The Middle-Easterners and GM Foods: A Critical Comparative between Literature and the Reality

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Abstract: One of the major problems of Middle-Eastern part of this world is the bone of contention between culture, belief, science, reality and the modern literature in justifying their legitimacy and importance. Genetic Modified Organism's (GMO) applications in all facets of life are not exempted. Particularly and importantly are the consumptions of GM foods. As the Islamic culture a major belief in the Middle-East have decree on all aspects of the Muslims life where food consumptions being one the most vital. Islam is neither in contrast to science nor development. The Muslims scientists and clerics' literature has tried to justify the permissibility of consuming GM foods through quotations from Qur'an and Sunnah. However, there are some scholars that are critical about the claimed benefits of GM foods. Thus, this research aims to uncover the variance between the existing literature and the reality about GM foods in the Middle-East. The researchers choose Saudi Arabia and particularly Makkah as the sample place. A questionnaire was developed and distributed in Makkah to acquire the public awareness and opinions on GM foods. The result was compare with the level of awareness and opinions of Middle-Easterners. The final conclusion was compared with the Middle-Easterners' existing literatures to uncover the need to change model and methods of researches in the Middle-East and the possible damage that GM foods and the literatures have inflicted on the masses.

Key words: Middle-eastern · gm food · Comparative · Literature · Reality

INTRODUCTION

The world goes hunger if GM foods are not produced, is the popular poems of pro-GM without exemptions. Therefore, the world needs to shift the paste of food productions and processes from primitive planting and harvesting to an advanced production through genetically modified food (GM food). This GM food aimed at a glance to eradicate hunger, diseases and improve quality of life. The 21st century's scientists have divided into pro and anti GM food. Geographically, middle-east is no exemption and professionally, middle-eastern scientists were not left behind in propagation and criticism of productions and consumptions of GM foods. At the moment, it appears the pro-GM foods are gaining upper hand over the anti-GM food. In the middle-east there are sorts of importation and consumptions of GM foods by populace willing, unwillingly, with or without the knowledge of the authorities. It is assumed the authorities have made it clear to the masses the sources, types and consequences of consuming GM food if there are any. The major agricultural produces focused on GM program are rice, fruits, soya beans and corn etc. However, some of these foods such as rice, potatoes, corn and fruits are preference to the middle-easterners.

Amidst concern on the food stuffs available in the United Arab Emirate (UAE) consumers' markets Premanandh et al., [1] carried out an empirical study on the food stuffs in UAE markets the result revealed that majority of the foods were GM foods. However, GM foods were neither produced nor officially imported into the country. Conclusively, GM foods got into the country

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without the knowledge of the government. Similar argument has been put forward by many literatures such as Olorogun [2] on entering to and consuming of GM foods across the third world nations willingly or unwillingly and imposition as the case may be. Olorogun attributed this situation to scientific, financial and human resources and above all political incapacity of the third world nations including the middle-eastern countries compare to their America and European counterparts.

Unlike the developing countries the developed nations are the dominant producers of GM foods as they have every resource to develop, propagate and impose it on other weak nations. However, developed nations' governments have imposed sanctions and other measures to prevent unexpected and future adverse effects of GM foods and products on human health. The advanced nations' populaces are aware of GM foods and consume it willing as the law imposed labeling of GM products.

Most third world nations both governments and individuals have no technical knowhow, no label and not aware of the kinds of foods they consumed. It could be concluded that currently 80% of available foods in consumers' markets across the world are GM produces. This wide spread partly could be attributed to the United Nations' food program in different parts of the world such as horns of Africa, Libya and some middle-east countries such as Palestine and Iraq. It is uncertain whether these UN food aids programs across the world are GM produces/foods. However, Bouzenita [3] had criticized the contemporary Islamic jurists of fully justifying productions and consumptions of GM produces based on Islamic laws without holistic evaluation of the products in question.

