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The Mystification of Genetically Modified Food Nourishing the Faith, Feeding the Tummy

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ABSTRACT

In questioning the emphasized on genetically modified food (GMF), one should consider the importance of biotechnology to food production in Malaysia. Under the Ninth Malaysia Plan more than RM 20000 million was allocated for the biotechnology sector in order to ensure that the agriculture sector in Malaysia, relating to food production and processing will improve significantly through advance biotechnology process. However, in regards to Muslim consumerism there are general concerns on whether or not GMF is Halal. Such crucial issue of GMF has become a problem especially for religious and governing authorities whom protect the Halal aspect of Muslim consumerism. GMF even if found to be permissible from the Islamic perspective, the question remains on the toyibban criterion of Muslim dietary requirement which emphasized that food must be safe, nutritious and healthy for consumption. This paper is a conceptual paper based on an extensive review of current and available literatures, on the subject of GMF, focusing on Halal consumerism.

Keywords: Genetically Modified Food, Halal, Muslim Consumer
JEL Classification: L6

1. INTRODUCTION

1.1. Biotechnology and Agriculture

The introduction of biotechnology in food producing sector such as agriculture has seen the insertion of genes into several conventional crops such as wheat, corn, soya bean and etc. The inclusion of such technology has resulted in pest, disease and drought resistant crops, insuring lower input cost and higher yield for the agricultural sector. Biotechnology crop, which is also known as transgenic crop, is not exactly new to the food producing sector. By year 2000, these crops have taken up more than 44 million hectares of total agricultural land around the world (Mitchelle et al., 2001). Developing countries accounted for more than 24% of this land with Argentina being the largest planter of biotech crops. From Malaysia perspective, significant increase in the production of several basic food items such as rice, fruits, vegetables, fisheries, and poultry has been achieved. However, Malaysia is still very much highly dependent on importation of many agricultural products such as wheat, beef, mutton and dairy items due, to their rising demand as well as relatively limited local production. Therefore, the key challenge for food security in the country is to achieve self-sufficiency level in most of the food requirements as well as to reduce dependency on food importation.

1.2. The Economics of Genetically Modified Food (GMF)

While different quarters still wrestled with the pro and cons of GMF, the exponential growth of global population deemed it necessary that adequate food supply is maintained. Even when religious based consumerism becomes a crucial element in determining buyers purchasing behavior in regards to their food, the key element that needs to be addressed will still be on the importance of GMF in the food supply chain. The world still faces daunting challenge of hunger, poverty and malnutrition. The introduction of genetic engineering to agriculture especially, ensured that the food security aspect of food production is being sensibly invigorated. In tandem with the growing population, decreasing of resources and the heavy reliance of developing

countries on agriculture, biotechnology approach seems to offer the best solution in term of a stabilizing the food supply chain. By exploring and capitalizing on the boon of biotechnology of food production, these countries will not only produce better, more disease and pest resistance crops with higher yield but it will also resulted in revitalization of their economies. Biotechnology in this case, is a means of advancing these countries economy, in an accelerated manner.

1.3. The Importance of GMF to the Food Supply

GMF plays an imperative role in the food supply chain. The introduction of GMF helps industries related in of food supply such as manufacturers, producers, processors, caterers and other food handlers to catch up with an ever increasing food demand especially from modern consumers that looking for specific health and nutritious foods (Christoph et al. 2008; Opara, 2003). GMF was identified as the tool that enabled the alleviation of inadequate food supply system which directly created the food crisis phenomena (Jaramillo, 2009). GMF not only increase the amount of food supplied to population, but at the same time introduce better crops which are not only resistant to crop diseases but also has more enduring shelf life. One of GMF key characteristics is it resistance to longer time which directly highlighted the importance of GMF to the food supply chain (Habibi-Najafi, 2006). In addition to that, the price offers through GMF are always lower compared to the conventionally produced food varieties (Chen, 2011). GMF brings imperative innovation in the food sector which is directly driving the importance of food supply chain, resulting in the rapid growing of GM crops all over the world (Rodríguez-Entrena and Salazar-Ordóñez, 2013). Such trend could be seen through the increase of planting area for GF crop all over the world. Since 1996, the area of GM crops plantation has widely increased by 87-fold from 1.7 to 148 million hectares inclusive of 29 countries which host half of the world's entire population (James, 2010a). Such vastness of crop plantation further implied how GMF is taking a substantial portion in the food supply chain around the world. Food derived from GM crops has increased very fast. Therefore, many industries through their governments, biotechnology companies, scientists and 14 million farmers from 25 countries support the benefits rather than the risks of GMF (James, 2010b; Mather et al., 2012; Ellahi, 1996).

