



Overview of the halal food control system in Malaysia

Anis Najiha Ahmad^{a, c}, Ungku Fatimah Ungku Zainal Abidin^{a, b}, Mohhidin Othman^{a, b},
Russy Abdul Rahman^{a, b, *}

^a Halal Products Research Institute, Universiti Putra Malaysia, Malaysia

^b Faculty of Food Science and Technology, Universiti Putra Malaysia, Malaysia

^c International Institute for Halal Research and Training (INHART), International Islamic University Malaysia, Malaysia

ARTICLE INFO

Article history:

Available online 23 February 2018

ABSTRACT

Awareness of the complexity in the global food chain, combined with several major halal food issues and scandals, are an impetus for major changes in the halal food control system in Malaysia. Malaysia holds a special position in the global halal market as the first country that assigns a government agency to regulate its halal matters and certification. This article describes and discusses the system for halal food control in Malaysia as framed by five important components for an effective national food control system: halal food legislation; halal food management control; inspection; laboratory; and education, communication, and training. Significant improvement has been made on the system; however, a few issues and challenges persist.

© 2018 Elsevier Ltd. All rights reserved.

Contents

1. Introduction	352
2. Halal food legislation and regulation	353
2.1. Fatwa	353
2.2. Food law	355
2.3. Halal standard	356
3. Halal food control management	357
4. Halal inspection and enforcement	357
5. Halal laboratory	359
6. Halal information, education, communication and training (IECT)	359
7. Challenges in halal food control system	360
7.1. Halal food law – fatwa	360
7.2. Halal food control management	360
7.3. Halal inspection and enforcement	360
7.4. Halal laboratory	361
7.5. Information, education, communication and training (IECT)	362
8. Conclusion	362
Acknowledgement	362
References	362

1. Introduction

Muslim life revolves around the concept of halal and *haram*. *Halal* is relative to food and drink, and means 'permissible for consumption by the Muslims'. *Haram*, in contrast, refers to

* Corresponding author. Halal Products Research Institute, Universiti Putra Malaysia, Malaysia.

E-mail address: russy@upm.edu.my (R. Abdul Rahman).

prohibited items. Some food products however fall under *mashbooh* (suspected), the non-defined area between halal and *haram* product. *Mashbooh* refers to products with unknown origin, or where there's uncertainty about its status in Islam. Fundamentally, all food products are permitted, except those that are explicitly forbidden in Quran (Chapter II, Verse 168) such as alcohol, pork, blood, meat from cadavers, and meat of animals that have not been slaughtered according to Islamic rules (Bonne & Verbeke, 2008). Islam also stresses the importance of *toyyib*, foods that are nutritional, high-quality, and safe.

The halal food laws are binding and must be observed always by individual Muslims. While the impact of religion on food consumption depends on the extent to which the individuals assess and follow their religion (Bonne & Verbeke, 2008), it has been estimated that 70% of Muslims worldwide adhere to at least some of the restrictions associated with halal foods (Minkus-McKenna, 2007). The Muslim population constitutes a considerable segment in today's food market, representing 23.4% of an estimated world population of 6.9 billion. This staggering number signifies compelling opportunities on a worldwide basis as the food industry moves to a more global business model (Riaz & Chaudry, 2004).

The global halal market has grown extensively, that in 1997 the Codex Alimentarius has adopted a general guidelines which include the scope, definition, criteria, and labelling requirements for use of the term halal to prevent any inconsistencies from imposing unnecessary barrier to global market (Jagadeesan & Salem, 2017; Joint FAO/WHO Codex Alimentarius Commission, 1997). However, this guidelines are still subjected to interpretation of the appropriate authorities of the importing countries (e.g. halal certification bodies) due to minor differences in the interpretation of certain aspects of *Sharia* law (Islamic laws) according to the different *mazhab* (Islamic schools of thought) (Joint FAO/WHO Codex Alimentarius Commission, 1997; Soon, Chandia, & Regenstein, 2017). The derivation of *Sharia* laws also differs between various sects such as Sunnis and Shiites (Zubaida, 2005).

Many companies are now targeting their products to Muslim consumers to tap the opportunities. Unfortunately, ignorance, confusion, and lack of understanding of food producers regarding halal requirements and import regulations has caused them to fail in meeting halal specifications (Riaz & Chaudry, 2004). van der Spiegel et al. (2012) pointed out that some of the common failures include improper use of halal certificates or marks on products (HMC, 2009a, 2009b; Hava, 2009), contamination in the production, use of animals that are not slaughtered ritually (HMA, 2007; HMC, 2009b), and little or no consideration of animal welfare (Stichting-Dier & Recht, 2010). In addition, various ingredients, including emulsions or aromas, are not required to be declared on the food labels (Ceranac & Bozinovic, 2009), increasing the risk of food contamination with pork in form of emulsifier gelatine, enzyme, glycerine, and lecithin. Aside from food labelling, there is increasing concern with halal food fraud, something that has been widely reported over the years (Fuseini, Wotton, Knowles, & Hadley, 2017).

The complexity of food production chains, countless halal issues, and fraud are making Muslim consumers cautious about their food selections and decisions. This prompted the Malaysian government to develop strategies to protect the integrity of halal products. Malaysia was the first country to establish *Halal*-related laws (Riaz & Chaudry, 2004) and have a documented and systematic *Halal* assurance system. The government is actively involved in halal certification, legally protecting the use of the halal logo for product labelling, and appointing government agencies as standard-setting and accreditation bodies. Other elements regarded as key components in a national food control system, and well-developed in Malaysia, include halal food control management,

inspection, laboratory and information, education, communication and training (IECT) (FAO & WHO, 2003). This review provides an overview of the halal food control system in Malaysia. To frame the discussion, five key elements from the national food control system are adapted. Challenges in some components were also discussed. List of acronyms used in this article is displayed in Table 1.

2. Halal food legislation and regulation

A comprehensive food legislation is the foundation of a food control system. Food legislation is defined as “the complete body of legal texts (laws, regulations, and standards) that establish broad principles for food control in a country, and that governs all aspects of the production, handling, marketing, and trade of food as a means to protect consumers against unsafe food and fraudulent practices” (FAO, 2006, p. 39). For halal, Ramli (2010) argued that legislation is needed (1) to protect the consumers, (2) to ensure that halal food producers fulfil their moral obligation towards the consumers, and (3) to facilitate halal food trade for both local and global market. Besides conventional legal texts, such as laws, regulations, and standards, an additional component in the halal food control system is fatwa, a legal opinion issued by Islamic scholars based on interpretation and adaptation of verses from *Quran* (the holy scripture) and *Hadith* (record of the traditions or sayings of the Prophet Muhammad) (Mehmood, 2015; Wiechman, Kendall, & Azarian, 1996).

2.1. Fatwa

A fatwa declaration is a mechanism that allows new rulings to be introduced in Islam. Fundamentally, *Sharia* laws are derived from *Quran* and the *Sunnah* (the practice of the Prophet Muhammad). However, when a contemporary situation or issues are not explicitly covered by Quran and Sunnah, Islamic scholars turn to *Ijma* (a consensus of legal opinion among Islamic scholars) and *Qiyas* (reasoning by analogy) as the alternative sources. In brief, fatwa is the product of *Ijma*. The dynamic feature of fatwa ruling's mechanism makes it relevant through time (Muhamad, 2011) to

Table 1
List of acronyms used.