Therefore, the current study aims to vindicate the reality of GM foods in the middle-eastern countries. Whether literatures from middle-east supports the reality is going to be investigate through an empirical study of small sample from Saudi Arabia and respondents were selected across suburbs of Makkah.

Literature Review: GM food consumption safety has sparked endless debate among academicians, food technologists, consumers and regulators. Academicians have contributes tremendously in providing clues and solution to all foreseeable circumstances surrounding GM food productions, transportations, safety, assessment of safety program, record analysis etc. however, these are not sufficient as some anti-GM individuals and bodies argues on the long term negative effects of GMOs on human beings and environment cannot easily access in a short term study.

Thus, studies that vindicate the safety and assessment of efficiency of the safety program are vital to this research such as König *et al.,* [4] examines the procedure of assessing safety of foods derived from GM crops. Among other procedures the study identified comparison between traditional crop and GM crop as basis of procedure of assessment. However, current assessment procedure was found to be effect. Nevertheless, further researches in the field of molecular biology and biochemistry were encouraged in order to improve methods of assessment thereby making assessment procedure more effective and informative. Thus, given the choice, consumers are likely to accept GM food although other incentives may be needed if alternative foods are available.

The introduction of GM foods led to public unrest across the world particularly in the Europe. The major concern is whether GM foods are safe for consumption or not? Mediating between the government and the citizens literatures such as Spence and Townsend [5] in their work studied the implicit attitudes towards genetically modified (GM) foods by comparison of context-free and context-dependent evaluations on acceptance of GM food among the consumers. Their results were in contrast with the initial hypothesis. The results demonstrate and imply that implicit attitudes towards GM food are more positive than anticipated and may lead to approach behaviour towards such products. Furthermore, Kuiper and Davies [6] indentified consumers' loss of confidence in GM food safety in EU. They suggested the implementation of food safety framework with four stages in addition to risk analysis procedures. Similarly, Costa-Font and Gil [7] study the consumers' acceptance of GM food in the Mediterranean Europe. In combating the public uproar EU adopted different safety policies incorporated in the EU constitution e.g. controversial precautionary principle (PP) [2, 8]. However, researchers encourage collaboration between government and the private companies.

Notably among these studies is the work of Wal *et al.,* [9] on the post-market surveillance (PMS) of GM foods: applicability and limitations of schemes used with pharmaceuticals and some non-GM novel foods. They found that PMS is vital in combating adverse effects of newly manufactured and introduced products on the consumers. Post-lunch Monitoring (PLM) was particularly recommended for pharmaceutical industry. They opined the manufacturer's record information could be used as basis for PLM system which should define and organize the flow of information between the different stakeholders.

Accordingly, researchers such as Engel *et al.,* [10] studied current and future benefits from the use of GM technology in food production. However, GM food produces and productions across the world and specifically Ireland have been associated with politics and have been termed as "biopolitics" by Morris and Adley [11] and Olorogun [2] focused on GM foods eco-political and its related promises' effects on the third world countries by evaluating the World Trade Organization and other international organizations' activities, intellectual properties etc.

The middle-eastern Islamic scholars such as Wahbah Zuhayle approved the adoption and consumptions of GM produces without exemptions. However, Bouzenita [3] argues that mere looking at end products such as potato or tomato in reaching an Islamic legal ruling of legitimizing GM food from Islamic perspective is not enough. Bouzenita further argues that the evaluation should be holistic from the laboratory activities, chemical used and other process are to be taken into consideration before a valid Islamic legal ruling could be reached. The anxiety of spreading unapproved food consumptions in the third world consumers markets in which middle-east countries were not exempted has called for empirical study such as Premanandh *et al.,* [1] investigates the entry of unapproved GM food produces into UEA consumers' market. They found out that the markets are dominated by GM foods without government approval.

