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Exploring the Awareness and Acceptance of University Students towards Genetically Modified (GM) Foods

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ABSTRACT

Genetically modified (GM) food has become one of most discussed subject among scientists, policymakers and public in general. Previous studies which have been conducted in many countries concluded that public in general has shown different level of awareness and acceptance towards GM food such as corn, potatoes, soy and rice. However, similar study on students has yet to be conducted in Malaysia. Thus the aim of this study is to explore the awareness and acceptance of GM foods among students. The approach of this study will be based on focus group discussion whereby students will be given opportunity to express their opinion on GM foods together with peers. The result from this study is important for us to formulate better strategy to increase positive outlook of GM foods in Malaysia.

KEYWORDS

GM foods, Awareness, Acceptance students

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INTRODUCTION

Modern biotechnology in agricultural has led the direction of the industry to a more positive route worldwide since it was introduced back in twentieth century. Among the changes that directly impact agricultural sector all around the world are the introduction of genetically modified (GM) crops with better yields and higher resistant to diseases and a more targeted plant breeding technique resulting in the development of new crop varieties with more desirable traits which eventually producing GM foods. GM foods are those that produced from genetically modified plants or animals (Zhang, Wohlhueter, & Zhang, 2016) According to (Qaim, 2009), GM traits are divided into three groups which are the first-generation, second and third-generation which are differentiated by the type of traits they carry upon genetic modifications. The first-generation GM crops involves the enhancement of their agronomic traits including higher resistance against pathogen attacks while second-generations focus on the improvement of quality traits such as better nutrient content in the food and third-generations crops were developed aiming at production of special compounds by these crops to fulfill the demand of certain industries, such as pharmaceutical and industrial.

Examples of genetically modified crops are corn, wheat, soybean, canola and sugar beet. (James, 2013) has tabled out in his report that US is still number one in the world as top GM crop producer having 70.1million hectares, followed by Brazil (40.3million hectares), Argentina (24.4million hectares), India (11million hectares) and fifth is Canada (10.8million hectares). This scenario directly reflects the increasing number of farmers cultivating GM crops over the world too. The continuous effort to grow GM crops and introduce GM foods has also led to continuous debate all over the world, resulting in various studies to study the pros and cons of GM foods, the awareness, the acceptance and the attitudes of different range of consumer towards GM foods. Studies showed that consumers in US are more positive in perceiving GM food while European consumers do not favor GM food since it was introduced in 1990s (Chen & Li, 2007). (Kaya, Poyrazoglu, Artik, & Konar, 2013) did a survey in Turkey among academicians regarding GM organisms and food and observed that this group of people were not favorable of GM related food. The acceptance of GM foods among the farmers and the scientific community in China is reasonably good as reported by (Han et al., 2015). Similar findings were reported in India which seen gradual acceptance of GM foods by the gatekeeper in the country food distribution channel (J. Knight & Paradkar, 2008). Tanius & Seng,(2015), K. Ismail et al., (2012) and (L.Amin et al., (2010) reported that the awareness as well as acceptance on GM foods in Malaysia are either negative or neutral among the common public.

At present there is no study yet done on the students. Students have significant role in the society as they will become the future leader of the country and will have purchasing power, replacing the current generations. It is equally important to understand their acceptance and awareness towards GM foods as the future of GM foods indirectly lies in them. For filling the current gap, we will conduct a study by mean of qualitative method to explore the awareness and the acceptance of GM rice among university students in Selangor. In addition, this study also aims to provide appropriate recommendations to the rice industry and relevant bodies to increase positive outlook on the future of GM rice in Malaysia.

