the past all modification and crossbreeding has happened within nature. Our predecessors never cross the genes of different species from a plant to an animal or fish. There is also a hadith indicating that the Arabs also crossbreed the date's plants. Nowadays people can take a gene that protects the flounder fish from cold, add it to genetic code of a tomato and make transgenic frost resistant tomato.

Intellectual property rights

Monsanto introduces a technology called terminator into food crops, which produced plants that grew sterile seeds. Monsanto claimed this was necessary to protect their intellectual property rights, since they were licensing the technology to farmers. However, public outcry about the undue influence that the terminator gene would give to Monsanto, particularly in less developed nations where seed saving is more common, led to its withdrawal.

Not only Monsanto, any other GM food producer have already developed seeds that will only produce one yield of crops that will make farmer dependent on such companies. These farmers, especially from developing countries are required to purchase more seeds from foreign companies that will make they lose their autonomy and become dependent farmers. Consequently, the monopoly of the world agro-economics will be on the hand of the GM companies.

The claim for legal ownership over GM plant has led to ethical concern and public confusion. Intellectual property rights are in fact temporary rights of exclusive exploitation of an idea and not ownership rights to the product that emerges from it (OECD Observer, 2004; Diaz & Gil-Delgado 2003). Many scientists argue that the restraining of biotechnology programmes through the Intellectual Property Right legislation has led many biotech research at hold

and they really hope that the ethical based system may have the virtue of open ended and adaptable to new circumstances as knowledge about GM foods improve.

Ecological Impact

Apart from the great benefit GM technology could bring, there is still a worry that GM plants could potentially lead to detrimental consequences to the environment. One of the greatest fears in regard to GM crops and food is that, once growing in our fields, these plants might pass pollen or seeds to native plants that could then take on the engineered traits. There have been some instances where insects and plants in and around GM crops have shown some damage. For example, the Soil Association in the UK points out that the death rate of lacewing insects was doubled when they were fed on plant eating-larvae raised on GM maize. Likewise, they point to damage to bees feeding of GM rapeseed genetically modified to produce natural insecticide intended to kill only caterpillars and beetles. To counter this potential problem, boundaries are placed around GM crops. Also, the much misunderstood 'terminator genes' has been produced to stop what is called the 'gene flow' or spread genes from plant to plant and into the wild. Research is ongoing into the halting of the 'gene flow'. Plants, which are modified by inserting a gene which renders all seed produced infertile has been much criticized as an attempt to corner the seed market.

During the last decade, more than 40 varieties of transgenic crops have been approved for use in the USA, most of them genetically modified to produce a pesticide called Bacillus thuringiensis, or Bt. The Bt toxin attacks pests like the European corn borer, but laboratory studies suggest it may also be dangerous to the larvae of the monarch butterfly and other butterflies and moths. A study conducted in South Africa also reveals that many local farmers are unaware of transgenes in local maize varieties (Iversen et al., 2014). The farmers had little knowledge regarding the extent of transgene introgression into locally recycled seed, what short and long term ecological and socioeconomic impacts such mixing of seeds might have, how the farmers perceive GM crops, and to what degree approval conditions are followed and controlled. This ignorant may lead to another issues that should call for the authorities to make a stringent regulation or awareness campaign among the local farmers.

Apart from environment effects, the GM food producers, farmers and manufacturers are accused of changing natural process and tampering with nature when cattle were changed from herbivores to cannibal carnivores. Previously, during winter when the grass is thin and weak, soybean was used to feed the cattle, as they need protein supplement. However, some farmers have used remnants of dead cattle instead of soybean as to save cost.

Consequently, the BSE (bovine spongiform encephalopathy) or mad cow disease that attacked the UK nation widely was claimed as the detrimental effect of the step of changing natural process.