Acronyms	Full name
DOC	Department of Chemistry
FSQD	Food Safety and Quality Division
GHSC	Global halal support centre
GPS	Global positioning system
HCB	Halal certification bodies
HDC	Halal Industry Development Corporation
HEP	Halal executive program training
HPL	Halal Panel Laboratories
HPRI	Halal Products Research Institute
IECT	Information, education, communication and training
IHRAM	Institute of Halal Research and Management
IUM	International Islamic University Malaysia
INFAD	The World Fatwa Management and Research Institute
INHART	International Institute for Halal Research & Training
JAKIM	The Department of Islamic Development Malaysia
MCMC	Malaysian Communications and Multimedia Commission
MDTCC	Domestic Trade, Cooperatives and Consumerism Ministry
MITI	Ministry of International Trade and Industry
MOA	Ministry of Agriculture
MOH	Ministry of Health
MOHE	Ministry of Higher Education
MOSTI	Ministry of Science, Technology and Innovations
NFC	National fatwa committee
TDA	Trade Descriptions Act
UPM	Universiti Putra Malaysia
USIM	Universiti Sains Islam Malaysia

clarify, modify, and harmonise contemporary religious matters. Naturally, fatwas are an important component in modern halal food control, given the ever-changing technology, innovation, and formulation in the food industry. A new food product/process is

only declared as halal (or *haram*) when a fatwa has been decided. Examples of fatwas issued in Malaysia related to the food's status and process are depicted in Table 2.

At the federal level, a fatwa is issued by the National Fatwa

Table 2
List of halal food related fatwa issued under National Fatwa Council.

Issue	Year	Fatwa Decision
Consuming bird's nest	September 6–8, 2007	Eating swallow's nest is ruled as permissible.
Status of fish fed with non-halal feed	April 4–6, 2006	Farmed fish that is purposely bred in impure water, fed with non-halal feed such as pig flesh, carcasses, etc. is ruled as not permissible for consumption.
Animal stunning	September 29, 2005	<ol style="list-style-type: none"> 1. Stunning using penetrative captive bolt and non-penetrative captive bolt (mushroom head gun) are <i>haram</i> as animal is killed before the slaughter act. 2. Electrical Stunning method is ruled as allowed with the following conditions: <ol style="list-style-type: none"> a. The type of stunner used is the 'head only stunner'. b. The velocity of the electrical current must be controlled within the specified limits which are around 0.75 A for goats, and 2.0 A for cows. The duration of the electrical current is between 3 and 6 s c. It must be supervised by an accredited Muslim personnel. 3. The water bath stunning method for poultries (chicken and duck) is ruled as permissible with the following conditions: <ol style="list-style-type: none"> a. The velocity of the electrical current must be controlled in order not to kill the animal b. It must be supervised by an accredited Muslim personnel. 4. The use of drugs and carbon dioxide in the slaughtering is ruled as permissible with the conditions that their application does not torture or kill the animal.
Method thoracic sticking in animal slaughtering	September 29, 2005	The thoracic sticking method, an additional procedure after the slaughtering is ruled as permissible with the following conditions: <ol style="list-style-type: none"> a. The slaughter act is complete by severing the four major vessels - the windpipe (trachea), gullet (oesophagus) and two jugular veins b. It is performed only after complete bleeding or 30 s after the slaughter c. The animal died because of the slaughtering; the thoracic sticking method is used only to speed up the death d. The process is supervised by an accredited Muslim personnel
Biotechnology in food and drinks	July 12, 1999	Products, food and drinks produced using bio-technology that involve pig DNA is contradictory to Islamic law, and is ruled as not permissible. Its application does not reach the level of <i>darura</i> (necessity) as there is still other alternatives. This decision is based on the <i>usul fiqh</i> (Islamic jurisprudence) maxim stating that preventing harm is prioritized than gaining benefit.
Hormone of FSH-P as a substance for the farm animals' enhancement	September 21, 1995	FSH-P is a hormone obtained from pig brain and it is considered as <i>najs mughallazah</i> (severe filth). Therefore, it is not permissible to use this hormon as an enhancement substance or for any other purpose such as animals breeding. This prohibition is based on doubt (<i>shubhah</i>). The prohibition includes young animal bred using Hormone FSH-P, its meat and milks.
Colouring (cochineal) in Islam	March 23, 1995	The use of food colouring (cochineal) in food according to the approved standard that is not more than 0.003%–0.006%.
Cheese as source of food	October 3, 1990	Cheese as food ingredient is ruled as permissible, provided that the enzyme used in the cheese production is extracted from plant, fungi or animal that are slaughtered in accordance with the <i>Sharia</i> law.
The use of active agent in food	March 7–8, 1990	Application of active agent in food is ruled as permissible with the condition that the source of agent is taken from plants. If it is taken from animal remits, then the animal must be slaughtered in accordance with the <i>Sharia</i> law.
Alcohol	July 14–16, 2011	<ol style="list-style-type: none"> 1. All <i>khamr</i> (alcoholic drinks) contains alcohol. However, not all alcohol is <i>khamr</i>. Alcohol that is extracted from <i>khamr</i> making process is ruled as prohibited and impure. 2. However, alcohol that is not produced through the <i>khamr</i> making process is not ruled as impure, but is prohibited from being consumed in its original form as it is a poison and can be fatal. 3. Soft drinks processed/made not for the purpose of producing <i>khamr</i> and containing alcohol below 1% (v/v) are permissible to be consumed 4. Whereas, soft drinks made with the same intention and method of making <i>khamr</i>, regardless of whether their alcohol content is high or low or whether their alcohol content is distilled, their consumption is prohibited. 5. Food or beverages containing natural alcohol such as fruits, nuts, grains or their juices, or alcohol that incidentally forms during the production process of certain food or beverages is not considered impure and is permissible to be consumed. 6. Food or drinks with flavouring or colouring that contains alcohol for stabilisation purposes are permissible to be consumed provided that the alcohol is not produced from the <i>khamr</i> making process, the quantity of such alcohol in the final product is not intoxicating and the alcohol level does not exceed 0.5%. 7. Medicines and perfumes containing alcohol as a solvent agent are not impure and are permissible provided such alcohol is not extracted from the <i>khamr</i> making process.
A fertilizer made from pig's excrement	May 12–13, 1981	Pig's excrement is <i>najs mughallazah</i> (severe impure). To use it as a fertilizer is ruled as permissible but <i>makruh</i> (undesirable).
Gas made from pig's excrement	May 12–13, 1981	Gas processed from pig's excrement using fire is ruled as impure. However, the gas is ruled as pure if it is not processed using fire.
Wine vinegar	April 4–6, 2006	Wine that turned into vinegar by adding extra substances is not permissible. However, the wine that turned into vinegar naturally is permissible.
Bacteria extracted from baby faeces as food additives in yogurt making	March 16, 2004	Using culture bacteria extracted from any impure items as an additive in yogurt is ruled as permissible provide that it has gone through separating and cleaning process that is in accordance with the <i>Sharia</i> law.

Adapted from Global Halal Support Centre (2017) and National Fatwa Council (2015).

Committee (NFC) in National Fatwa Discourse meetings. Established in 1970, the NFC consists of a chairperson, a secretary, and *Muftis* (jurists qualified to give authoritative legal opinion) from all 14 states in Malaysia, five *Sharia* experts, and a law advisor. The Department of Islamic Development Malaysia (JAKIM) acts as the Secretariat to the NFC. A Research Division Unit, JAKIM is tasked with the preparation and compilation of all research papers required for the formulation of fatwas. The NFC uses a collective approach to produce fatwa on the issues related to modern science and technology. The collective approach involves briefings and discussions with selected experts from related fields. The process of fatwa declaration is depicted in Fig. 1. NCF coordinates fatwas passed at the state level for national application (Ismail & Ehsan, 2010). A fatwa issued at the federal level is not binding (obligatory and enforceable) on states unless the religious edict is gazetted by the state. Normally, fatwa will be forwarded to the respective States Fatwa Committees to be considered for gazetting purposes (Azam & Adil, 2015).