Consumer Awareness on GM Foods

There have been numerous studies done to study the awareness of GM foods among the members of public. Researchers found that the awareness element is critical in order to gauge the current and future status of the subject of interest. GM foods have given raise to continuous and thorough discussions among the policy makers as well as gatekeepers in almost every country in the world. While many raised the benefits of GM foods, some remained cold towards GM foods due to its nature and deemed as “unnatural” and unethical. Recent study done on Turkish consumers in Istanbul, Turkey, implicated that the awareness of GM is present but they have insufficient knowledge about genetic modifications and the whole process. (M. Tas, M. Balci, A. Yüksel and N.S.Yesilçubuk,, 2015). In US, one of the recent study showed that consumers in US have inadequate knowledge on GM food (McFadden & Lusk, 2016)

Another study suggests that the awareness of the consumers in US towards GM foods remains low despite the actual consumption of GM food (Wunderlich & Gatto, 2015). The same trend is seen in India where the gatekeeper serving the food distribution network specified that consumers seems not to be bothered with the GM issue and are not aware of it (J. Knight & Paradkar, 2008). Studies on the awareness towards GM foods were done among students in few countries and some findings tend to

resemble the results on the public awareness of GM foods though some studies showed opposite trend. It was reported by S. Abuqamar, Q. Alshannag, A. Sartawi et al., (2015) in their study that undergraduate students from a university in United Arab Emirates displayed limited awareness on matters related to biotechnology. Polish students have little knowledge on genetic modification indicating low awareness on GM foods. The study showed that more than 81% of the respondent among Polish students are not aware on genetic modification technology itself (Jurkiewicz, Zagórski, Bujak, Lachowski, & Łuszczki, 2014). Another study revealed that basic awareness among US undergraduate students is very low on the function on GM food in their diet (McCollough, C. & Strychar, K., 2010). Similarly a study among Culinary students in a university in Istanbul, reporting low level of knowledge on GM organisms and biotechnology (Yıkmış, Gülüm, Aksu, & Alpaslan, 2017). On the other hand, Korean students are more aware on genetically modified organisms (Kim & Kim, 2004). Another study conducted in a college in Fla, US among 214 students has reported good knowledge of genetically modified organisms among them (R. V. Leary, 2016) Ishak & Zabil, (2012) concluded in their study that consumer awareness and knowledge are related and both contribute very much to effective consumer behavior.

Consumer Acceptance on GM Foods

GM foods acceptance varies from one country to another and this element could change because of several factors. European consumers have negative acceptance towards GM foods and it has adopted some stricter GM labeling requirements as well as stringent approval. This showed that the European consumers have very little intention on purchasing GM foods (Lucht, 2015). On contrary, US consumers are more open and have better acceptance towards GM foods. Being world number 1 as GM crops producer as reported by James (2013), the US biotechnology industry is not facing strong public rejection as in EU (A. J. Knight, 2009). Acceptance among students vary as well. A study comparing working adults and university students on GM beef and milk revealed that university students have positive acceptance on the GM foods compared to the working adults and this led to a positive anticipation of better acceptance on GM technology in the future (Schnettler et al., 2016). On the other hand, Slovakian students acceptance on GM foods is low as reported by (Prokop et al., 2007) while report by Wunderlich & Gatto (2015) has quoted Turker et al.(2013) on strong negative response from Turkish nursing students on GM food. Study on students in the College of Agricultural and Life Sciences at the University of Florida has revealed that they have neutral attitudes towards GM foods (T. K. Ruth et al., 2016) This also reflects neutral acceptance on GM foods by the students. Turkish university students demonstrated positive acceptance towards GM food (Usak et al., 2009) This scenario is also the same for American students where they showed positive acceptance on GM foods (Laux, Mosher, & Freeman, 2003).

MATERIALS AND METHODS

Survey

This study will adopt qualitative research method to achieve the objectives. There are two ways of conducting the study namely focus group discussion and in-depth interview. It is design to gain insights on the awareness and acceptance of GM rice among bumiputra students in Selangor.

Focus Group Discussion

Focus group discussion is a small discussion group comprised of a number of people and a moderator, discussing an issue or a specific topic. The number of respondent usually maintained at no more than twelve people. In this study, the number of respondent is set at eight people. The respondent of the study will be students from MARA Technology University (UiTM) in Selangor. Three sessions of focus group discussion are planned for the study at three different UiTM campuses in the state. Three set of questions will be discussed comprising of engagement questions, followed by exploration and ended with exit questions.

In depth Interview

In depth interview is one to one interaction session to acquire valuable, first-hand information from a specific person or expert. This study will conduct two in depth interview sessions with two experts from the academic sector and agriculture research sector. Six questions will be asked and discuss during the interview session.