Al-Qur'an and al-Hadith points of views

As regard to the potential risks associated with GM food, Al-Qur'an has led several rules on food intake. Allah The Almighty said: "Eat of the things which God hath provided for you, lawful and good: But fear God, in Whom ye believe" (al-Ma'idah 5: 88). What we can deduce from this ayat is that Allah orders us not only eating Halal food, but good food as well. Thus, based on this Quranic verse, we should not only avoid haram (illegal) foods and drinks such as non-slaughtered animals and liquor, also we should refrain ourselves from taking regularly any foods and drinks that contain chemical substances, preservatives, additives or colouring agent that may harm our bodies. However, there is no scientific evidence that GM foods are harmful to human health. There are many research and experiments conducted that GM foods are as safe as their conventional counterparts. Furthermore, many scientists argue that GM food on our plates have been tested far more thoroughly than any other conventional foods. For instance, a research conducted by Harry Kuiper of the State Institute for Quality Control of Agricultural Products in Wageningen, Netherlands, had shown that GM tomatoes were not harmful to rats, conversely they would have been poisoned by the basic nutrients in the tomato such as potassium (Librarythinkquest, 2004). As a result all myths that associating GM food and health hazard has yet proven scientifically. Furthermore, genetically modified food has been developed to improve the quality and the characteristics.

However, for Muslims, God has created and fashioned every living things in the best form and man as a viceroy or *khalifatullah* (al-Baqarah, 2:30) is assigned to manage and utilize them for living purposes in the best way and order. As a viceroy, man has been given responsibility on this earth and he is accountable on what he has done before God in the Hereafter. This is the crucial guideline for any human being to live in this world, utilize the entire natural resources for the sake of living things and ensure the best for nature, as it will become legacy for the future generation. The very well-known hadith in the Sahih al Bukhari is that: "Everyone of you is a guardian and is responsible for his charges. The ruler who has authority over people, is a guardian and is responsible for them" (Hadith. Al-Bukhari. Kitab al-Nikah: Juz` 81: #16). Islam teaches its believer to be kind to nature and do not betray the responsibility and the trust that have been given to them.

As stated earlier, man as a *khalifatullah* (vicegerent of the world) has his own responsibilities towards nature. Animals, nature, trees and all creatures

in this world are created to assist people living easily and assist them to become good servants of Allah. Everything people do, they have to submit it to God. Therefore, human and nature are two important elements in this world in order to fulfill the prophet's mission that is *tawhidullah*. Seyyed Hossein Nasr in work Man and Nature (1968) has stressed that the relationship between man and nature should be as the same as the relation between man and wife. Each of them has their own responsibilities towards each other. Unfortunately, for modern man, nature has become like a prostitute- to be benefited from without any sense of obligation and responsibility towards her. This domination over nature without rendering it back for the purpose of *`ibadah* (act of worship) to God has led to massive disaster.

Islam, at the first stage regards attempt to modify living things a sin as stated in the Al Qur'an: "God did curse him, but he said: "I will take of Your servants a portion marked off, I will mislead them, and I will create in them false desires, I will order them to slit the ears of cattle, and to deface the (fair) nature created by God." Whoever forsaking God, takes Satan for a friend, hath a surety suffered a loss that is manifest" (Al-Qur'an. AnNisa' 4:119). This ayat is a warning from Allah that any means to unnecessary change of the Creation of Allah will make one subject to the curse of Allah and his Prophet. However, if the change falls under the category of essential type (*daruriyyat*), so such a change and modification is permissible. For instance, if the genetic engineering is conducted to prevent from harm i.e to reduce reliance on pesticides and herbicides, which damage the environment, such an experiment is permissible and is in line with the principle of Shari`ah that is promoting welfare and preventing from harm (*jalb al-masalih wa dar' almafasid*).

Furthermore, in order to create better livestock and crop, Islam encourages gene modification that has been used for centuries using natural methods involving organisms of the same species. There is a hadith where the Prophet S.A.W approved the action of crossbreeding of date plant by the Arab in his saying: "You are more knowledgeable in your worldly affairs" (Hadith. Muslim. Kitab Al-Fada'il: Bab 39: #6082). However, according to this hadith that was narrated by Anas, at the first stage, when the Prophet saw the Arab was making crossbreeding into the dates plants, he prohibited them by saying that it is better if they let the dates grow naturally. However, when the Arabs let the dates grow naturally as suggested by the Prophet, the yield of the plant was not as satisfactory as before and then the Prophet said: "You are more knowledgeable in your worldly affairs." In the same hadith, the Prophet mentioned that he was the best person to refer to in the religious matters, nevertheless when it comes into the worldly affairs, he admitted that the people knew better than him. Islam and Shari`ah do not put strict limitation