Apart from the NFC, each state in Malaysia has its own fatwa committee that has the authority to declare fatwa (Nasohah, 2005). Like the fatwa declaration process at the national level, in most states, the process starts with an inquiry to the Islamic Council. Upon the inquiry, a concept paper will be prepared. On many occasions, a research committee will be set up to carry out thorough research. The result will then be discussed in the State Fatwa Committee. After that, a draft will be prepared by the Department of Mufti’s Office and referred to the State Legal Advisor for further scrutiny. Then, the issue will be discussed and debated in the State Fatwa Committee, and brought to the Islamic Council. Once the fatwa is accepted, it will be brought up to the Sultan for approval and, finally, gazetted. The gazetted fatwa is binding for Muslims and should be recognized by the court for that particular state (Azam & Adil, 2015).

It is important to note that fatwa approved and gazetted in Malaysia are not necessarily accepted in other Muslim countries. In

fact, different and even contradictory fatwa on the same issues can be declared at a given period, at different or even the same regions (Black, 2009; Brockopp, 2003). Additionally, to ensure the continuity of fatwa development, research, and management, the World Fatwa Management and Research Institute (INFAD), a reference fatwa centre, was established in Universiti Sains Islam Malaysia (USIM). One of the activities of this centre includes maintaining a repository of halal-industry related fatwas from across the globe, allowing halal industry perspectives to be analysed beyond the local perspective (HDC, 2017).

2.2. Food law

While many countries still do not have a regulatory body to control the authenticity of product labelling and marketing as *Halal* (Bonne & Verbeke, 2008; Halim & Salleh, 2012; Harvey, 2010), Malaysia regulated its first halal related law under the Trade Descriptions Act (TDA) of 1972. Mandated under the Domestic Trade, Cooperatives and Consumerism Ministry (MDTCC), this law is directed to companies or individuals who apply false trade descriptions (signs, labels, or other markings) on their products or premises (Riaz & Chaudry, 2004; Zakaria & Ismail, 2014). In 2011, TDA 1972 was repealed and replaced with the new TDA 2011 (see Table 3) to introduce new features for greater statutory protection and tighter enforcement against false halal trade description.

One of the most noteworthy features of TDA 2011 is the appointment of JAKIM and State Religious Authorities from each respective state as the competent halal authorities who can certify any foods, goods, or services as halal. TDA 1972 gives no specific provisions giving jurisdiction to these agencies although they are primarily responsible in halal matters (provide certification, auditing, and monitoring) (Zakaria & Ismail, 2014; Zakaria, 2004). Additionally under TDA 2011, any foods, goods, or services shall not be described as halal in Malaysia unless it is certified and marked

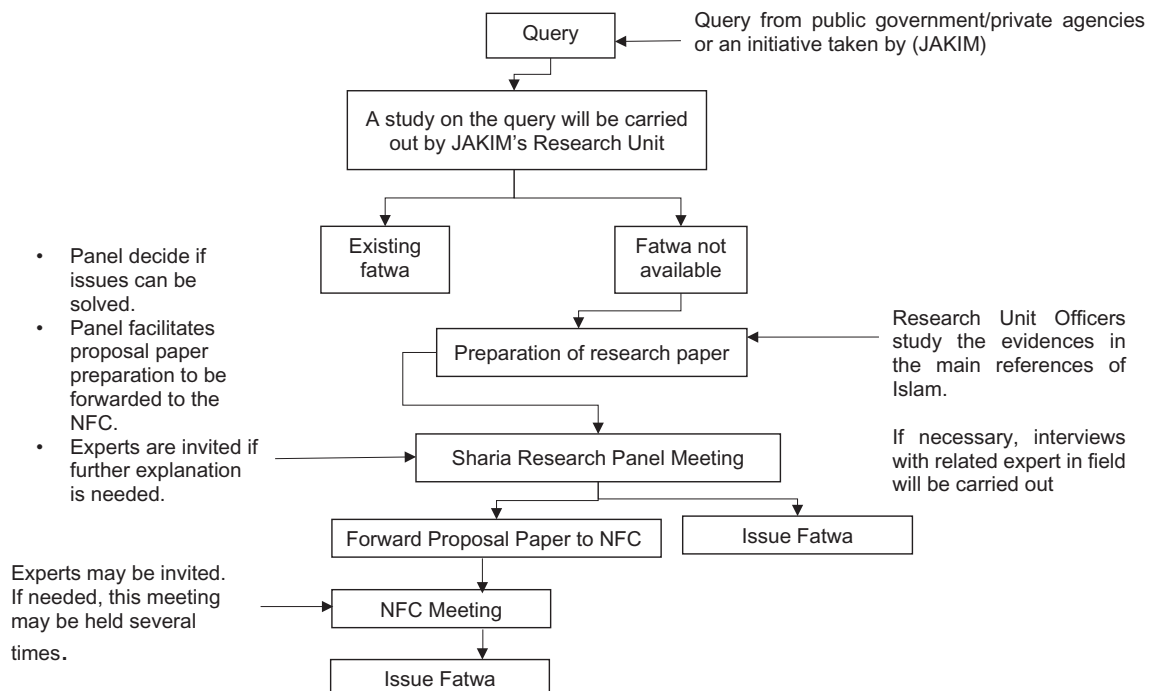



Fig. 1. Fatwa decision process in science and technology related issues. Adapted from Isa, Baharuddin, Man, and Chang (2015).

Table 3
Trade descriptions Act 2011

Order	Detail
Trade Descriptions (Definition of Halal) Order 2011	<ul style="list-style-type: none"> The use of the “Halal” description or any other such descriptions is voluntary under the current legislations. However, Trade Descriptions (Definition of Halal) Order 2011 provides that when food or goods are described as halal or are described in any other expression to indicate that the food or goods can be consumed or used by a Muslim, such expression means that the food or goods: <ol style="list-style-type: none"> neither is nor consist of or contains any part or matter of an animal that is prohibited by Hukum Syarak (Islamic laws) for a Muslim to consume or that has not been slaughtered in accordance with Hukum Syarak; does not contain anything which is impure according to Hukum Syarak; does not intoxicate according to Hukum Syarak; does not contain any part of a human being or its yield which are not allowed by Hukum Syarak; is not poisonous or hazardous to health; has not been prepared, processed or manufactured using any instrument that is contaminated with impure according to Hukum Syarak; and has not in the course of preparing, processing or storing been in contact with, mixed, or in close proximity to any food that fails to satisfy paragraph (a) and (b). When services in relation to the food or goods including the transporting, storing and processing raw materials, serving and retailing of such food or goods are described as halal such expression means that the services in relation to the food or goods are carried out in accordance with Hukum Syarak. Any person not in compliance with the Order commits an offence and upon conviction, shall be liable to a fine not exceeding RM 1 million or imprisonment for a term not exceeding 3 years or both. The penalty for a body corporate is a fine not exceeding RM 5 million.
Trade Descriptions (Certification and Marking of Halal) Order 2011	<ul style="list-style-type: none"> Under the Order, only the Department of Islamic Development Malaysia (JAKIM) and the Islamic Religious Council (MAIN) in the respective States are appointed as the competent authorities to certify that any food, goods or services in relation to the food or goods is halal in accordance with the Trade Descriptions (Definition of Halal) Order 2011. All food, goods or service shall not be described as halal unless it is: <ol style="list-style-type: none"> certified as halal by the competent authority (JAKIM/MAIN); and marked with the logo issued by the competent authority (JAKIM/MAIN) as follows:
	
	<ul style="list-style-type: none"> Any person not in compliance with the Order commits an offence and upon conviction, shall be liable to a fine not exceeding RM 100,000.00 or imprisonment for a term not exceeding 3 years or both. The penalty for a body corporate is a fine not exceeding RM250,000.00.