1.4. GMF Acceptance Globally

Acceptance of GMF is highly dependent on marketing orientation such as satisfying the needs and wants of the customer (Ellahi, 1996) and is determined based on exogenous process which involved interaction between industry and outsider party such as government policy and regulation (Mitra et al., 2012). Earlier measurement towards reaction, affinity and acceptance behavior of GMF showed mixture of results. Previous researches done in Europe showed that most European customers are inclined to reject GMF compared to American customers, whom in general are receptive towards GMF (Costa-Font and Gil, 2012; Gaskell et al., 2000; Siipi and Launis, 2009; Hallman et al., 2003; Le Marre et al., 2007; Powell, 2011). Another research in Argentina showed how Spanish customers basically perceived GMF as beneficial to population (Costa-Font and Gil, 2012). Similar study done in Asia however showed Japanese customers viewed GMF negatively but at the same time support the research and development (R&D) activities pertaining to GMF (Ishiyama et al., 2012). Meanwhile, scholars whom measured results from acceptance of Taiwanese customers concluded an overall positive acceptance towards GMF (Chen, 2011). Such mixed results from various similar past studies on customer acceptance of GMF further introduced complexity in the overall customer understanding and acceptance of GMF. These mixed outcomes of customer acceptance towards GMF showed how the issue of GMF being integrated as part of food supply is not easy to be understood literally, and need further, in depth study on the issues. Japanese acceptance behavior also indicated how future studies should not done through multi-dimensional approach instead of the single dimensional approach used by previous researchers (Chen, 2011; Bredahl, 2001; Chen, 2008; Prati et al., 2012) the used of multi-dimensional approach would overcome limitation that could compromises the overall result of this research especially when it comes to explaining the different types and level of customer acceptance towards GMF. Multidimensional approach provided more potential in comprehensively explaining behavior and attitude (Fishbein and Ajzen, 2010).

2. GMF IN MALAYSIA, THE PROGRESS SO FAR

GMF has been introduced into the Malaysia food supply since 1998 (Amin et al., 2010). As other Asian countries such as Philippines, Vietnam, India, Bangladesh, China and Indonesia are developing the nutritionally enhanced new rice known as the golden rice, Malaysia through the Malaysian Agricultural R&D Institute was paying attention on developing virus-resistant transgenic rice (Amin et al., 2011; Hallman et al., 2003) keeping in tandem with producing better crops through genetic manipulation. Apart from that, various efforts that included the development of ripe-delayed papaya, GM chilly, virus-resistant chilly peppers, passion fruits, GM pomelo, GM palm oil and GM pineapple with enhanced quality (Ellis, 2006).

Unfortunately, most of the GMF is still under R&D process. For instance, until today the commercialization of GMF is confined to the delayed ripening papaya and rice that have been approved by Genetic Modification Advisory Committee (Christoph et al., 2008; Ellis, 2006; Abu Bakar, 2007; Amin et al., 2011; Ismail et al., 2012). In addition, Malaysia has received importation of GMF from other countries such as GM soybean and GM corn since 2004 to be appeared into Malaysian market (Amin et al., 2008; Escaler et al., 2011). This clearly shows that Malaysia is extensively introducing and developing GMF at this moment. While Malaysia made GMF is still in its developing stage, the local market is already filled with various such product which made avoiding GMF seems unfeasible in the long run.