in worldly affairs provided they are used, managed and utilised for the benefit of the common people and vice versa. That means it is not only for good of certain groups of people. It is evident that at the first stage the Prophet prefers we preserve and monopolise living things in their natural ways. However, if there is a need to modify them in natural ways such as crossbreeding or what so ever for the good of human life, he did recognise such an action.

Zuhaili in his masterpiece, Al-Fiqh Al-Islami wa Adillatuh (1997) has further elaborated this hadith by saying that any worldly affairs that are not textually covered in the Holy Book of al-Qur'an nor hadith is upon the discretion of human being provided it will not violate the principle of Shariah that is promoting interests, avoiding hardship and for the good of people. The writer is of the view that the principle of *masalih mursalah* may be applicable here to justify the necessity of changing God's creation in GM technology and to justify the necessity of claiming legal ownership over such foods and products.

The application of *masalih mursalah* to justify GM food technology

Another tool in Islamic law that can be applied to justify the validity of GM foods is *masalih mursalah* (public interest). Majority of Muslim jurists unanimously agree that al-Qur'an, hadith, *ijma'* (consensus) and *qiyas* (analogy) are the prime sources of law in Islamic jurisprudence. However, there are disputes among jurists on the usage of any other sources of law and *masalih mursalah* is one of them. The Maliki School of law accepted it as its founder Imam Malik regards "public interest" is a valid source of juridical decision. Other schools of law such as Hanbali and Hanafi also accept this principle of deriving *hukm* (legal rules) as well as the Shafii School of law though the latter school basically discards this principle in its original meaning. This paper does not attempt to discuss the disputes among Muslim scholars on this issue extensively rather it is merely highlighting an epigrammatic view on it. The more important point that is highlighted in this section is the guidelines set up by Muslim scholars in adapting the mentioned principle by which we can justify the necessities of genetically modified foods and the issues of intellectual property rights.

Many scholars view that its name *masalih or maslahah* (interest) comes together with the word *mursalah* (the unrestricted public interest) as it is not mentioned specifically in Qur'an neither in Sunnah (Zaidan,1998; Zuhaili, 1998). There are three types of *maslahah; maslahah mu`tabarah* (accredited maslahah), *maslahah mulghah* (discredited maslahah) and *masalih mursalah* (unrestricted public interest). *Maslahah mu`tabarah* refers to interests recognised by God (the law maker) as the purpose of Shari`ah is to protect five specific interests; to protect the religion (*din*), property (*mal)*, life (*nafs*),

reason *(`aql*) and lineage (*nasb*). Preserving these interests are vital and is considered as essential in human life. *Maslahah mulghah* refers to any unrecognized *maslahah* by Shariah law. Meaning that, certain ruling is applied regardless of certain personal interest such as the compensation one has to pay when committed unlawful action. In this situation, one's personal interest will not be taken into consideration for instance in *hudud* cases. *Maslahah mursalah* as mentioned above refers to any interest, which is not mentioned in the Qur'an or Hadith. Since these interests have not been covered textually, therefore are considered *mursal*. This is the principle that may be adapted to justify the necessity of changing God's creation in GM technology and claiming legal ownership over such foods and products.

Having discovered the three types of *maslahah*, it seems crucial to define the meaning of *masalih mursalah* as our centre of discussion. *Maslahah* literally means interest, welfare, advantage, wellbeing. Zaidan (1998) defines it as to promote and bring welfare and to avoid and prevent harm (*jalbu al-masalih wa dar' al-mafasid*). Meanwhile Ghazali in his book Mustasfa as cited by Zuhaili (1998) advocates that *maslahah* does not merely carry this meaning nonetheless the most important thing is to preserve the five objectives of the Shari`ah. Meaning that any means to protect any one of the five objectives of Shari`ah will be deemed as a *maslahah* in Islam.