Previous researches have demonstrated and test many variable that there are unaware spread of GM foods in the Europe [6] and in the middle-east countries Premanandh *et al.,* [1] others question its acceptability in and conformity with Islamic fundamental rules [3]. However, they all failed to consider whether the existing literatures create sufficient awareness among average middle-easterners. Furthermore, opinions of general populace on GM foods production and consumptions have not been empirically tested as it had been done in Europe such as work of Spence and Townsend [5] and Kuiper and Davies [6] respectively. Thus, the researchers measured the reality in the middle-east on GM foods through questions on awareness, consume, label, risk, policy, Islamic perspective and literature.

Methodology
Participants: Participants were Muslim Saudi living in suburbs Makkah comprises of both professionals and University students with different specialization from across localities in Makkah. Age ranged from 20 to 60 with a mean age of 35.5 (SD=16.26). Of the sample pool, 50% were males and 50% females. Similarly, more than three

quarter of the participants were affiliated to both government and private institutions where 60% reported working with government and 15% with private companies and 25% were university students. Of this sample pool 95% were educated and at least university level while 5% were high school graduates.

The researchers ignore variables such name of institutions, working experience, favourite meal etc. in the above demographic data due to reluctant nature and culture of the Saudi on responding and answering questionnaire. As expected the demographic data has great significance in this study. Therefore, they were considered as control question in some of the data analysis. However, the researchers did not recruit non-educated as samples as it was assumed that they are not qualified to answer the questions.

Material: Material was a questionnaire that used a 1(strongly agree) to 4 (strongly disagree) response format. This was a deviation from most questionnaires that gave a neutral position for those who choose to be neutral in other study. In this present study, researchers assume that the current food consumption in Saudi is inverse proportion to the existing literatures on GM food. Questionnaire was developed by the researcher, consisted of 7 items designed to measure various correlation and awareness of the public about GM foods and the literatures. The items for this questionnaire were based on statements or issues described in previous academic literature on status of GM foods productions and consumptions in middle-east countries such as Premanandh *et al.,* [1] on UAE; and the eco-political effects on third world nation by Olorogun [2] and as well as the implications of productions and consumptions of GM foods in Islamic perspectives by Bouzenita and Anke [3]. These questions were labeled as 7 variables designed to measure the correlation between reality and the literatures. Individually, the first question evaluated the respondents' level of awareness of GM foods/produces. While the second, third, fourth, fifth, sixth and seventh measured whether they consume GM foods, identified it (label), is there any risk, government policy, Islamic perspectives (negative or positive) and whether the literatures are efficient and sufficient respectively.

Statistic Analysis: In this research series of statistical analysis such as reliability test of the model, central tendency, Pearson correlation among individual variables, analysis of variance (ANOVA) with Friedman's Test and Kendall's coefficient of concordance were evaluated. The results were analyzed by using SPSS®.

Results and Preliminary Analysis: The model reliability test using C``ronbach's Alpha (coefficient α =. 59; Table 1) showed the model is explanatory of the dependent variable which is reality on GM food in Saudi Arabia specifically in Makkah at an average. The participants in this study had total strongly agree awareness 13.3%, 23.3% agree, 43.3% disagree, 20% strongly disagree with mean of awareness 2.7 (SD =.95; Table 1). Accordingly, consume had 3.3% strongly agree, 23.3% agree, 46.7% disagree and 26.7% with mean 2.9 (SD=. 80). Likewise, label is 13.3%, 13.3% agree, 20% disagree and 53.3% with 3.13 (SD =. 1.11). Similarly, risk has 10% strongly agree, 26.7% agree, 26.7% disagree and 36.7% strongly disagree with mean 2.9 (SD= 1.03). In the same way, policy has 10% strongly agree, 23.3% agree, 50% disagree and 16.7% strongly disagree with mean 2.7 (SD=. 86). Also Islamic perspective has 10% strongly agree, 20% agree, 53.3% disagree and 16.7% strongly disagree with mean 2.7 (SD=. 85). Lastly, media which

represent literatures had 16.7% strongly agree, 53.3% agree, 16.7% disagree and 13.3% strongly disagree with mean 2.26 (SD=. 90). The variables awareness, consume, label, risk, policy and Islamic perspective were negatively skewed at -.36, -.35, -.93, -.39, -.44 and -.56 respectively except literature which was positively skewed at. 61. These results are summarized in the table 1.