2.1. GMF Role in Malaysia Food Production

GMF is a one of the products derived from the food biotechnology sector. In Malaysia, emphasized on GMF is in line with the establishment of National Biotechnology Policy (NBP) in 2005 which came in three different time related phases namely Phase I (2005-2010), Phase II (2011-2015) and Phase III (2016-2020). In

general, NBP covered nine thrusts namely healthcare, industrial, R&D, human capital development, financial infrastructure, legal and regulatory framework, strategic development government support and commitment as well as agricultural. In the agriculture sector the main focus is on the introduction and consumption of GMF. The main aim is to ensure that the agriculture sector in Malaysia especially related to the food production and food processing would improve significantly through advance biotechnology process. In addition, through such technology, lies also the enormous potential of food exportation to other countries, seen as a prime tool in boosting up the ambition of Malaysia to become an economically accomplished nation by the year 2020 (Malaysian Science and Technology Information Centre, 2014; Ahmad et al., 2008).

Why is GMF so important to Malaysia that it rendered the support for its government? This is mainly due to the fact that GMF is one component which emerged from the agriculture sector. The Malaysian government has put a strong emphasized on biotechnology by allocating a huge financial support for the sector. Under the Ninth Malaysia Plan (9MP), more than RM 20000 million has been allocated in the biotechnology sector by the Malaysian government. Half of the total investment was placed on amenities and another RM 463 million was allocated for R&D activities. A further RM530 million was for the business development of the biotechnology sector. The National Biotechnology Division (BIOTEK) under the Ministry of Science, Technology and Innovation has been given the important responsibility of monitoring and leading all agenda related to the biotechnology sector including technology development as well as promotion of biotechnology program. This massive investment is parallel with the direction of Malaysia New Economic Model (NEM) in which the main aim was to turn Malaysia into a high-income nation with the capability to be a market leader, equipped with well-governed agencies, regionally integrated, with high level of entrepreneurial and innovative abilities.

2.2. Malaysia GMF Approach

Malaysia has realized that food safety can no longer be considered solely as a domestic entity nor can it be the responsibility of a single agency. Even though the mandate for food safety rests with the Ministry of Health, other government agencies are also responsible for food safety in the country. In Malaysia, it is up to the Food Quality Control Division of the Ministry of Health, to uphold the integrity of food safety through shared responsibility and accountability on the basis of tripartite management. This is an approach taken on safeguarding food safety through shared responsibilities among government, industries and consumers. The food safety legislation gives due recognition to the consumer rights e.g., the new regulations for nutrition labeling and claims ensure that consumers are getting the right and adequate information to make a wise choice when buying their food. This new regulations guarantee that consumers are not misled by attractive (but ambiguous) claims on the food packaging. The consumers too, should play their role by reading the labels before making the right choice in buying food especially in ensuring that they are eating correctly based on the food pyramid.

3. GMF AND THE MUSLIM CONSUMERISM

However, while investment is expensive in trying to produce GMF, for Muslim countries such as Malaysia, GMF posed another issue in the food chain of Muslim consumerism. While seen as the ideal way in ensuring ample food supply to the ever increasing population in Malaysia, GMF is not exactly a well-known entity among the mostly Muslim consumer. When it comes to this market niche, another crucial element that came upon play is the issue of Halal. In general, the Halal food concept serves as a guideline for Muslims in all aspects of consumerism and consumption of products and services. Muslims are bound by the Islamic dietary laws, thus they will check and judge the permissibility and prohibitive nature of all foods and drinks before consumption to prevent them from consuming forbidden and doubtful products. GMF being the product of high technology process warrant massive attention due to its core process of combining genes of various living organism that include plants and animals, cross recombinant process that fruitful in producing better, less susceptible to disease and resulted in abundance food for consumption. However, the recombinant genes required and used in producing this "superior" crop could originate from either other plants or animals, sources that could be forbidden by the Muslim dietary Halal law. However, even though both sides have their views, equipped with the necessary proof, for Muslim consumers the question remains, where does Islam stand on this?