Other scholars define this principle as public welfare (Doi, 1984). This principle together with other principles like *istishab* and *istihsan* go back in their origin to reason; to the study of the reasons behind the rules, to the fulfilment of the interests of the people in their social life and to abiding as closely as possible with absolute good and the dictates of justice and equity (Mahmassani, 2000). However, the study of the reasons behind the rules can only be applied to transaction matters and not to religious observances (*ta`abudiyyah*). Therefore, any action which benefits people is considered legal and lawful. To some extent, majority of Muslim jurists agree that the governing measure of all that lawful or unlawful thing or action is the benefit or the harm which stems from it (Zahrah, 2001; Mahmassani, 2000; Razi, 1997). This is the argument which the scholars of Maliki School of law use in advocating this principle.

On the other hand, many scholars from Shafii School of law do not accept the *masalih mursalah* as one of the sources in Islamic legal rules due to the fact that interest varies according to different degree of people, time and place. Furthermore, as *maslahah* or interest is a subjective matter, it will open a back door to the exploitation of this principle when people simply cling on it tenaciously to fulfill their unlawful desire. Generally speaking, we can conclude that scholars from Shafii School of law reject maslahah or interest as a determining factor in legal ruling. However, Ghazali in his book al-Mustasfa as cited by Zuhaili (1998) only sanctioned the application if the maslahah to

be served was absolutely essential. He also put strict guidelines in accepting this principle as a method of deriving legal rulings in Islam.

Guidelines in adopting the principle of *masalih mursalah*

In order to apply this principle for genetically modified food we should understand that Muslim scholars have set up guidelines and attached several conditions that should be fulfilled in applying this principle in transaction matters, which can be concluded as;

Firstly, the interest should be in harmony with the spirit of the Shariah or in other words it should be in line with the general objectives of the Shariah. Furthermore, it should not be in conflict with any of its accepted sources.

Secondly the interest involved in the case should be accepted by majority of scholars and the interest must be reasonable, rational, and logical.

Thirdly the application of this principle is to avoid hardships and difficulties.

Fourthly There are three types of *maslahah* according to the priorities; *daruriyat, hajiyat* and *tahsinat*. The interest should be one of the essential (*daruriyat*) or the necessary (*hajiyat*) and not of the perfectionist (luxury) type. *Daruriyat* includes the preservation of religion, property, life, reason and lineage as mentioned earlier. Meanwhile, the necessary type or *hajiyat* appertains to the betterment of living. People depend on this maslahah as it will release people from hardship. For example; in the case of concession granted to travellers to break the fast during the daytime of Ramadan. On the other hand, the perfectionist type (*tahsinat*) refers to "decoration and improvement" which make life more cheerful and comfortable.

Fifthly, Other ulama' from Maliki and Hanbali Schools of Law put a condition that the application of this principle should be based on the objective to promote the welfare and the interest of the public and not only the interest of certain group of people or individuals (Zuhaili, 1998; Zuhaili, 1997). This is due to the fact that the aim of Shari`ah is to protect the interest of the whole mankind. Sixthly, the case under review should be one pertaining to matters of transactions so that interest involved in it may be construed upon grounds of reason. The case should not be one relating to religious observances (Mahmassani, 1983; Razi, 1997; Zuhaili 1998).

The guidelines applicable to the principle of *masalih mursalah* to legitimise an action is an evidence that our previous Muslim scholars had taken serious effort to determine that this principle cannot be simply violated by whatever means.

