

Muslim consumers' awareness and perception of *Halal* food fraud

²Ruslan, A. A. A., ^{1,2,3*}Kamarulzaman, N. H. and ^{4,5}Sanny, M.

¹Department of Agribusiness and Bioresource Economics, Faculty of Agriculture,
Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia

²Halal Products Research Institute, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor,
Malaysia

³Institute of Plantation Studies, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor,
Malaysia

⁴Department of Food Science, Faculty of Food Science and Technology,
Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia

⁵Institute of Tropical Agriculture and Food Security, Universiti Putra Malaysia,
43400 UPM Serdang, Selangor, Malaysia

Article history

Received: 23 May, 2018

Received in revised form:

30 October, 2018

Accepted: 26 November, 2018

Abstract

Halal is an important aspect of food selection as it is one's part to obey religious obligations and commandments. Since the *halal* food industry covers the farm-to-table operations, therefore unwanted practices which culminate to *halal* food fraud along food supply chain has become a major concern among Muslim consumers. This is because food fraud is a subjective concept, hence objective verification of fraudulent activities and the extent of fraud could be difficult to verify. The current study was therefore carried out to determine Muslim consumers' awareness and perceptions towards *halal* food fraud. A total of 352 respondents from Klang Valley areas were randomly selected to be the target respondents in this study. The data obtained were analyzed using descriptive analysis, chi-square analysis, and factor analysis. The results indicated that most of the respondents (96.9%) in Klang Valley areas were aware of *halal* food fraud issues. The findings also showed that gender, age, education level, and occupation had significant relationships with awareness of *halal* food fraud. Three factors were classified as influential to Muslim consumers' perception towards *halal* food fraud namely *halal* logo, labeling and packaging, authorities' exposure and enforcement as well as consumer attitude. The study recommended that Islamic authorities should continuously seek ways to improve and educate consumers towards *halal* food fraud while the government should further strengthen their important role of enforcing law and penalties to irresponsible industry players.

Keywords

Food fraud

Halal

Awareness

Perception

Muslim

© All Rights Reserved

Introduction

Food is a necessity of life that gives energy and nutrients for growth. For Muslim consumers, *halal* is an important aspect of food selection as it is one's part to obey religious obligations and commandments. The Muslim world is expected to experience a rapid population growth from 1.8 billion in 2012 to 2.2 billion in 2030. This scenario has led to an increase in economic development as well as disposable income. The global *halal* market represents more than 20% of the entire food industry and demand for *halal* products is expected to increase up to 70% by 2050 (Munich Personal RePEc Archive (MPRA), 2016). Due to the growing Muslim population, the *halal* marketplace has emerged as one of the most

profitable and influential markets in today's business. Muslim consumers have a high purchasing power, and this plays an important role in the demand for *halal* food products. In Malaysia, *halal* food products are generally produced by well-known food companies such as Adabi Consumer Industries, Ramly Group, Aminah Hassan, Ayamas Food Corporation, Faiza Marketing Sdn. Bhd. and many more as well as Small Medium Enterprises (SMEs) *halal* food companies. The *halal* food industry comprises activities such as processing, preparatory, preservatives, distribution, food service, and beverages as according to the Syariah law. The industry embodies a complex and global collection of diverse businesses that supply most of the *halal* food products to Muslim consumers throughout the world.

*Corresponding author.

Email: nitty@upm.edu.my

Recently, the frequent mass media reports of food fraud scandal cases along the food supply chain have raised serious concerns among Muslim consumers on *halal* food products. Table 1 shows selected examples of *halal* food fraud cases which are reported globally.

Table 1: Reported Cases on *Halal* Food Fraud

Year	Location	Item	Contaminant	References
2000	Mexico	Sausages and burger patties	Undeclared porcine species meat products	Flores-Munguia, Bermudez-Almada and Vazquez-Moreno (2000)
2005	Italy	Horse meat sausages	Pork meat was added fraudulently in Italian horse fresh sausages	Di Pinto, Forte, Conversano and Tantillo (2005)
2011	Iran	<i>Halal</i> meats	Unlawful (adulterated) meats containing poultry, pig, donkey and horse meat	Doosti Ghasemi, Dehkordi, and Rahimi (2011)
2013	South Africa	Minced meat, burger patties, deli meats, sausages and biltongs	Detection of porcine DNA in various meat products	Cawthorn, Steinman and Hoffman (2013)
2013	UK	Meat pies and pastries	Porcine DNA	Whitworth (2013)
2013	UK	Frozen burgers	Porcine DNA	Whitworth (2013)
2013	UK	Lamb burgers	Traces of pork	BBC News (2013a)
2013	UK	Vaccine	Pork gelatin	BBC New (2013b)
2013	US	Chicken sandwich	Mislabeled as <i>halal</i>	Trenwith (2013)
2013	China	Homemade food products	Mislabeled as <i>halal</i>	Lipes (2013)
2013	Hungary	Pork tenderloins	Pork tenderloins labeled as beef tenderloins	Rapid Alert System for Food and Feed (2013)
2013	Portugal	Poultry meat	Possible cross contamination of poultry meat products with pork meat	Soares, Amaral, Oliveira and Mafra (2013)
2014	EU	Packaged chicken sausage	Mislabeled	Bottaro, Marchetti, Mottola, Shehhu and Pinto (2014).
2014	Turkey	Gelatin products (marshmallow and gum drops)	Products contain porcine gelatin and labelling failed to indicate the use of pork gelatin	Demirhan, Ulca and Senyuva (2014)

Table 1. (Cont.)