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Table 1: Questions for Focus Group Discussion

Engagement

1. What does the term GM suggest?
    a. What do we understand about GM
    b. How do we feel about GM food?
2. From where have we obtained information regarding GM food or GM rice?
    a. Do we trust the current information available?

Exploration

1. Why do we read food labels?
    a. What do we read on labels?
2. What do we think about GM labelled rice?
3. What are the considerations we take into accounts when purchasing GM rice?
    a. What are the three most important and why do we emphasize on that factors?
4. What are the risk and benefits we might gain from GM rice?
5. How do we describe our attitude towards GM food, particularly GM rice?
    a. Why do we have such attitude?

Exit

1. What do you think about the future of GM rice in the country?
2. How do you want the information on GM food, especially GM rice to be disseminated to the public?

Table 2. In depth interview questions.

1. Studies on the awareness and perceptions about GM food has been done in Malaysia among
2. the public as well as Muslim community.
3. How do you feel about similar study among students?
4. How do you describe the current acceptance of GM food by the general public in Malaysia?
5. What could be the contributing factors to the current scenario with regard to GM food in Malaysia?
6. In your views, what could be the risk and benefits of GM food?
7. How would you describe the future of GM rice in Malaysia?
8. How would you suggest about the most effective method to create awareness on GM food?
9. Do you think the public need to be educate? If yes, which are the most efficient and cost-effective way to educate the public?

RESULTS AND DISCUSSIONS

Students Awareness and Acceptance on GM Foods

According to J. Maes et al., (2017) quoting Sturgis and Allum (2004), the relationship between knowledge and attitude is indirect and rather complicated but must not be overlook. The study investigated the factors that contribute to willingness to eat GM food among students and results demonstrated that both subjective knowledge and objective knowledge do contribute to positive acceptance among students. The study also reported that according to House et al. (2005), subjective knowledge form stronger connection with acceptance towards GM foods as compared to objective knowledge whereby subjective knowledge refers to what people think they know while objective knowledge is what people actually know. Although increased knowledge does not necessarily affirm positive acceptance towards GM food, it does facilitate consumers in shaping their perception and judgement.

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There is study reporting the importance of knowledge in providing better risk perception and acceptance among consumers. Knowledge can be gained through formal education. In this matter, students who learned about science or biotechnology via formal education tend to be more open and accepting genetic modification technology as compared to those learning non-science subjects. This is because they learn more about biotechnology in detail and have basic understanding on how gene modification works. Study on Finnish university students revealed a connection between field of study and attitudes towards GM food. Those who study natural sciences have more positive attitude compared to those studying humanities and social sciences (J.P. Mäkiniemi et al.,2014) A similar findings was reported in a study involving university students in United Arab Emirates in which students attending science and food agriculture courses are more aware on GM food. In addition, it was suggested that emphasize should be given on biotechnology subjects to improve students awareness because they will soon be the policy maker (Abuqamar et al., 2015). This is also supported by study conducted on the willingness of consumers to buy GM foods by Hossain et al., (2004) in which the relationship between education and scientific knowledge with positive acceptance on GM foods.

Another element that plays a vital role in the acceptance of GM foods among students is trust on the information pertaining to the GM foods. Information on GM foods can be disseminate in many ways including precise and truthful labeling on the GM foods, documentary on genetic modifications via the media as well as public talk by the experts. Wunderlich & Gatto, (2015) reported that in one study concerning US consumers, it was revealed that scientists are among the trusted group of people besides university research groups and medical professionals when it comes to GM foods. Study on students in India found that acceptance towards GM food increased with the involvement of international regulatory bodies in promoting GM foods (Dilip B. Kajale & Becker, 2015) Consumers put their trust in scientists, regulatory bodies as well as some prominent companies because they have limited knowledge on biotechnology. They are confident with these sources and this in turn could lead to positive assessment on biotechnology and GM foods (Siegrist, 2000). Another study conducted in India on students support for GM food labeling, it was reported that the students trust the university in which right information on GM food from the university will increase the positive outlook on GM food (Dilip Babasaheb Kajale & Becker, 2013).