Source: MDTCC (2017)

with the logo by JAKIM or State Religious Authorities (Zakaria & Ismail, 2014; Zakaria, 2008). This helps addressing problems related to consumers trust when multiple agencies are allowed to issue halal certifications (Rezai, Mohamed, & Shamsudin, 2012; Wahab et al., 2015).

There are other laws which are not explicit or specific to but are indirectly related to halal, such as the Food Act of 1983, the Consumer Protection Act of 1999, and the Animal Rules of 1962. The Food Act of 1983 stipulates that it is an offence for any person to prepare, pack, label, or sell any food in any false, misleading, or deceptive manner as to its character, nature, value, substance, quality, composition, merit, safety strength, purity, weight, age, origin, and proportion. Under this act, a non-halal product cannot be marked as halal. In addition, the Food Regulation of 1985 (under the Food Act of 1983) makes it obligatory for food containing beef, pork, its derivatives, or lard to be clearly labelled. Through the Consumer Protection Act of 1999 (section 8), using false, misleading, or deceptive information related to a product, presentation, or practice to mislead consumers is prohibited. Under this act, an aggrieved consumer may refer any dispute or claim of less than MYR 10,000 to the established Consumer Redressal Tribunal. Other indirectly related law, the Animal Rules of 1962 empowers the Veterinary Department to issue a slaughtering certificate/licence to abattoirs or individuals to ensure that animals intended to be slaughtered are healthy and disease-free (Zakaria, 2008).

2.3. Halal standard

Besides laws and regulations, Malaysia has also developed its own halal standards. The standards are established through a consensus of committees comprised of producers, policy makers, consumers, and others with relevant interests. Giovannucci and Reardon (2001) described standards as parameters that segregate comparable products into categories and describe them with consistent terminology that can be understood by the market. Meanwhile, Jukes (2014) defined food standards as “nationally or internationally accepted procedures and guidelines (voluntary or mandatory) that apply to various aspects of food production, handling, marketing, and trade to enhance and/or guarantee the safety and quality of food” (p. 35). One of the main objectives of standardisation is to ensure everyone adheres to the same procedures or product specifications, which in return facilitate logistical procedures, trade, prevent consumer deception, and improve product quality (Dankers, 2003).

Currently, 14 standards for halal have been developed. MS1500: 2009 prescribes the practical guidelines for the industry regarding the preparation and handling of halal food (including nutrient supplements). JAKIM and the State Religious Authorities are responsible for the issuance of halal certificates to the industry in Malaysia, whereby MS1500 is used as a basis for halal certification (Department of Standards Malaysia, 2017). To date, the MS1500 series of standards has been revised in 2004 and 2009. In order to

minimise redundancy or conflicts between standards, MS1500: 2009 is harmonised with Codex Alimentarius, international food safety/quality standards (GHP, GMP, HACCP), and local public legislation (Ahmad, Abdul Rahman, Othman, & Ungku Zainal Abidin, 2017; Talib & Ali, 2009). Malaysian manufacturers and service providers are urged to implement this voluntary standard as it offers the potential of greater access to markets in the form of 'preferred supplier' status for some large buyers, a better image in the market place in general, and access to a global halal market (Talib, Hamid, & Chin, 2015).

According to van der Spiegel et al. (2012), trust in halal products requires distinctness in certificates, accomplished through generally accepted standards and halal assurance systems. There are multiple halal certification bodies (HCB) that have been established worldwide. Some HCBs are non-profit organizations, whereas others are for-profit organizations. There are also some HCBs that are set by government agencies, multinational quality assurance corporations, as well as private individuals (Motarjemi, Moy, & Todd, 2014). Different HCB may set different halal requirements and/or use different assurance systems; ranging from well described standards to inspection criteria based on trust (van der Spiegel et al., 2012). Credibility and recognition of HCB are particularly important for halal import and export (Motarjemi et al., 2014). Some of the certifications, especially from smaller and less known halal certification bodies, often were not recognized by the importing countries (Latif, Mohamed, Sharifuddin, & Mahir, 2014). In some instance, halal certificates issued are only recognized in the importing countries after accreditation from the countries' authorities (Fuseini et al., 2017). Malaysia for example, currently recognizes 67 Islamic bodies in 41 countries (JAKIM, 2017).

The task of granting *Halal* certificates and monitoring is specifically handled by government agencies. Briefly, all halal certificate applicants must go through series of stringent and exhaustive procedures to obtain certificate; application; audit process (corrective measures, if applicable) and assessment by appointed panel. Finally upon certificate approval, certified companies will also be monitored (Musa, Muslim, Omar, & Husin, 2014). The procedure to obtain halal certificate is depicted in Fig. 2.

3. Halal food control management

Modern and well-drafted laws and legislation may appear to be sufficient, but in practice, without effective food control management, the legislation is likely to be ineffective (FAO & WHO, 2003; Jia & Jukes, 2013; Motarjemi et al., 2014). According to FAO & WHO (2003), the core responsibilities of food control management system include the establishment of regulatory measures, monitoring system performance, facilitating continuous improvement, and providing overall policy guidance. In Malaysia, the integrity of halal products is assured under multiple agencies, led by JAKIM. In a multiple agency system, responsibilities for food control are shared between government ministries (health, agriculture, commerce, environment, trade, and industry) and across government agencies

at different levels (federal, state, local) (FAO, 2006). For instance, JAKIM is also supported by the *Halal* Industry Development Corporation (HDC), an agency under the Ministry of International Trade and Industry (MITI). HDC focuses on the development of halal standards, branding and promotion, and commercial development of halal products and services.

National food safety and quality control, which includes food standards, food hygiene, food import and export, food advertisement, and accreditation of laboratories, is under the jurisdiction of the Ministry of Health (MOH) Malaysia. Food Safety and Quality Division (FSQD) of MOH is responsible for protecting the public against food-related hazards and frauds, as well as motivating and promoting the preparation, handling, distribution, sale, and consumption of safe, quality food. They are also in control of the effective execution of food safety programs, which includes routine compliance, sampling, food premises inspection, food import control activities, and licensing of specified food substances required under the food law (Ashok, 2013). As food safety and quality is a great part of halal food control, the role of MOH in halal food control is very important.

Several government agencies are involved either directly or indirectly in halal food control. These agencies are the Ministry of International Trade and Industry (MITI), the Department of Standards Malaysia, the Department of Veterinary Services, the Royal Malaysian Customs Department, and the Local Authorities. The Veterinary Department is partly responsible for ensuring meat and meat-based products imported into Malaysia are halal certified. The Department of Standards Malaysia is responsible for developing the standard for halal food, and accrediting Conformity Assessment Bodies, such as testing laboratories, inspection bodies, and certification bodies (Borhan, 2016). The Royal Malaysian Customs focuses on the inspection of imported food items at the various ports of entry (Wahab et al., 2015). Table 4 provides a list of halal agencies (including halal-related institutions) and a summary of their roles.