2015	UK	<i>Halal</i> slaughter house	Not following <i>halal</i> practices in the slaughtering process	Press Association (2015)
2015	Italy	Chicken sausages	Detection of pork DNA in chicken sausages	Di Pinto, Bottaro, Bonerda, Bozzo, Ceci, Marchetti, Mottola and Tantillo (2015)
2016	Spain	Marshmallows, gummies, hard candies and complex candies	Detection of porcine DNA in commercial candy products	Munoz-Colmenero, Martinez, Roca and Garcia-Vazquez (2016)

Source: Soon *et al.* (2017)

Food fraud as described by Spink and Moyer (2011) is related to cautious and intentional substitution, addition, tampering or misrepresentation of food, food ingredients or even food packaging, and misleading statements in the labeling of a product with the aim of making easy money to maximize profits and minimize losses. *Halal* food fraud is seen as irresponsibility of producers or manufacturers who use non-*halal* ingredients in food products, fake *halal* logos, physical contamination of *halal* food, and non-*halal* logistics services that do not adhere to the Syariah law. On the other hand, Jaswir *et al.* (2016) described food fraud or adulteration of food products to mean the substitution of valuable and high-cost ingredients with lower quality and cheaper-cost ingredients that are easily available in the market.

Halal and haram are important Islamic dietary rules that should be adhered even by non-Muslims in the *halal* industry. The challenge is that most non-Muslims may not really understand the implications of these rules. This issue has captured the interest of the public, because according to the Islamic law which explains that the permissibility of food sources considered as acceptable should be those that improve the development of human well-being and behavior (Fadzlillah *et al.*, 2011) as well as being beneficial to human rather than causing harm (Idris and Noor, 2013). *Halal* involves different processes such as slaughtering, storage, display, preparation, hygiene, and sanitation. Thus, Muslim consumers are concerned when most of the *halal* food products being imported are from non-Muslim countries. Generally, the global *halal* meat supplies are from non-Muslim countries such as Brazil, Australia, India, France, China, Netherlands, and Spain (Aljazeera, 2017).

There have been some cases which revealed a high possibility of cross-contamination between *halal* and haram products. Cases such as when *halal* meats are stored together with non-*halal* meats. As reported, there was a case when the Department of Malaysian Quarantine and Inspection Service (MAQIS) seized cargo shipment of *halal* and non-*halal* frozen meats stored together at Port of Tanjung Pelepas (Said, 2017). Due to complex food supply chains, *halal* meat adulteration can take place in many forms. In the case of meat adulteration, it does not only involve substituting the ingredients but mislabeling of these products from the country of origin (Montowska and Pospiech, 2011), in addition to the slaughtering of animals in a manner that does not adhere to the Syariah law as being debated in the *halal* food industry. Zakaria (2008) argued that *halalness* of food products is difficult to verify when the product is pre-packaged or processed.

Recognizing the importance to penetrate the *halal* marketplace, many non-Muslim producers are seeking to obtain *halal* certification and become a player in the *halal* industry due to the *halal* logo is an important factor for Muslim consumers food purchasing decisions. Muslim consumers in Malaysia usually do not accept food products that are not certified as *halal* by the Department of Islamic Development Malaysia (JAKIM) (Ahasanul et al., 2015). However, there are some irresponsible producers who exploit the *halal* food market by using the unrecognized or unauthorized *halal* logo in packaging their products. In other cases, non-Muslim producers label their products with fake Islamic brand names or symbols to attract Muslim consumers' attention and trust towards buying their products. Further, some food operators displayed Quranic verses or other Arabic characters on their premises as an indirect signal to attract Muslim consumers to come to their premises.

Further, with today's advanced communication technologies through mass media and social media have facilitated the information to spread instantaneously. The technologies have the capacity and are capable in reaching out a huge number of consumers worldwide. The messages brought by the mass media and social media will help consumers in many ways as well influence them as future references in the decision-making process of purchasing food products. When consumers are exposed to something that is detrimental, they will shift their behavior from consuming to boycotting the products. Increasing consumers' awareness of food safety issues bring a huge impact to irresponsible producers and manufacturers that seeking for profit

rather than maintaining the quality of food products. For examples, in 2014, detection of porcine DNA was reported in two Cadbury chocolate products in Malaysia (Cadbury Dairy Milk Hazelnut and Cadbury Dairy Milk Roast Almond) (The Star, 2014). Due to this shortcoming situation, it has affected the trust of consumers in consuming *halal* products and has brought quite extensive losses for the innocent producers or manufactures as the consumers are becoming distrust their products. Consequently, regaining consumers' trust on doubtful or questionable *halal* products will not be occurred in a short time and even it will be more difficult. In light of the above discussions, the main objective of this study was to determine Muslim consumers' awareness and perception of *halal* food fraud.