3.1. Halal Status of GMF Product

Malaysia National Fatwa Committee on July 12, 1999 issues a fatwa which states that any product, food or drink processed using biotechnological methods incorporating swine DNA is against the precepts of shariah and is therefore not permissible and Malaysia have yet to reach a stage whereby the rule of "necessities overrule prohibitions" could be applied. This means that biotechnological usage of non Halal animal DNA in the processing of foods and drinks could not be justified as there are other viable alternatives to Muslim consumers thus indicating that the dangers of the usage of prohibited material are greater than the benefits. While this fatwa clearly put down the rule for swine DNA, there are still many other issues *vis-a-vis* GM food that still need to be looked at. For instance, what about the usage of DNA from other animal sources? Some of these issues were further addressed by a newer fatwa in 2011 whereby the use of other animal that is Halal (to consume) is deemed acceptable as long as the animals are slaughtered according to the shariah method. However another issue arises from this directive in which question is being asked on whether this meant that DNA extracted from live animals can't be used? All such related matter requires careful study so that all these various doubts could be tackled.

Aside from the issue of swine genetic material, we have yet to come across an opinion on the many-faceted issues of GMF from any Islamic scholar. In which case, such produce will be deemed unsuitable by the conventional Muslim dietary law. However, the limited awareness of Muslim consumer of GMF produce and the lack of general understanding of such issue will pose uncertainty in term of Muslim consumer behavior towards purchasing such product. Regulation bodies such as the Ministry of Health and

even the Islamic governance body such as JAKIM (Department of Islamic Development Malaysia) themselves would need to not only understand the issues on hand, but understand the basis of GMF production, a feat in itself.

3.2. Muslim Consumers and GMF

So far there has been a huge gap in the understanding of GMF acceptance by Muslim customers. Most of studies done on GMF was conducted in the perspectives of customers from developed and non-Muslims dominated countries such as in Italy (Prati et al., 2012), Germany (Christoph et al., 2008), Finland (Saher et al., 2006) and Australia (Lockie et al., 2005). Hardly any empirical evident is available from the perspective of the Muslim customers. Halal global food market contributed to more than 60% of an overall market of Halal products worldwide, estimated at a staggering USD 2.3 trillion (The Halal Journal, 2010). This goes to show how there is a dire need to understand and comprehend the acceptance and buying behavior of Muslim customers, especially with GMF becoming ever increasingly important to the global food supply chain.

3.3. The Concept of Halalan Toyibban

Halal is an Arabic word means "permissible" or "lawful." In other words halal is "pure food" in regards to meat by following Islamic practices such as ritual slaughter and pork avoidance (Fisher, 2011). Alqudsi (2014) underlying Halal as is permissible and has to follow Syariah compliance, he also added toyyiban which means wholesomeness that is healthy, safe, nutritious and quality. Halal is an Arabic term which means lawful and the opposite of Halal is haram which means unlawful or forbidden (Fauziah, 2013). Halal is defined as an act, object or conduct over which the individual has the freedom of choice and its exercise does not carry either a reward or punishment. While haram means all that which the Lawgiver (Allah) has prohibited in definitive term, and its perpetrator is liable to punishment in this world or the Hereafter. Asia in particularly Malaysia, Thailand, Philippines, Indonesia, Singapore, Brunei, China, Pakistan, Bangladesh, India and West Asia with growing Muslim people are growing factors and bigger Halal market and the target for Halal market (MIHAS, 2010). The Muslim population is growing at a faster rate than non-Muslim population (Razalli et al., 2013). The Islamic law consists of five main legal rulings namely obligatory, prohibited, recommended, reprehensible and permissible. Fauziah (2013) has stated the objective of the Islamic law apply to the protection of religion, protection of life, protection of life, protection of mind, protection of lineage and protection of property. She also added that Maqasid as-Shariah has been an important tool for formulating the fundamental principle and cardinal values pertaining to human welfare. It can be said that Islamic law and legal rules are regulated to ensure the basic necessities of the population are place and sanctity of life is safeguarded through the general concept that people should be protected against harm and evil. The halalan toyyiban concept must be understood in an integrative by way of its' internal and external aspect. It is important that this concept be absolutely understood as it is a standard to measure quality of consumerism. It has to be applied in the field of consumerism by all parties involved whether it is consumer, government, manufacturer, supplier or businessman. However, there are not many of those in the production or manufacturing business is giving consideration to it.