4. Halal inspection and enforcement

Food inspection is "the examination of food or systems for the control of food, raw materials, processing and distribution, including in-process and finished product testing, to verify that they conform to requirements" (FAO & WHO 2003, p. 20). The roles for food inspection, monitoring, and enforcement of halal food laws, regulations, and standards in Malaysia are divided between JAKIM, State Religious Authorities and other related ministries.

One of the greatest challenges in halal enforcement and inspection is the use of unauthorised or fraud certifications, and self-made halal logos. Many view the unauthorised use of halal certification as an attempt to mislead consumers, and regard it as threat that could compromise the integrity of *Halal* food products in the market (Hafiz, Mohamed, & Ab, 2014; Talib & Johan, 2012; Mohamed Syazwan Ab; Talib et al., 2015). To ensure the authenticity of the halal expressions used, MDTCC, with the cooperation of JAKIM and State Religious Authorities, consistently conducts inspections. Under TDA 2011, JAKIM's Monitoring and Enforcement Section has also been given the responsibility and authority to monitor and enforce matters pertaining to halal and its certification. Before revision of TDA 2011, JAKIM's officers could only conduct enforcement activities when MDTCC officers were present. The delegation of power through the issuance of 'authorisation cards' to JAKIM's officials as the 'Assistant Controller of Trade Descriptions (for halal)' gives power to JAKIM to carry out enforcement on their own. MDTCC can still interfere, if necessary, to smooth the implementation of the trade description (Ab Manan, Abd Rahman, & Sahri, 2014).

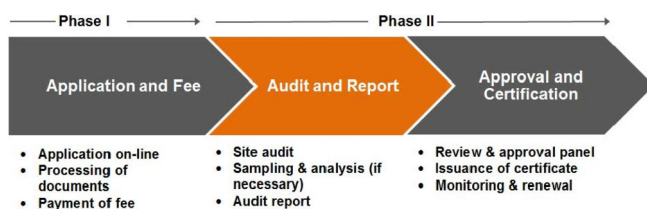


Fig. 2. Malaysian halal certification procedure. Source: HDC (2017).

Table 4
Halal multi-agencies and their functions.

Department	Main responsibility	Act
Department of Islamic Development Malaysia (JAKIM)	Issues Halal certificate for local and export markets; Monitoring and enforcement of halal guidelines	Trade Descriptions Act 2011
Halal Industry Development Corporation (HDC)	Standards development, branding enhancement as well as commercial and industry development.	
Ministry of Domestic Trade, Cooperative and Consumerism (MDCTT)	Enforcement and monitoring program to protect Halal integrity, Halal logo and consumer's interest	Trade Descriptions Act 2011
Malaysia External Trade Development Corporation (MATRADE)	Export promotion activities	
Malaysian Industrial Development Authority (MIDA)	Halal investment	
Ministry of Health (MOH)	Food safety	Food Act 1983 (Act 281) and Food Regulations 1985 Poison Act
Malaysia Productivity Corporation (MPC)	Identify potentials in Halal industry and provides training and consultancy to SMEs and industries to meet halal standards and requirements	
Department of Veterinary Services	The welfare of animals and livestock industry	Animal Rules 1962
Ministry of Agriculture and Agro-Based Industry (MOA)	Animal health and abattoirs	Animal Rules 1962
Royal Malaysian Customs	Customs services	
Department of Statistic Malaysia	To collect, interpret and disseminate latest and real-time statistics in the monitoring of national economic performance and social development.	
Standards and Industrial Research Institute of Malaysia (SIRIM)	Developing and updating Malaysian Standard; helps development and promotion of Malaysia's Halal Standards	Standards Malaysia Act
Economic Planning Unit (EPU)	Support and helps in formulating Halal Industry's Master plan to strengthen the role and function	
SME Corporation Malaysia	Provides matching grants to SMEs for Halal product development and formulation, sample testing, acquisition of machinery and equipment, renovation expenditure for compliance to certification requirement, other related costs for compliance to requirements of Halal certification and promotional activities	
Department of Chemistry	Halal analysis and traceability	Food Act 1983 (Act 281) and Food Regulations 1985
Malaysian Agricultural Research and Development Institute (MARDI)	Generating and promoting new, appropriate and efficient technologies in food and agro-based industries	MARDI Act
Biotechcorp	To identify value propositions in R&D and commerce and support these ventures via financial assistance and developmental services	
TPM Biotech Sdn. Bhd.	Recognize the opportunity and potential of Malaysian natural resources	
Malaysian Palm Oil Board (MPOB)	Research and development the Malaysian palm oil industry, and the provision of excellent service	
National Pharmaceutical Control Bureau (NPCB)		
Malaysian Government Ministries:	Supporting halal industry through each own capacity.	
<ul style="list-style-type: none"> • Ministry of Finance • Ministry of Tourism Malaysia • Ministry of Science, Technology and Innovation 		
Research Institution/local universities:	Halal research and development (R&D) and courses in Halal matters.	
<ul style="list-style-type: none"> • Halal Product Research Institute (HPRI), Universiti Putra Malaysia (UPM) • International Institute for Halal Research & Training (INHART), International Islamic University Malaysia (IIUM) • Institute of Halal Research and Management (IHRAM), Universiti Islam Sains Malaysia (USIM) • Halal Informatics Research Centre, Universiti Teknologi Malaysia (UTM) • Universiti Teknologi Mara (UiTM) • Universiti Sains Malaysia (USM) • Universiti Kebangsaan Malaysia (UKM) 		
Local councils in the states	Approval for activities related to safety	Local Government Act and other relevant subsidiary laws enacted thereunder

Adapted from (HDC, 2017; Musa et al., 2014).

Besides roles related to halal logo/label, JAKIM or State Religious Authorities are also involved in inspecting and monitoring halal certification's applicants and holders. Compliance with the MS1500 standard is only mandatory if the company chooses to label its products as halal (JAKIM, 2014). Inspections are normally carried out upon the applicant fulfilling all documentary requirements and once payment has been received. At least two inspecting officers (one Islamic affairs officer and one food technology/technical staff

for abattoirs) are assigned to conduct site inspection in the applicant's plant or on premise. Once inspection has been completed and found satisfactory, the premises will be approved for a halal certificate, and subject to further monitoring for two years.

Surveillance activities, which involve visits by JAKIM or State Religious Authorities accompanied by personnel from other related bodies like the Ministry of Agriculture, MDTCA, Ministry of Science, Technology and Innovations (MOSTI), and the local government,

are undertaken in halal certified companies to ensure their compliance to requirements. The composition of the surveillance team would depend on the type of facilities and products that are certified. Frequency of surveillance visits ranges from once a month to once a year, depending on the state. States like Sarawak and Perlis report monthly visits, while Negeri Sembilan and Penang conduct inspections only once a year. JAKIM has an average surveillance visit interval of every six months (Ismail & Ehsan, 2010).

Prosecution on halal matters is under jurisdiction of the MDTCC and other enforcement agencies, based on the input from JAKIM or State Religious Authorities, as the witness. The court decision may be announced by JAKIM or State Religious Authorities for public information (JAKIM, 2014).