Literature review

The concept of *halalan-toyyiban* comes from root word *halal* and *toyyib*, where *halal* in Arabic word is defined as "allowed or permissible and *toyyib* means pure, safe, wholesome and nutritious" (Yahya et al., 2016). *Halalan-toyyiban* for food product means the food product is permissible, safe and not harmful to be consumed. As Muslims, Syariah law instructs followers to choose wholesome, clean, and *halal* food in daily living. The demand for *halal* food products is growing rapidly due to the increasing Muslims population in recent years. According to Wilson and Liu (2011), *halal* industries need a supply chain approach where the concept of *halal* principles is enforced on products that are supposed to adhere to *halal* standards. Therefore, it is the responsibility of industry players to ensure that the practices are clean, hygienic, and non-detrimental to human health or well-being. Omar et al. (2008) described that *halal* food products or services must be safe to consume, produced in a conducive place as well as not harmful to human health. The food revolution has impacted foods and beverages producers and suppliers around the globe. To gain more profits, irresponsible food industry players manipulation of products using advanced technology results to the neglect of the *halalan-toyyiban* concept in food safety (Salahudin et al., 2015).

A study conducted by Hifza and Mohd (2010) where the authors argued that Muslim consumers are faced with the risk of fraudulent *halal* food products due to lack of regular enforcement by Islamic authorities and low knowledge about *halal* amongst consumers. According to Yusoff and Adzharuddin (2017), individuals lack of awareness is one of the major threats because of subjective factors

such as value, religious commitment, consumer attitude, information processing or external factor like environmental culture. Muslim consumers' awareness on *halal* products plays a significant role in educating *halal* industry players in the market to produce food products that adhere to the Islamic guidelines. Transparency on food labeling such as certified *halal* logo, expiry date, price, brand name, ingredients, country of origin as well as other proof gives knowledge and awareness to consumers in selecting food products. According to Katarzyna et al. (2010), food labeling provides buyers with direct information about food products. Donna et al. (2001) reported in a qualitative study by the Australian and New Zealand Food Authority on food labeling issues that the decision of consumers to choose their food products is based on the information available on the food product labels. According to Macanda (2005), food labels should educate and provide awareness to consumers purposeful decision-making during purchasing.

A consumer perception is normally affected by advertising, reviews, social media, public relations, personal experience, and others. Consumers' action on selecting food products are related to their attitudes which is linked to a complex set of ideas, motivations, and experiences. According to Ajzen and Fishbein (1980), the perception of a person towards social factors will influence the individual behavior to act or not to act in a particular manner. The behavior of an individual leads to positive outcomes if consumers hold a positive attitude and vice versa. Food quality and safety are two main elements in consumers' perception and decision-making process in food selection (Grunert, 2005; Rohr et al., 2005). The complexity of food choices made by the consumers is on the increase. In the case of *halal* food fraud, Muslim consumers' perception towards the issues is very sensitive as consumers are looking for *halal* certification in the labeling of these food products.

Materials and methods

A total of 352 Muslim respondents in Klang Valley areas were selected via simple random sampling to determine their awareness and perception of *halal* food fraud. Face-to-face interviews were carried out with the respondents. A well-structured questionnaire was used to get responses from these respondents. The questionnaire was divided into two sections wherein the first section was established to obtain respondents' socio-demographic profiles while the second section consisted of the statements related to the knowledge, awareness, and perception

of consumers towards *halal* food fraud. These statements were established to obtain respondents' agreement towards *halal* issues.

The data collected were analyzed using descriptive analysis, Chi-square analysis, and factor analysis. The descriptive analysis was carried out to summarize the socio-demographic profiles of the respondents such as gender, age, marital status, household size, education level, occupation, and monthly income based on frequency distributions and percentages. In addition, the frequency and percentage on awareness of *halal* food fraud were analyzed using descriptive analysis. Chi-square analysis was conducted to determine the significant association between the two variables. The following hypotheses were developed and tested in this study:

H_0 : There is no association between socio-demographic profiles and Muslim consumers' awareness of *halal* food fraud.

H_1 : There is an association between socio-demographic profiles and Muslim consumers' awareness of *halal* food fraud.

Factor analysis is a statistical technique for categorizing variables and identifying the homogeneous sets called 'factors' as an identifying group of variables. The analysis was used to summarize the information contained in a large number of variables to a smaller number of variables by reducing the number of variables or group variables with similar characteristics. Factor analysis was carried out to identify factors that influenced consumers' perception of *halal* food fraud.