Analysis: Significant correlations between variables are found in Table 2 using Pearson correlation one tail test. The correlations shows that similar relationships do exist between the variables under observation in this study, but the initial analysis does not indicate which variables are better at predicting relationship between reality and literature at any stage. A series of simultaneous regression analyses were conducted to examine the relationship between reality and the literatures in middle-east on GM foods measures and each scales concerning variables research. The relationship among these

Table 1: The results of frequency test from SPSS

Question/variable	No: 30	%	Mean	SD
Awareness			2.7	0.95
strongly agree	4	13.3		
agree	7	23.3		
disagree	13	43.3		
strongly disagree	6	20		
consume			2.96	0.8
strongly agree	1	3.3		
agree	7	23.3		
disagree	14	46.7		
strongly disagree	8	26.7		
label			3.13	1.11
strongly agree	4	13.3		
agree	4	13.3		
disagree	6	20		
strongly disagree	16	53.3		
risk			2.9	1.03
strongly agree	3	10		
agree	8	26.7		
disagree	8	26.7		
strongly disagree	11	36.7		
policy			2.7	0.87
strongly agree	3	10		
agree	7	23.3		
disagree	15	50		
strongly disagree	5	16.7		
Islamic perspective strongly agree	3	10	2.8	0.86
agree	6	20		
disagree	16	53.3		
strongly disagree	5	16.7		
literature strongly agree	5	16.7	2.3	0.91
agree	16	53.3		
disagree	5	16.7		
strongly disagree	4	13.3		

Table 2: the correlation between the variables

		Awareness	Consume	Label	Risk	Policy	Islamic perspective	literature
Awareness	Pearson Correlation	1	.345*	.072	.391*	.150	.418*	.335*
	Sig. (1-tailed)		.031	.353	.016	.214	.011	.035
Consume	Pearson Correlation	.345*	1	.121	.079	-.013	.336*	.013
	Sig. (1-tailed)	.031		.262	.340	.473	.035	.474
Label	Pearson Correlation	.072	.121	1	-.109	.469**	-.039	.376*
	Sig. (1-tailed)	.353	.262		.283	.004	.419	.020
Risk	Pearson Correlation	.391*	.079	-.109	1	.124	.051	.103
	Sig. (1-tailed)	.016	.340	.283		.258	.395	.293
Policy	Pearson Correlation	.150	-.013	.469**	.124	1	-.133	.400*
	Sig. (1-tailed)	.214	.473	.004	.258		.242	.014
Islamic perspec	Pearson Correlation	.418*	.336*	-.039	.051	-.133	1	.171
	Sig. (1-tailed)	.011	.035	.419	.395	.242		.183
Literature	Pearson Correlation	.335*	.013	.376*	.103	.400*	.171	1
	Sig. (1-tailed)	.035	.474	.020	.293	.014	.183	

*. Correlation is significant at the 0.05 level (1-tailed).

**. Correlation is significant at the 0.01 level (1-tailed).

Table 3: The analysis of variance between the variables and the mean

ANOVA		Sum of Squares	df	Mean Square	F	Sig
Between People		51.638	29	1.781		
Within People	Between Items	13.390	6	2.232	3.060	.007
	Residual	126.895	174	.729		
	Total	140.286	180	.779		
Total		191.924	209	.918		

Grand Mean = 2.7810

variables was tested with each of the four scales being used as separate dependent variables. Three models accounted for a significant amount of variance among variables research on respondents: awareness, consume, label, risk, policy, Islamic perspective and literatures. Specifically, there are significant correlation between awareness and consume, risk, Islamic perspective, literature at 34% (sig. =.031; $p<0.05$); 39% (sig.=. 016; $p<0.05$); 41% (sig.=. 011; $p<0.05$); 33% (sig.=. 035; $p<0.05$) respectively. The correlation between consume and Islamic perspective was 33% (sig.=. 035; $p<0.05$). Furthermore, there was significant correlation between label to policy and literature at 46% (sig.=. 004; $p<0.01$); 37% (sig.=. 020; $p<0.05$) respectively. Similarly, the policy and literature showed 40% correlation with sig.=. 014. However, there were no significant correlations between Islamic perspective and other variables except awareness and consume. Likewise, no correlation exists between literature, consume, risk and Islamic perspective as showed in table 2.