As regards intellectual property right of GM food, whose interest is served here? Since the GM manufacturers are licensing the technology to the farmers through their 'terminator gene' technology, it will make farmers

especially in less developed countries loss their autonomy and consequently become dependent to such GM companies. The agro economic world will at last be on the hands of GM food producers. Even though the GM companies have their own intellectual property rights (IPR) over the foods, plants and seeds, this is truly violates the Shariah principle that we should help the need and the hunger without any financial motives. Via GM food technology, the genes can be manipulated to enable staple crops to grow in marginal condition, but the farmers still have to purchase the seeds from the conglomerates. Furthermore, although nearly 800 million people go to bed hungry every night as stated by the World Bank Vice President for Sustainable Development, Ian Johnson but there is still a strong argument that the problem of starvation in African countries is mainly caused by inefficient domestic management of food and political reasons rather than food scarcity itself. Furthermore, the GM technology in Islam is permissible under the principle of *maslahah* provided that the *maslahah* is to serve the interest of the public rather than only certain group of people. Examining the reasons why some manufacturers license the technology to farmers, it is clear that it is only to protect their own interest. Even though they do have right over their technology that recognized by Islam, there is still a fear of the terminator gene will be passed to native plants, hence making them cannot grow naturally. Therefore, this terminator gene contradicts the Shariah principle as it may lead to the prohibited monopoly practice.

On the other hand, if the genetically modified foods technology is utilised to improve the characteristics of foods, enhance its nutrients, making the seeds draught resistant, hence Shariah would allow the technology. GM food is also a solution to feed hunger people during extreme climate change. In addition, many efforts have been taken to assess the safety of the foods. Research proves that existing methods are deemed adequate for the safety assessment of foods derived of the GM crop (Konig et al. 2004). The efforts have been borne out by regulatory bodies, all supported by expert advice, and in guidelines on food safety assessment and biotechnology elaborated by national and intergovernmental organisations. These efforts can be regarded as Shariah compliant methods adapted to minimise, remove and control the harm that may associate with GM foods. This concept is similar with the Shariah concept of minimising *mafsadah* (harm) in order to gain the *maslahah* (benefit).

CONCLUSION

To conclude, many experiments have shown that GM food is safe for consumption and the technology does not contradict Islamic tenets on food intake. Furthermore, GM food has been altered genetically in order to

improve trace element nutrients and is well balanced. However, there is a strong need for labelling GM food products as the consumer's trust should not be abused especially when the processing involves inserting animal genes for vegetarians and pig genes for Jews and Muslims. Furthermore, there is still a major concern considering the fact that mixing genes from radically different organisms is ethically wrong. Therefore the manufacturer should be more responsible and not let the customers end up eating food without knowing it contain GM ingredients.

It is important to note that Islam imposes no restrictions on biotechnology research. Rather it considers this act as an *ibadah* (act of worship) and a means of better living even though some religions might render the technology of GM food as an acceptable intervention in God's creation or so called as 'playing God'. However, Islam advocates that the door of scientific research should not be left wide open without proper Shariah examination. This is to ensure that the door of *maslahah* is not left wide open for those who are opportunists and making maximum profit out of the need of poor people. All possible precautions should be taken to ensure public interests are protected and the research is in line with the *Shariah.*

REFERENCES

Ali, A.Y. 2000. The Holy Qur`an, Original Arabic Text with English Translation & Selected Commentaries. Kuala Lumpur: Saba Islamic Media. Al-Qur`an.

Bo Lonnerdal (2003). "Genetically Modified Plants for Improved Trace Element Nutrition". *The Journal of Nutrition*. Vol. 133. 1490-1493

Brainy Encyclopaedia (2004) *Genetically Modified Food.* http://www.brainyencyclopedia.com/encyclopedia

Bukhari. *Sahih Al-Bukhari*. (trans). Muhammad Muhsin Khan. 1984. The Translation of the Meaning of Sahih Al-Bukhari. New Delhi: Kitab Bhavan. Vol. I-IX Al-Qur`an (Trans.)

Bushey, D.F., Bannon, G.A., Delaney, B.F., Graser, G., Hefford, M., Jiang, X., Lee T.C., Madduri K.M.,, Pariza, M., Privalle, L.S., Ranjan, R., Saab-Rincon, G., Schafer, B.W., Thelen, J.J., Zhang, J.X.Q., Harper, M.S. (2014). Characteristics and safety assessment of intractable proteins in genetically modified crops. *Regulatory Toxicology and Pharmacology. 69*. 154–170

Diaz, M. D. C. F., Gil-Delgado. M.D.L.R.C. 2003. "Is Intellectual Property Right Legislation Constraining the Agri-Food Biotechnology Center in the European Union?" (Research). *The Sociology of Science and Technology Conference (SSTNET) of the European Sociology Association (ESA).* Murcia, Spain. 24 September.