Results and discussion

Socio-demographic profiles of respondents

Table 2 shows the socio-demographic profiles of the respondents. Out of 352 respondents interviewed, most of the respondents were female 233 (66.2%) while 119 (33.8%) of the respondents were male. This study showed that majority of the respondents 210 (59.7%) were within the age group of 21 to 30 years old, followed by 86 (24.4%) were within the age group of 31 to 40 years old. Only 3 (0.9%) respondents were below 20 years old and above 61 years old respectively. In addition, 182 (51.7%) of the respondents were single and 163 (46.3%) were married. In terms of household size, 189 (53.7%) of the respondents' household size was between 4 to 6 persons, followed by 103 (29.3%) lived with less than or equal to 3 people per household, and only 7 (2.0%) of the respondents had household size of

more than 10 people.

Table 2: Socio-demographic profiles of respondents

Characteristic	Frequency (n)	Percentage (%)
Gender		
Male	119	33.8
Female	233	66.2
Age		
≤ 20 years	3	0.9
21-30 years	210	59.7
31-40 years	86	24.4
41-50 years	38	10.8
51-60 years	12	3.4
> 60 years	3	0.9
Marital Status		
Single	182	51.7
Married	163	46.3
Divorce	7	2.0
Household Size		
≤ 3 people	103	29.3
4-6 people	189	53.7
7-9 people	53	15.1
≥ 10 people	7	2.0
Education Level		
Primary School	4	1.1
Secondary School	45	12.8
Pre-University	14	4.0
Tertiary Education	289	82.1
Occupation		
Government Sector	104	29.5
Private Sector	127	36.1
Self-employed	31	8.8
Housewife	12	3.4
Student	72	20.5
Others	6	1.7
Monthly Income		
≤ RM1,000	48	13.6
RM1,001-RM3,000	202	57.4
RM3,001-RM5,000	63	17.9
RM5,001-RM7,000	27	7.7
RM7,001-RM9,000	7	2.0
> RM9,000	5	1.4

Note: n = 352

In terms of education level, 289 (82.1%) respondents attained their tertiary education either undergraduate or postgraduate degree, while 45 (12.8%) respondents had completed their secondary education. Only 4 (1.1%) respondents had primary school education level. Majority of the respondents

worked in the private sector 127 (36.1%), while about 104 (29.5%) respondents worked in the government sector. The result also revealed that 12 (3.4%) respondents were housewives and contributed to purchasing food products. As stated by Lautiainen (2015), information on respondents' occupation is an important element in determining the purchasing behavior pattern of consumers in selection of food products. Lastly, most of the respondents 202 (57.4%) in this study earned monthly income between RM1,001 to RM3,000, followed by 63 (17.9%) respondents whose monthly income were between RM3,001 to RM5,000 per month and 48 (13.6%) respondents had monthly income less than RM1,000. Only 5 (1.4%) respondents had high monthly income which was above RM9,000.

Awareness of halal food fraud

Table 3 shows the respondents' awareness of *halal* food fraud. The result showed that majority 341 (96.9%) of the respondents in this study had heard and were exposed to *halal* food fraud. Only 11 (3.1%) respondents have not heard of any fraudulent food related to *halal*. Most of the Muslim consumers had received *halal* food fraud information from both mass media and social media. According to Yusoff and Adzharuddin (2017), consumers awareness of *halal* issues increases as they are exposed to media sources.

Table 3: Respondents' awareness of *halal* food fraud

Statement	Frequency (n)	Percentage (%)
Yes	341	96.9
No	11	3.1
Total	352	100.0

Note: n = 352

Association between respondents' socio-demographic profiles and their awareness of halal food fraud

Chi-square analysis was used to test the association between two or more variables. In this study, two variables were tested to see if there is an association between dependent and independent variables. Table 4 shows the result of the associations between socio-demographic profiles and respondents' awareness of *halal* food fraud. The result showed that gender, age, education level, and occupation were significantly associated with the awareness of *halal* food fraud. Gender and age were significant at 1% level of significance ($p < 0.01$), while education level and occupation were significant at 10% level of significance ($p < 0.10$).

In terms of gender, the result revealed that females were more aware of *halal* food fraud. This result agrees with the study by Sangkumchaliang

and Huang (2012) that females were the major contributors to food purchasing decisions for the family. Another study by Wahlich et al. (2013) found that females tend to spend time reading food labels than men. The p -value ($p < 0.01$) showed that there is an association between respondents' awareness of *halal* food fraud with their age. This is supported by the findings from Zorba and Kaptan (2011) that female respondents with an average age of 24 years were more interested in food safety issues than men.

From the result in Table 3, a p -value ($p < 0.10$) of education level has an association with respondents' awareness. This is supported by the findings from Gupta and Panchal (2009) that consumers' awareness in adulterated food increases as their education level increases. Respondents with higher education level (pre-university, tertiary education) had a high awareness level of *halal* food fraud compared to those with lower education level (primary school, secondary school). Education level and occupation were observed to be strongly related. Generally, when respondents have a higher education level and better jobs, they usually will buy high-quality food products. Furthermore, Quantaniah (2013) described that respondents with high education level have a better understanding about the *halal* issues.