5. Halal laboratory

Effective food control systems require adequate analytical capacity (well-equipped laboratory facilities with qualified manpower) to measure the quality of the national food supply (Whitehead, 1995). In food control, laboratories are responsible for analysing food samples to detect, identify, and quantify contaminants (pesticide residues or heavy metals), and for analysing specimens to identify the causes and sources in food-borne illness outbreaks. Laboratories findings provide support for food law enforcement, and help inform the process of food safety, quality policy, and decision making. In halal food control, monitoring specific *haram* ingredients in raw materials, half fabricates, and final food products can demonstrate compliance with some halal requirements (van der Spiegel et al., 2012), help in dissemination of information for consumers, and at the same time, instil trust and confidence in the halal authority (Jaswir et al., 2014, pp. 165–175). However, analysis is not often used worldwide to prove the absence of *haram* ingredients, except in countries like Malaysia, Indonesia, and Thailand (van der Spiegel et al., 2012).

Analytical quality assurance programmes are needed to ensure competency of laboratories to provide consistent and accurate results in food control system. In halal food control, analysis must be carried out at selected government laboratories (JAKIM, 2014). Currently, the laboratory under the Department of Chemistry (DOC) is the official laboratory for Halal Certification. DOC is a well-established research institution with 11 labs nationwide equipped with state-of-the-art technology and strong human capital expertise and skills. DOC is supported by 350 science officers (an average of 10 years' experience) and 530 technical support staff. Beside halal analysis, DOC is also responsible for analytical-related tasks for crime investigations, food safety, and product specification evaluation (Department of Chemistry, 2017).

Besides DOC, the halal food control system is also supported by MOH's laboratories. In conventional food control systems, premises that are handling, processing, and serving food are inspected regularly, and food samples are taken for microbiological, chemical, and physical tests. Laboratories have been established nationwide for these analyses, and are expected to conform to standards outlined in ISO/IEC 17025:2005 (Ashok, 2013). Currently, there are 15 MOH laboratories (with different testing capacities) across the nation providing analysis for food additives, biotechnology, natural contamination, heavy metal, mycology, microbiology, molecular, food packaging, drug residues, pesticide residue, food standards, and labelling (Food Safety and Quality Department, 2017).

DOC and MOH laboratories services, however, are not exclusive for halal analysis. This leads to a delay for halal analysis services, prompting the suggestion to set up a dedicated halal laboratory for halal analysis, known as Malaysia Halal Analysis Centre (MyHAC). While the MyHAC's capacity building (development of methodology and standard of procedure for analysis) is still on-going, in the

future, it is expected that MyHAC will become a one-stop centre for industrial research and halal certification. For now, to provide an alternative for the industry to accelerate their verification process in applying for halal certification, JAKIM has temporarily appointed selected testing laboratories (TPM Biotech, etc.) as one of Halal Panel Laboratories (HPL) (Salama, 2015). HPL is responsible for ensuring compliance towards the established testing management criteria to maintain sample integrity, and to ensure that analysis methods used meet the specified conditions and criteria. TPM Biotech Laboratories meet the requirements of the ISO/IEC 17025:2005 accreditation for chemical and nucleic acid tests (Technology Park Malaysia, 2017).

Product analyses are also developed and performed in Halal Science Centres or research institutes, like Halal Products Research Institute (HPRI) at Universiti Putra Malaysia. The main research area in halal research centre includes developing new methods and techniques in halal product authentication in food and consumer products. The halal analysis is based on certain identified biomarkers, such as oil/fat-based, protein-based, DNA-based, metabolites-based, and alcohol-based (van der Spiegel et al., 2012).

6. Halal information, education, communication and training (IECT)

In addition to laboratory service, the delivery of information, education, and advice to stakeholders across the farm-to-fork are also crucial (Mansourian, Mahfouz, & Wojtezak, 2009). Halal education, communication, and training (IECT) is imperative for indorsing awareness among consumers, to improve their halal knowledge and help them to make informed decisions. IECT is used to promote the adoption of a halal assurance system by the food industry. Inspiration to be the global reference centre in Halal knowledge and Halal-related services is the motivation for Malaysia to strengthen its IECT element. To achieve the inspiration, public and private partners in the state, federal, industry, and academia arenas work together to develop halal education, communication, and training.

HDC is at the forefront in dissemination of halal knowledge and information in Malaysia. One of HDC's initiative is the establishment of Global Halal Support Centre (GHSC). GHSC is a focal point for companies, investors, researchers, professionals, and service providers to access halal-related information, compasses of halal principles, industry statistics, market trends, certification compliances, and recent halal research and innovations. HDC has also introduced innovative Halal application to help consumers locate Halal food premises using the Global Positioning System (GPS) technology and Google Maps. Users will also be able to obtain immediate access to the Halal-related information, including directories, e-codes and fatwas, and industry news. Additionally, information related to halal is also made available through HDC's official website, <http://www.hdcglobal.com>, and other halal agencies' websites, such as JAKIM: <http://www.halal.gov.my/v3/>. These websites provided specific and targeted information and materials for three different halal stakeholders, government, business, and consumers. The campaign encouraging food enterprises to apply for halal certification can also be found on these websites. Besides websites, each agency also uses social media, such as Facebook, to engage the public on halal issues.

Training courses on food standards, certification programs, and quality assurance schemes for food industry associations and food enterprises are often organised by government agencies, such as JAKIM and HDC, as well as other cooperating organizations, like halal institutions at universities (HPRI, UPM; INHART, IIUM; IHRAM, USIM; etc.). Food industry training is an important component to strengthen the industry's need for professional

human resource and capital development in the *Halal* sector. HDC offers halal-oriented custom training modules, certification guidelines, and technical advisory services for anyone who seeks to better understand what halal is all about. The programs are on *Sharia* laws, certification processes, and consumerism as well as food safety. The comprehensive training modules are intended to ensure practitioners have a full understanding of facets needed to support the growing *Halal* industry. For example, HDC introduced *Halal* Executive Program Training (HEP) in 2010 to fulfil the needs for trained human resources in companies to manage their halal management system. Industry professionals like *Halal* executives need to understand the tools, principles, and sources of knowledge that Islamic scholars use to derive fatwa to solve the *Halal* issues in their organisation (Rafida, Alina, Syamsul, Mashitoh, & Yusop, 2013) while ensuring the implementation of their company halal food management system is complying with the Malaysian *Halal* Standard MS1500:2009. Besides HDC, nowadays training for *Halal* Executives is also conducted by multiple organizations, including public universities, and consultant companies.

Universities are actively involved in the halal food control system in numerous ways. Besides halal analysis development and testing, Malaysian public universities such as UPM, IUM, and USIM offer Master's and PhD programmes in halal food analysis that include new techniques for halal products authentication, as well as innovations on alternative halal products. Recently, more courses on managements, social sciences, and laws have been introduced (Ismail & Ehsan, 2010). Additionally, through outreach and public information programs, universities also help consumers understanding halal concepts and issues.

7. Challenges in *halal* food control system

While the *Halal* food control system in Malaysia is well developed and consistently updated, like other conventional national food control systems, problems and challenges with the system persist. Some significant areas where problems and challenges remain in the current halal food control system are discussed below.

7.1. *Halal* food law – fatwa

Standardisation in laws and regulation fatwa is necessary for consistent implementation across the states to reduce the difficulties faced by food traders and producers. According to Azam and Adil (2015), freedom for each state to issue their own fatwa may result in inconsistencies in fatwa implementation across the nation. Azam and Adil (2015) suggested the need to increase the NFC's role as a platform in standardising fatwas across states and institutions. For now, aside from staying abreast to changes in fatwa, food companies need to be aware of the differences between fatwa issued by different state, especially in the state where their products are being manufactured.