The analysis of variance (ANOVA) below showed the variances between the variables and the mean (Table 3). The grand mean is 2.78 and general model is significant at. 007 indicating that the model is sufficient

and indicator of the reality in the middle-east. The 2.78 grand mean perhaps was as a result of wide deviations of the variables from the mean. The degree of freedom (df) between the 30 random sampling is 29 and 6 within the people between items (variables measured) with p=. 05 indicating that there is a 95% probability that the population mean is greater than 6 and lower than 29 the overall certainty of predictions presented and the F-statistic is 3.06.

DISCUSSION

This study suggests several useful things regarding GM foods in the middle-east. Degree impacts of GM food can be predicted using reality and literatures as scales. Perhaps most interesting is the finding that when one examines different facets of the GM foods debate, attitude on the issues are predicted better in some cases by reality and other cases by literatures. In particular, variables used in measuring reality and characteristics demonstrated fitness of the model. This is consistent with the results of suburb Makkah of Saudi Arabia data on reality and academic literatures that informed the populace on GM foods. On the other hand confidence in government and

other institutions' ability to address issues productions, importation, exportation and consumptions of GM foods/produces is predicted effectively by reality and literatures: high need of awareness, high need of further researches and literatures.

Also of interest is the finding that people had stronger disagreement with most of the variables (questions) of this research. This may indicate the gap between the reality in the middle-east and the researches available in reporting about GM foods as evident the skewness is asymmetrical. Alternatively, this finding may simply reflect participants' familiarity with the terms GM foods through news reports or other sources. Further sources is needed to address the way GM foods and its terminologies are communicated and understood and their potential positive and negative to affect people's reality toward the literatures that spelt out meanings of GM or other aspects of this type of research.

Our data represent pilot study and an initial step in understanding the connection between reality of GM foods and its literatures in the middle-east; as such there are certain caveats that must be address. Perhaps most important, the data is small sample and the generalizability of these data to different parts of middle-east, age, ethnic, or other groups may be limited. Our intent here, however, is to investigate whether similar awareness on GM foods exist in the middle-east as it existed in Europe and America and the role of literatures. As has been pointed out elsewhere [1] GM foods available in abundant in UEA without the government and individuals knowledge. Although the mean score on each variable measure may differ, it does not follow that one would expect differences in the standard deviation among the variables. In fact, the deviations from the grand means for all variables are almost equal between. 80-1.1. Likewise, to the extent that reality vary among participants, relatively homogenous and small samplings like ours are likely to underestimate correlation among variables. The exclusion of age and other control variables might have some effects on the results of this study.

In the future, researchers might profitably investigate the influence of large sampling on reality and literatures of GM foods productions, importation, exportation and consumptions in the middle-east and it is advisable to be on regional consideration. Additional variables are vital to understanding the reality across the continent.

Finally, although these data offer insight into the judgments that large gaps do exist between the reality and the literatures and the dilemmas that the middle-

easterners' must have gone through for many decades. However, this data is too small and confined to suburb Makkah in Saudi Arabia. Such acute problem raises one important question which needs further attention: what about the majority of Saudi's views and knowhow about GM foods. Further research should be conducted to address these factors to determine more fully whether non-correlation between reality and literatures are social norms of the Saudi or middle-east in general and discovered by Premanandh *et al.* [1] in UAE. In the context of technological advancement and rapidly increasing public interest in biotechnology [12] such issues needs researchers' attention.

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