Table 4: Associations between respondents' socio-demographic profiles and awareness of *halal* food fraud

Variable	Chi-Square	df	Significant	Result
Gender	24.254	1	0.000 *	Reject Ho
Age	20.138	4	0.000 *	Reject Ho
Marital Status	2.786	2	0.248	Fail to reject Ho
Household Size	0.728	3	0.867	Fail to reject Ho
Education Level	6.933	3	0.074 **	Reject Ho
Occupation	9.547	5	0.089 **	Reject Ho
Monthly Income	4.539	5	0.475	Fail to reject Ho

Note: n = 352

*Significant at 1% level of significance

**Significant at 10% level of significance

Factors that influenced Muslim consumers' perception of halal food fraud

Factors that influenced Muslim consumers' perception of *halal* food fraud are shown in Table 5. The result of Kaiser-Meyer-Olkin (KMO) test was observed to be 0.898, which is above the minimum required value of 0.500 and Bartlett's test of less than 0.05 level of significance indicated that the data is appropriate for factor analysis. Exploratory

factor analysis (EFA) method was used to determine the factors that influenced Muslim consumers' perception of *halal* food fraud. Three (3) factors were extracted from the analysis namely *Halal Logo, Labelling and Packaging, Authorities' Exposure and Enforcement as well as Consumer Attitude* (Table 5). The first factor was *Halal Logo, Labelling and Packaging*. Six (6) items were grouped under the first factor with the eigenvalue was 6.250, the variance explained was 41.665% and the Cronbach's alpha was 0.861. *Authorities' Exposure and Enforcement* were recorded as the second factor that influenced consumers' perception in this study. Four (4) items were grouped under the second factor with the eigenvalue for this factor was 2.002, the variance explained was 13.344% and the Cronbach's alpha was 0.894. *Consumer Attitude* was the third factor with five (5) items were grouped under the third factor where the eigenvalue was 1.115, the variance explained was 7.433% and the Cronbach's alpha was 0.761. The cumulative percentage of variance for the three (3) factors of the analysis was 62.442%.

Halal logo, labelling and packaging

Halal logo, labeling and packaging was part of the product attributes that Muslim consumers are attracted to when making decisions to buy food products. This is in line with the findings of Mohayidin and Kamarulzaman (2014) that consumers mostly preferred processed food products that are certified *halal*. However, in order to combat the problem of *halal* food fraud, industry players adherence to all aspects must be considered by the consumers, who also have the right to report any fraudulent activities particularly unauthorized *halal* logo used by manufacturers or processors. Besides, packaging and processing activities along the food supply chain are very important determinants of the *halal* status of food products. The curiosity of Muslim consumers regarding issues of contamination of processed foods with prohibited (haram) substance along supply chain possibly during food processing and transportation is on the rise (Fadzillillah et al., 2011; Ahmad Tarmizi et al., 2014). Hidden ingredients from questionable sources are another serious problem when producers omit labeling of non-*halal* ingredients in order to cut down production costs as well as to gain undue profits. In addition, non-*halal* food and drink products are supposed to be kept separate from those consumed by Muslim consumers on a different shelf or partition Muslim consumers are supposed to purchase only food products that have been certified *halal* by JAKIM by inspecting the product package before purchasing.

Authorities' exposure and enforcement

In order to combat fraudulent activities, proactive exposure and enforcement by an authority is an important aspect that should be improved from time to time. Authorities like the Department of Islamic Development Malaysia (JAKIM), and Department of State Islamic Religious (JAIN) should improve their monitoring activities by hiring more enforcement officers in combating *halal* food fraud issues. Moreover, JAKIM as a *halal* authorized entity must take firm action against manufacturers who do not follow Malaysia *halal* food standard MS 1500:2009. Such proactive actions by relevant authorities play an important role in educating Muslim consumers in Malaysia on *halal* food fraud issues. Mass media or social media is one of the platforms that today's consumers gather swift information (Sabran and Ramly, 2006), particularly on *halal*. Furthermore, strategic collaborations between the Ministry of International Trade and Industry (MITI), Malaysia External Trade Development Corporation

(MATRADE) and Royal Malaysian Customs Department (RMCD) must be encouraged to foster strict control on the entry of imported food products into the local market.

Consumer attitude

The negative perception of *halal* food fraud influences consumers' attitude towards purchasing food products. A person's awareness plays an important role in the perception they form (Assael, 1995). With the increase in consumers' awareness and consumer perceptions towards *halal* food fraud, consumers are beginning to pay attention to ingredients before purchasing food products. This attention increases should there be any issues of *halal* food fraud reported in the mass media. When consumers are aware, they tend to choose food products based on the *halal* logo on product packaging rather than the taste of the food products; as such, Muslim consumers prefer to purchase food products with *halal* logo certified by JAKIM.