Doi, A .R. I. 1984. *Shari`ah: The Islamic Law*. Kuala Lumpur: A.S. Noordeen.

Ghana Public Health Association (2014). Recommendations from a meeting on health implications of genetically modified organism (GMA). *Ghana Medical Journal*, 48, 117-119. doi:http://dx.doi.org/10.4314/gmj.v48i2.11

Iversen M, Grønsberg, I.M, van den Berg, J., Fischer, K., Aheto, D.W., Bøhn, T. (2014) Detection of Transgenes in Local Maize Varieties of Small-Scale Farmers in Eastern Cape, South Africa. *PLoS ONE* 9(12): e116147. doi:10.1371/journal.pone. 0116147

Khan, S.A. 2003. "Neocolonialism in the Muslim World through Genetically Modified Foods: The Empire Strikes Back?"(Paper). The AMSS 32nd Annual Conference. Indiana University, Bloomington, Indiana. 26-28 September.

Konig, A.,Cockburnb, A., Crevelc, R.W.R., Debruyned, E. , Grafstroeme , R., Hammerlingf , U., Kimberg , I., Knudsenh, I., Kuiperi , H.A. , Peijnenburgi , A.A.C.M. , Penninksj , A.H. , Poulsenh, M. , Schauzuk, M., Wall, J.M. (2004) Assessment of the safety of foods derived from genetically modified (GM) crops. *Food and Chemical Toxicology, 42*, 1047–1088

Madeline, Ostrander (2014). Can GMOs Help Feed a Hot and Hungry World? *The Nation.* 23-27.

Mahmassani, S. 2000. Falsafat al-Tashri` fi al-Islam.

Monsanto. 2015. *Research and innovation*. Retrieved from http://www.monsanto.com/products/pages/vegetable-seeds-science.aspx 22/05/2015

Nasr, S.N. 1968. Man and Nature- The Spiritual Crisis of Modern Man. London: Unwin Paperbacks.

National as You Sow Foundation. 2003. "Risky Business-Financial Risks that Genetically Engineered Foods Pose to Kraft Foods, Inc. and Shareholders". National as You Sow Foundation. www.asyousow.org

Nawawi, M. n.d. Al-Minhaj Syarh Sahih Muslim bin Al-Hajjaj. Mansoura: Maktabah Al-Iman.

OECD observer. "Intellectual property: rights and wrong". http://www.oecdobserver.org/news/

Oraby, H., Shaffie, N., Ghaly, I. (2015). Biological impact of feeding rats with a genetically modified-based diet. *Turkish Journal of Biology*, *39*, 265-275. doi:10.3906/biy-1406-61

Razi, F.M. 1997. Al-Mahsul fi `Ilmi Usul al-Fiqh. Al-`Alwani, T.J. (ed.). Vol.6. Beirut: Al-Resalah Publishers.

The Independent (1999). "The History of GM Foods". http://www.global-reality.com/biotech

ThinkQuest 2000. 14 August 2000. "Pros and Cons of GM Food". http://www.thinkquest.org

World Health Organisation (2015). *Food, Genetically Modified.* Retrieved from http://www.who.int/topics/food_genetically_modified/en/

Zahra, M.A. 1997. *Usul al-Fiqh*. al-Qahirah: Dar al-Fikr al-`Arabi.

Zahra, M.A. 2001. *The Four Imams-The Lives and Teaching of their Founders.* Aisha Bewley. (trans.). London: Dar Al Taqwa Ltd.

Zaidan, A.K. 1998. *al-Wajiz fi Usul al-Fiqh*. Beirut: Al-Resalah Publishers.

Zuhaili, W. 1998.Usul Fiqh Al-Islami. Damascus: Darul Fikr. Vol.I-II.

Zuhaili, W.1997. Al-Fiqh Al-Islami wa Adillatuh. Damascus: Darul Fikr. Vol. I-XI