7.2. *Halal* food control management

Food fraud remains an ongoing threat for halal food industry. Few examples of halal food fraud include intentional mislabelling of non-halal meat as halal, halal meat contamination, and illegal meat trade (Fuseini et al., 2017; McElwee, Smith, & Lever, 2017). There are also transnational halal food fraud incidences that directly affect Malaysia. For example in 2015, two companies were charged in the United States for conspiring to export misbranded beef products that did not meet Malaysian standards of halal slaughter (Malaysian Digest, 2017). As no comprehensive inquiry into the halal food fraud has been published in Malaysia, very little is known

about the occurrence, extent and impact of this problem. Documented cases may represent only a small percentage of the real fraud incidents (Johnson, 2014), as fraud cases often go undetected when they cause no public and food safety implications (Evershed & Temple, 2016; Johnson, 2014).

Food fraud is a constant challenge for national food control worldwide. As fraudsters are “often opportunistic, patient, often well-informed, and actively seek to avoid detection” (Spink, Moyer, & Whelan, 2016, p. 69), some argue that the traditional food safety strategies are inadequate for food fraud countermeasures (Curl, 2015; Spink, Ortega, Chen, & Wu, 2017; van Ruth, Huisman, & Luning, 2017). Moreover, policing food fraud is inherently difficult in transnational cases as the authority are bound by national borders (Spink et al., 2016). Several recommendations to mitigate food fraud risks has been proposed which include clear leadership relating to food fraud (e.g. through establishment of Food Crime Unit), a coordinated multidisciplinary approach and better information sharing between food enforcement agencies (Elliott, 2014; Spink et al., 2016). Some recommendations are also relevant to inform the Malaysian authority on the improvement needed in its current halal food control management to better handle halal food fraud.

The effectiveness of the overall halal food control management is often tested while dealing with national and international halal food scandals or incidents. Scandals or incidents related halal foods are not uncommon. Yet few cases have received the media attention and international profile, or generated such an intense public outrage like the Cadbury case (Kalla, 2015). The case started with routine testing by MOH, who found porcine (pig) DNA in two locally made Cadbury products on 27 February 2014. In late May 2014, a photo of a confidential report was unofficially posted on social media, instigating rumours that Cadbury chocolate may not be halal (Musa et al., 2014). The chronology of the incident described in Table 5 revealed multiple issues in halal food control management, such as weak coordination, lack of communication, confusion of jurisdiction between JAKIM and MOH, and differences in levels of expertise and resources between laboratories.

The problems in coordination and jurisdiction between different agencies are also mentioned in previous publications as the challenges of Malaysia halal food industries (Astro Awani, 2014; Musa et al., 2014; Soraji, Awang, & Mohd Yusoff, 2016). The problems mentioned above are among a few common downsides of the multi-agency approach in a national food control system (FAO & WHO, 2003). Additionally, FAO & WHO (2003) also mention the lack of coherence as another problem that lead to over-regulation or time gaps in adequate regulatory activity. The multi-agency approach makes the overall management control more complex, and this may affect transparency and the free flow of information between the different agencies (Al-busaidi & Jukes, 2015; Alomirah et al., 2010).

As it is not always possible for countries to develop an integrated food control system, FAO & WHO (2003) suggest that countries with multiple agencies approach each other to clearly identify the role of each agency to avoid duplication of effort, and to find measures that help improve coherence among these agencies. National agencies also need to identify areas of the food chain that require special attention and additional consolidation of resources. Additionally, in situations involving overlapping jurisdictions on halal issues, it important to note that consultations with JAKIM as the main authority in halal matters and policies in Malaysia are required.

7.3. *Halal* inspection and enforcement

Cases of fake halal logos remain one of the big problems in the

Table 5
Summary chronology of Cadbury halal-incident case.

Dates	Events
23 May 2014	Photo of confidential report dated 27 February 2014 on the finding of porcine DNA on 2 types of Cadbury bar (Dairy Milk Hazelnut and Cadbury Dairy Milk Roasted Almond) went viral on social media.
24 May 2014	MOH issued a press release admitting the finding of porcine DNA on 2 types of Cadbury chocolates, but made no reference to JAKIM. JAKIM suspended halal certificates for the affected Cadbury products. Sample of products were taken from Cadbury's factory for further analysis. JAKIM pointed out the MOH's samples were not taken directly from Cadbury's factory, suggesting that this resulted in possible contamination and flawed test results.
25 May 2014	JAKIM held a meeting with MOH, Department of Standards, and DOC.
26 May 2014	MOH issued a statement to hand over the case to JAKIM.
27 May 2014	MOH issued a statement that there is a possibility of DNA porcine contamination during product manufacturing.
28 May 2014	JAKIM confirmed that Cadbury complied with the halal food manufacturing process and that they still waiting for DOC's report for further confirmation on analysis result.
30 May 2014	JAKIM officers appeared on various media channels explaining the controversy to the public.
1 June 2014	JAKIM's Director-General, Tan Sri Othman Mustapha stated that JAKIM was not informed on finding of porcine DNA by MOH.
2 June 2014	JAKIM confirmed that no porcine DNA was found in Cadbury products based on the analysis made by DOC.
3 June 2014	Cadbury Malaysia issued a statement affirming that Cadbury products manufactured and sold in Malaysia are halal.
4 June 2014	MOH issued multiple statements: – the preliminary laboratory testing result was leaked; – MOH laboratories are not accredited for porcine DNA testing; – mutual agreement that product contaminated with porcine must be refer to JAKIM.
9 June 2014	Suspension of halal certificates for two types of Cadbury chocolates were lifted.

Adapted from [Musa et al. \(2014\)](#) and [Astro Awani \(2014\)](#).

halal food control system, in spite of series of inspections and raids by the authorities ([Hafiz et al., 2014](#); [Rezai et al., 2012](#)). Until 2014, there was no prosecution of cases brought to court related to *Halal* logo abuses reported. While in 2012, out of 29 cases reported, only one company was compounded with MYR 3000. In the other 28 cases, companies' MYR 15,000-worth of goods were confiscated ([Ab Halim & Ahmad, 2014](#)). Many perceive this problem is also partly contributed to the poor and inconsistent enforcement. Lack of resources remains the basic problem in handling food fraud, even in developed nations with sophisticated scientific developments and analytical techniques ([Shears, 2010](#)). In the Malaysian context, problems with lack of staff in JAKIM and State Religious Authorities in charge of enforcement in term of surveillance and complaints are often cited by multiple studies ([Ab Halim & Ahmad, 2014](#); [Fischer, 2015](#); [Ismail & Ehsan, 2010](#)). Moreover, besides inspection and enforcement, these staff are also responsible for halal certification application and consumers' awareness ([Ab Halim & Ahmad, 2014](#)). Additional concern related to halal inspection and enforcement was regarding staff skills and knowledge in both *Sharia* and industry/scientific matters to ensure quality of the response provided to industry ([Ismail & Ehsan, 2010](#)).

7.4. Halal laboratory

Numerous analytical methods have been developed for halal authentication. Despite the advancement, detection is often limited to specific non-halal raw materials ([van der Spiegel et al., 2012](#)). Analytical tests need to be improved and constantly updated as the absence of analytical methods could increase the risk of fraud ([Ruth & Granato, 2017](#); [van Ruth et al., 2017](#)). With the increase of fraud cases related to halal, there is also a challenge in term of cost and time which limiting number of samples that can be tested in laboratory. Effective resource utilisation is important. This could be achieved through targeted sampling programmes based on intelligence gained ([Brooks, Elliott, Spence, Walsh, & Dean, 2017](#); [Smith, Manning, & McElwee, 2017](#)).