Table 5: Factors that influenced Muslim consumers' perception of *halal* food fraud

Items	Factor Loading		
	F1	F2	F3
Factor 1: <i>Halal</i> Logo, Labelling and Packaging			
1. Muslim consumers have the right to report on any fraud <i>halal</i> logo used by manufacturers or producers.	0.766		
2. Packaging and processing method along the supply chain of food products is also important in determining <i>halal</i> status.	0.706		
3. It is very important for consumers to know about ingredients used for food products.	0.696		
4. Non- <i>halal</i> food and drink products should be separated from Muslim consumers.	0.693		
5. I choose to buy products with only <i>halal</i> logo certified by JAKIM.	0.660		
6. I will always look at the <i>halal</i> logo on the packaging before buying any food products.	0.603		
Factor 2: Authorities' Exposure and Enforcement			
1. Authorities like JAKIM, JAIN should improve monitoring activities in combating <i>halal</i> food fraud from widespread.		0.837	
2. JAKIM must take actions on all manufacturers who do not follow the <i>halal</i> standard.		0.828	
3. Education on <i>halal</i> food fraud is important to Muslim consumers by authorities.		0.776	
4. The government needs to have strict control over the entry of import food products in the local market.		0.771	
Factor 3: Consumer Attitude			
1. I will look at the ingredients before purchasing food products.			0.740
2. I will identify <i>halal</i> food products reported in newspapers and on the internet that are fraud.			0.720
3. I choose food products based on the <i>halal</i> logo but not based on their taste.			0.684
4. I only buy a product that has only <i>halal</i> logo authorized by JAKIM.			0.669
5. I am always concerned about issues related to <i>halal</i> food fraud.			0.622
Cronbach's Alpha	0.861	0.894	0.761
Eigenvalues	6.250	2.002	1.115
% of Variance	41.665	13.344	7.433
Cumulative % of Variance	41.665	55.009	62.442

Note: n = 352

Conclusions

Halal food fraud is a sensitive and serious matter to Muslim consumers. This study was focused on understanding Muslim consumers' awareness and perception towards *halal* food fraud. The results indicated a significant association between socio-demographic profiles and awareness of *halal* food fraud wherein gender, age, education level, and occupation are the significant variables. The results suggested that consumers' knowledge and awareness of *halal* food fraud influence their perception towards *halal* food fraud. Thus, understanding consumers' awareness of *halal* food fraud is crucial for Islamic authorities in improving services geared towards educating consumers. The role of the government in enforcing law and penalties to offenders who engage in *halal* food fraud along the supply chain. Stringent monitoring by the relevant authorities should be more aggressive in order to combat this problem. Furthermore, it is suggested that initiatives towards increasing consumers' knowledge and awareness through information sharing in the form of *halal* campaigns on social media and other relevant platforms should be taken seriously to disseminate information on *halal* food fraud. Increased knowledge and awareness among Muslim consumers on issues pertaining to *halal* food fraud products is likely to reduce the possibility of consuming fraudulent products. This is only possible if the recognized Islamic authorities improve services relating to consumer education, while the government enforces law and penalties to irresponsible industry players. This will ensure that consumers are alert to *halal* food fraud when choosing and buying food products.