3.4. Mystification of GMF Safety

In regards to GMF however, studies need to be carried out so as to ascertain that the food is safe, nutritious and healthy for consumption. Thus far, GMF has been getting a lot of negative press. While proponents for GMF have pointed out that GMF is a plausible solution to the eradication of the problem of food shortage, opponents had came up with a list of health hazards that are said to have been caused by GMF. It is no surprise then that the debate on GMF is still on going. In one corner, we have the giant corporations and industrialists who are supporting the production of GMF. Their arguments are that GMF is more resistant, resilient and have a higher yield. In the opposite corner, we have consumerists and environmentalists who are concerned with the risks of GMF as well as the destruction of the gene pool in the ecological system population increase in the world creates the need for more food to be consumed. Additional factors such as long drought, crop diseases and various natural disasters pose further threat to the already delicate global food supply chain. This issue is widespread around the world, Malaysia agricultural sector notwithstanding. In developing countries especially, the need for ever-larger food supply is becoming more persistent. Researcher and scientist view biotechnology as a prominent contender in solving such demand. Such view began the development of GMF. In many countries, the agricultural sector is willing to make pricey investment into the area of biotechnology as such investment is seen as insignificant when compared to the potential benefit of a secured food supply to its population.

4. DISCUSSION

The increase of the world population and various occurrences of natural disaster had caused shortage in food supply around the globe. Due to this, technology driven food production, was seen as a crucial approach to overcome such problem. The introduction of biotechnology to the food production sector such as agriculture has resulted in the incorporation of biotechnology approach in crop growing, through genetic modification of conventional crops such as wheat, corn, soya bean and etc. This approach has helped crops to be more hardy and resistant to pest, disease and drought, insuring lower input cost and higher yield for the agricultural sector. Biotechnology crop, also known as transgenic crop, has been gaining ground in the food producing sector. Researchers and scientists viewed biotechnology as a prominent contender in solving the continually increasing demand of food supply. Such view propagated the expansion of GMF. In many countries, the agricultural sector is willing to make risky investment in biotechnology as such investment is seen as insignificant when compared to the potential benefit of a secured food supply to its population. In 1996, it was reported that there was about 1.7 million hectares of land planted with GM crop but by 2010, the area had expanded to 160 million hectares. By 2014, the crop area has increased to 181.5 million hectares, covering 28 different countries44. The Islamic countries have also moved towards this technology in order to support the demands of their own food supply chain. Four Islamic countries have joined the ranks as

GMF producers, in which two i.e. Pakistan and Burkina Faso are categorized as mega biotechnology countries with a total crop area of more than 50,000 hectares (James, 2014). This showed how GMF is an unavoidable alternative in the food supply chain and its importance is growing stronger to the Muslim population as well.

However, while GMF produce may be worthwhile in terms of production volume, for Muslim countries such as Malaysia, it poses another issue in the food chain of Muslim consumerism. GMF is still a novelty and little understood among the mostly Muslim consumer, thus the issue of meeting Halal requirement is uncertain. The central issue with GMF lies in its core process. GMF requires the combining of genes from various living organism that may include plants and animals, a cross recombinant process which attempts to produce hardier crops, one which is less susceptible to disease but at the same time results in increase crop yield. However, through gene recombinant technology, the practice may violate the Muslim dietary Halal law. In which case, such produce will be deemed unsuitable by the conventional Muslim dietary sharia requirement. However, the limited awareness and generally low understanding of such issue may threaten Muslim consumer confidence towards the Halal status of such products.

5. CONCLUSION

In terms of GMF in Malaysia, further empirical study needs to be conducted on the general acceptance of the product itself. It would be appropriate at this point to ensure the level of awareness among Malaysia public in regards to the existence of the product in local market. The understanding among Malaysian consumers needed to be understood before further evaluation can be done especially on their acceptance, regardless of their religious background. Lastly, future research should also look into enlarging the scope of this study population especially, to increase the generalizability of the research outcome. Widening the area of focus to include as many level of consumers as possible, as it will provide better and more representative data.

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