Informative, precise and correct labeling on GM foods will also affect the acceptance of students towards GM foods in the future. Consumers generally will tend to read labels when new food is introduced on the shelves. Though labeling GM food might put people off and warrant negative acceptance, it will still stimulate purchase intention. This is in line with a result obtained through a consumer survey in Belgium in which more than fifty percent of the respondents claimed that GM food labeling will facilitate them in their purchase decision, whether to buy GM food or vice versa. In addition, labeling helps to alleviate the perception that consumers are obliged to consume GM foods (Verdurme & Viaene, 2003). The mass media play a very important role in reaching out consumers out there. It is very important that the correct information on biotechnology is conveyed to the public. Study on Turkish nursing students showed that majority of them (74.3%) turned to the mass media such as the radio and television for information regarding biotechnology (Wunderlich & Gatto, 2015).

In China, three years studies showed that half of their respondents still look out for information on GM foods from the radio and television as sources of information (Han et al., 2015). Thus, the role of media must be properly governed to ensure the public get the correct information regarding GM foods and biotechnology in general. All this information that is channeled to the consumers will be perceived and evaluated by the consumers based on the trust. Hossain et al. (2004) also stated that both trust and confidence demonstrated by the public towards public or private biotechnology institution has contributed to greater willingness to buy GM foods.

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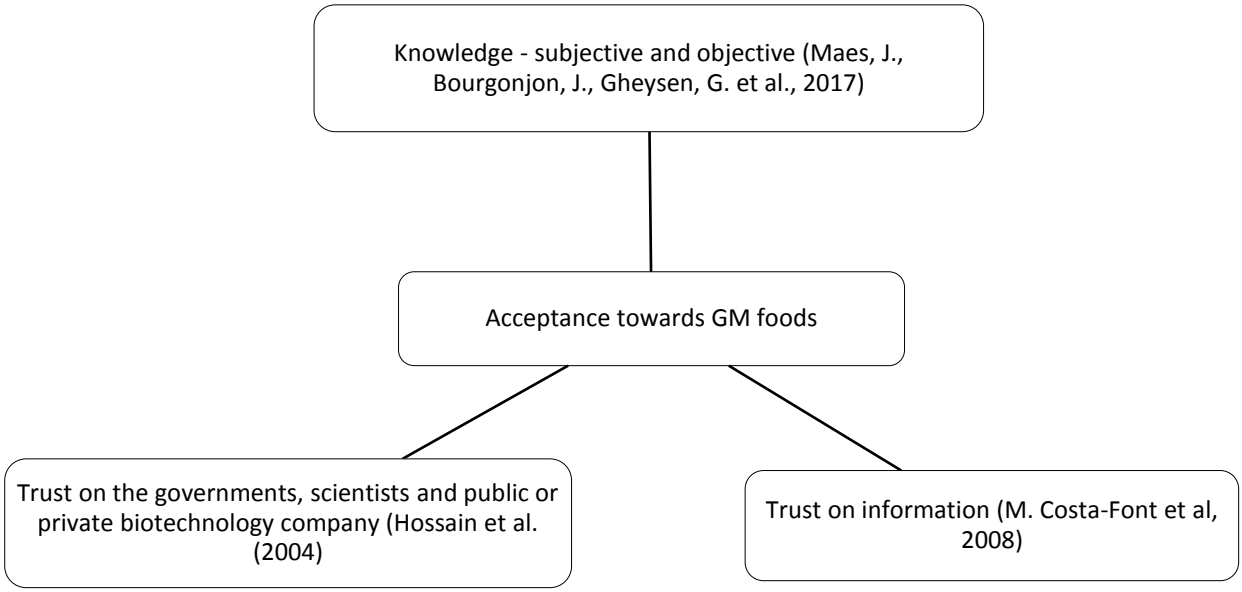

Figure 1: The relationship between factors that contribute to the acceptance of GM foods.

CONCLUSIONS

Exploring students' awareness and acceptance on GM foods has garnered scores of attentions from researchers nowadays. More studies are now focused on their perception on genetic modification technology and their willingness to purchase and consume GM foods. They are the millennial generations, soon to replace older generations in making the policy, drawing all guidelines, decision making and hold the purchasing power. This preliminary study hopes to provide the relevant parties including the policy makers and the stakeholder in food industry on current indications of the younger generation acceptance towards GM foods as to assist them in formulating effective strategies to increase positive outlook of GM foods in the near future.

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