References

- Ahasanul, H., Abdullah, S., Farzana, Y., Arun, K. T. and Mirza A. H. 2015. Non-Muslim consumers' perception toward purchasing *halal* food products in Malaysia. *Journal of Islamic Marketing* 6(1): 133-147.
- Ahmad Tarmizi, H., Kamarulzaman, N. H., Abd Latif, I. and Abd Rahman, A. 2014. Factors behind third-party logistics providers readiness towards *halal* logistics. *International Journal of Supply Chain Management* 3(2): 53-62.
- Ajzen, I. and Fishbein, M. 1980. *Understanding attitudes and predicting social behavior*. Englewood Cliffs, New Jersey: Prentice-Hall.
- Asiegbu, I. F., Powei, D. M. and Iruka, C. H. 2012. Consumer attitude: Some reflections on its concept, trilogy, relationship with consumer behavior, and marketing implications. *European Journal of Business and Management* 4(13): 38-50.
- Assael, H. 1995. *Consumer behavior and marketing action*, 5th ed. Ohio: South-Western College Publishing.
- BBC News. 2013a. Leicester schools *halal* lamb burger contained pork. BBC News. Retrieved from website: <http://www.bbc.com/news/uk-england-leicestershire-22466068>
- BBC News. 2013b. Leicestershire schools' flu vaccine contains gelatin. BBC News. Retrieved from website: <http://www.bbc.com/news/uk-england-leicestershire-24113970>
- Bottaro, M., Marchetti, P., Mottola, A., Shehu, F. and Pinto, A. 2014. Detection of mislabeling in packaged chicken sausages by PCR. *Albanian Journal of Agricultural Sciences*: 455-460.
- Cawthorn, D.-M., Steinman, H. A. and Hoffman, L. C. 2013. A high incidence of species substitution and mislabelling detected in meat products sold in South Africa. *Food Control* 32(2): 440-449.
- Demirhan, Y., Ulca, P. and Senyuva, H. Z. 2012. Detection of porcine DNA in gelatine and gelatin containing processed food products - *Halal/Kosher* authentication. *Meat Science* 90(3): 686-689.
- Di Pinto, A., Bottaro, M., Bonerba, E., Bozzo, G., Ceci, E., Marchetti, P., ... and Tantillo, G. 2015. Occurrence of mislabelling in meat products using DNA-based assay. *Journal of Food Science and Technology* 52(4): 2479-2484.
- Di Pinto, A., Forte, V. T., Conversano, M. C. and Tantillo, G. M. 2005. Duplex polymerase chain reaction for detection of pork meat in horse meat fresh sausages from Italian retail sources. *Food Control* 16(5): 391-394.
- Dispatchlive. 2005. Outlawed: The health department has proposed new regulations to protect consumers. Retrieved from website: <http://www.dispatchlive.co.za/2005/11/19/Business/>
- Donna, P. B., Kriss, W. and Jessica, M. 2003. Food labelling issues- consumer qualitative research. In Report of Food Standard Australia New Zealand. Retrieved from website: <http://www.foodstandards.gov.au/publications/pages/evaluationreportseries/foodlabellingissuesconsumer/Default.aspx>
- Doosti, A., Ghasemi Dehkordi, P. and Rahimi, E. 2011. Molecular assay to fraud identification of meat products. *Journal of Food Science and Technology* 51(1): 148-152.
- Elasrag, H. 2016. *Halal* Industry: Key challenges and opportunities. Retrieved from website: https://mpr.ub.uni-muenchen.de/69631/1/MPRA_paper_69631.pdf
- Ellis, D. I., Muhamadali, H., Allen, D. P., Elliott, C. T. and Goodacre, R. 2016. A flavour of omics approaches for the detection of food fraud. *Current Opinion in Food Science* 10: 7-15.
- Fadzilillah, N. A., Che Man, Y., Jamaludin, M. A., Rahman, S. A. and Al-Kahtani, H. A. 2011. *Halal* food issues from Islamic and modern science perspectives. In Proceeding of the 2nd International Conference on Humanities, Historical and Social Sciences, p. 159. Singapore.

- Flores-Munguia, M. E., Bermudez-Almada, M. C. and Vazquez-Moreno, L. 2000. A research note: detection of adulteration in processed traditional meat products. *Journal of Muscle Foods* 11(4): 319-325.
- Grunert, K. G. 2005. Food quality and safety: Consumer perception and demand. *European Review of Agricultural Economics* 32(3): 369-391.
- Gupta, N. and Panchal, P. 2009. Extent of awareness and food adulteration detection in selected food items purchased by home makers. *Pakistan Journal of Nutrition* 8(5): 660-667.
- Hifza, R. I. and Mohd, Z. H. M. 2010. Fraudulent quality labeling: Case of *halal* labeling. *China-USA Business Review* 9(9): 41-46.
- Idris, N. A. and Noor, M. A. M. 2013. Analisis keprihatinan pengguna Muslim terhadap isu *halal*-haram produk melalui pembedaan indeks. In *Proceeding of the Persidangan Kebangsaan Ekonomi Malaysia ke VIII*, p. 1245. Johor Bahru.
- Jaswir, I., Mirghani, M. E. S., Salleh, H. M., Ramli, N., Octavianti, F. and Hendri, R. 2016. An overview of the current analytical methods for *halal* testing. In Manan, S. K. A., Rahman, F. A. and Sahri, M. (Eds), *Contemporary Issues and Development in the Global Halal Industry: Selected papers from the International Halal Conference 2014*, p. 291-301. Singapore: Springer Singapore.
- Katarzyna, S. H., Pantil-Kuncewicz, A. and Mieczkowska, M. 2010. Contemporary food labelling and its role in consumers' edition. *Proceeding of the International Conference of Food Innovation*. Retrieved from website: <http://www.foodinnova.com/foodInnova/docu2/342.pdf>
- Lautiainen, T. 2015. Factors affecting consumers' buying decision in the selection of a coffee brand. Lappeenranta, Finland: Saimaa University of Applied Sciences, Degree thesis.
- Lipes, J. 2013. Foods mislabeled as *halal* imports. *Radio Free Asia*. Retrieved from website: <http://www.rfa.org/english/news/uyghur/halal-01182013161229.html>
- Mohayidin, M. G. and Kamarulzaman, N. H. 2014. Consumers' preferences toward attributes of manufactured *halal* food products. *Journal of International Food and Agribusiness Marketing* 26: 125-139.
- Montowska, M. and Pospiech, E. 2011. Authenticity determination of meat and meat products on the protein and DNA basis. *Food Review International* 27(1): 84-100.
- Munich Personal RePEc Archive (MPRA). 2016. *Halal industry: key challenges and opportunities* (MPRA Paper No. 69631). Munich, German.
- Muñoz-Colmenero, M., Martinez, J., Roca, A. and Garcia-Vazquez, E. 2016. Detection of different DNA animal species in commercial candy products. *Journal of Food Science* 81(3): T801-T809.
- Omar, W. M. W., Muhammad, M. Z. and Omar, A. C. 2008. An analysis of the Muslim consumers' attitudes towards '*halal*' food products in Kelantan. In *Proceeding of the ECER Regional Conference*, p. 165. Kelantan, Malaysia.
- Press Association. 2015. Abattoir clips highly regrettable. Retrieved from website: <http://www.dailymail.co.uk/wires/pa/article-2937224/Halal-slaughterhouse-video-probed.html>
- Quantaniah, N. A., Nureina and Syakinah, N. 2013. Selecting *halal* food: A comparative study of the Muslim and non-Muslim Malaysian student consumer. In *Proceeding of the 2nd International Conference on Technology Management, Business and Entrepreneurship*, p. 438. Melaka, Malaysia.
- Rapid Alert System for Food and Feed. 2013. RASFF portal. Retrieved from website: <https://webgate.ec.europa.eu/rasff-window/portal/?event=SearchForm&cleanSearch=1>
- Rohr, A., Luddecke, A., Drusch, S., Müller, M. J. and Alvensleben, R. V. 2005. Food quality and safety - consumer perception and public health concern. *Food Control* 16: 649-55.
- Sabran, R. and Ramly, R. M. 2006. The role of mass media in promoting *halal* products in Malaysia. Retrieved from website: <http://www.ukm.my/hairun/kertas%20kerja%20iCEPs/The%20Role%20of%20Mass%20Media.pdf>
- Said, H. 2017. Maqis seized containers of unseparated *halal*, non-*halal* meat at Tanjung Pelepas. *The New Straits Times*. Retrieved from website: <https://www.nst.com.my/news/crime-courts/2017/07/258158/maqis-seizes-containers-unseparated-halal-non-halal-meat-tanjung>
- Salahudin, A., Hamdan, M. N. and Ramli, M. A. 2015. Penggunaan teknologi pengesanan *halal* terhadap produk makanan: Kajian menurut perspektif hukum Islam. In *Proceeding of the 2nd International Convention on Islamic Management*, p. 1. Kuala Lumpur: Universiti Malaya.
- Sangkumchaliang, P. and Huang, W. 2012. Consumers' perceptions and attitudes of organic food products in Northern Thailand. *International Food and Agribusiness Management Review* 15(1): 87-102.
- Soares, S., Amaral, J. S., Oliveira, M. B. and Mafra, I. 2013. A SYBR Green real-time PCR assay to detect and quantify pork meat in processed poultry meat products. *Meat Science* 94(1): 115-120.
- Soon, J. M., Chandia, M. and Regenstein, J. M. 2017. *Halal* integrity in the food supply chain. *British Food Journal* 119(1): 39-51.
- Spink, J. and Moyer, D. C. 2011. Defining the public health threat of food fraud. *Journal of Food Science* 76(9): R157-163.
- The Star. 2014. JAKIM suspends *halal* certification of two Cadbury products. Retrieved from website: <http://www.thestar.com.my/news/nation/2014/05/24/jakim-cadbury-chocolates/>
- Trenwith, C. 2013. Fast food giant to pay \$700k for *halal* mislabeling. Retrieved from website: <http://m.arabianbusiness.com/fast-food-giant-pay-700k-for-halal-mislabelling498543.html>

- Wahlich, C., Gardner, B. and McGowan, L. 2013. How, when and why do young women use nutrition information on food label? A qualitative analysis. *Psychology and Health* 28(2): 202-216.
- Whitworth, J. 2013. FSA calls urgent meeting after pork DNA found in *halal* meat. *Food Production Daily*. Retrieved from website: www.foodproductiondaily.com/Safety-Regulation/FSA-callsurgent-meeting-after-pork-DNA-found-in-halal-meat
- Wilson, J. A. J and Liu, J. 2011. The challenges of Islamic branding: Navigating emotions and *halal*. *Journal of Islamic Marketing* 2(1): 28-42.
- Yahya, H., Samicho, Z. and Azmi, A. F. M. 2016. A review on application of *halalan-toyyiban* risk management plant (HTRMP) and frozen food chain during warehousing activities for maintaining *halal*, safety and quality. *Journal of Applied Environmental and Biological Science* 6(11): 96-102.
- Yusoff, S. Z., and Adzharuddin, N. A. 2017. Factor of awareness in searching and sharing of *halal* food product among Muslim families in Malaysia. In *Proceeding of the SHS Web of Conferences*, p. 1. Terengganu, Malaysia.
- Zakaria, Z. 2008. Tapping into the world *halal* market: Some discussions on Malaysian laws and standards. *Shariah Journal* 16 (Special Edition): 603-616.
- Zorba, N. N. D. and Kaptan, M. 2011. Consumer food safety perceptions and practices in a Turkish community. *Journal of Food Protection* 74(11): 1922-1929.