Beside fraud, contamination is another central challenge in halal food control. The results produced by MOH laboratory were the central issue in the controversial case related to Cadbury in 2014.

Although two Cadbury chocolates tested by MOH were found positive for porcine DNA, follow-up testing by DOC on the samples (taken directly from its factory) showed no signs of contamination ([Kamaruddin, 2014](#)). Laboratory analysis for the halal control system must follow standard sampling procedures that conforms to the standard protocols, be undertaken using methodology accredited in accordance to ISO/IEC 17025:2005, and be carried out by qualified personnel in a dedicated and well-equipped laboratory (e.g. a filtered air system to avoid contamination). In cases related to Cadbury, the first testing was conducted in one of MOH's laboratories that was not accredited for the analysis of porcine DNA in food products, and on samples that were taken from shelves ([Musa et al., 2014](#)), making them more susceptible to contamination outside of the factory. MOH did not rule out the possibility that the two Cadbury chocolate samples which tested positive for porcine DNA were contaminated ([Astro Awani, 2014](#)).

Multiple lessons were learned from this case, including the need to coordinate the analytical function of national laboratories to avoid problems, and to strengthen the capacity of government laboratories in operational aspects, including sampling protocols and analytical procedures, sampling, sample preparation and analysis, collection, transportation, handling and storage of samples, methods and procedures used, criteria for adopting methods, quality assurance, method validation, and data quality evaluation ([FAO, 2006](#)). For instance, as DOC is accredited based on ISO/IEC 17025:2005 to conduct DNA testing in processed food, their analytical reports carry more weight in this case. In fact, only analytical reports by the DOC can be used for prosecution related to halal certification ([Astro Awani, 2014](#); [JAKIM, 2014](#)). Correct sampling procedures and protocol is important in determining whether DNA occurrence is caused by contamination or producer's deliberate act. It is important to note that Malaysian halal certification body has a zero tolerance policy for any presence of non-halal material or substance during halal production. Therefore, for halal verification purpose, samples need to be taken from the factory right from the onset of the manufacturing process, taking into account the raw ingredients, the process flow, storage, and the machines and equipment used ([Astro Awani, 2014](#); [Nor'azman, 2014](#)).

7.5. Information, education, communication and training (IECT)

The popularity of social media presents an opportunity for broader dissemination of halal food information. It is beneficial in terms of speed, accessibility, and interactive capacity to raise awareness about an issue or during crisis communications. However, these benefits are countered by the lack of control of accurate information, low trust, and the risk of information overload (Rutsaert et al., 2013). As of March 2017, an estimated 67.7% of Malaysians used the Internet (Internet World Statistic, 2016). It was revealed in 2016 Reuters Institute Digital News Report that 69% of 1006 Malaysian respondents get their news from social media. Despite the high penetration of Internet, there's a concern from Malaysian Communications and Multimedia Commission (MCMC) on the ability of the public to differentiate between real and fake news (Cheng, 2016). In halal food control context, a simple halal incident may result in national panic, and this incident is often aggravated with false information and fake news via both the Internet and media. There is also a proliferation of false information on halal that can be found on the Internet, especially on social media (Malaysian Digest, 2017).

Another issue related to IECT is the awareness of Malaysian consumers, which is regarded as one of the strengths in Malaysian halal food control. However, their awareness is limited to the need to purchase halal certified food products. Consumers are not well informed on consumer protection laws pertaining to halal products and halal certification procedures. Previous studies also showed that Malaysian Muslim consumers are not clear about the distribution of powers in the administration and enforcement of halal certification (Musa et al., 2014; Soraji, Awang, & Yusoff, 2016).

8. Conclusion

This review describes halal food control in Malaysia based on five components (law, control management, inspection and enforcement, laboratory, IECT) of a conventional national food control system. Some challenges in the existing national halal food control system are also highlighted; for example, coordination and jurisdiction between different halal agencies, halal food fraud, and proliferation of fake news on halal products. It is important to note that while this review attempts to provide comprehensive descriptions about Malaysian halal food control, the sources of review are limited to documents and previous literature on halal matters. Engagement with stakeholders (halal agencies, food companies, and consumers) through in-depth interviews or focus groups is needed for an accurate system description and analysis of the current situation in halal food control. Moreover, as the components of Malaysian halal food control system exhibit many similarities with conventional national food control system, Malaysian policy makers may consider FAO's (2006) guide "Strengthening National Food Control Systems: Guidelines to Assess Capacity Building Needs" to structure their assessment and make informed decisions on the necessary improvements to the halal food control system.

Acknowledgement

The authors thank the Ministry of Higher Education for their funding through the Fundamental Research Grant Scheme (No. 5524577).

References

Ab Halim, M. A., & Ahmad, A. A. (2014). Enforcement of consumer protection laws on halal products: Malaysian experience. *Asian Social Science*, 10(3), 9–14.

- <https://doi.org/10.5539/ass.v10n3p9>.
- Ab Manan, S. K., Abd Rahman, F., & Sahri, M. (2014). *Contemporary issues and development in the global halal industry*.
- Ahmad, A. N., Abdul Rahman, R., Othman, M., & Ungku Fatimah, U. Z. A. (2017). Critical success factors affecting the implementation of halal food management systems: Perspective of halal executives, consultants and auditors. *Food Control*, 74, 70–78. <https://doi.org/10.1016/j.foodcont.2016.11.031>.
- Al-busaidi, M. A., & Jukes, D. J. (2015). Assessment of the food control systems in the Sultanate of Oman. *Food Control*, 51, 55–69. <https://doi.org/10.1016/j.foodcont.2014.10.039>.
- Alomirah, H. F., Al-zenki, S. F., Sawaya, W. N., Jabsheh, F., Husain, A. J., Al-Mazeedi, H. M., ... Jukes, D. (2010). Assessment of the food control system in the State of Kuwait. *Food Control*, 21(4), 496–504. <https://doi.org/10.1016/j.foodcont.2009.07.015>.
- Ashok, P. (2013). *Food safety in Malaysia*, 58(4), 180–184. Retrieved from: http://www.slideshare.net/ahmadahamid/food-safety-malaysia?utm_source=slideshow02&utm_medium=ssemail&utm_campaign=share_slideshow_loggedout.
- Astro Awani. (2014). Cadbury issue: MOH should report the findings to jakim first. Astro Awani. Retrieved from: <http://english.astroawani.com/malaysia-news/cadbury-issue-moh-should-report-findings-jakim-first-36959>.
- Azam, M., & Adil, M. (2015). Standardisation of fatwa in Malaysia: Issues, concerns and expectations. *Islam and Civilisational Renewal*, 6(2), 196–212.
- Black, A. (2009). Fatwas and surgery: How and why a fatwa may inform a muslim patient's surgical options. *ANZ Journal of Surgery*, 79(12), 866–871.
- Bonne, K., & Verbeke, W. (2008). Religious values informing halal meat production and the control and delivery of halal credence quality. *Agriculture and Human Values*, 25, 35–47. <https://doi.org/10.1007/s10460-007-9076-y>.
- Borhan, F. (2016). Role of department of standards Malaysia in Malaysia halal ecosystem. Retrieved from: http://www.arr.gov.pl/data/01943/kuala_lumpur_14062016_4.pdf.
- Brockopp, J. E. (2003). *Islamic ethics of Life: Abortion, war, and euthanasia*. University of South Carolina Press. Retrieved from: <https://books.google.com.my/books?id=agqtUJoOgQoC>.
- Brooks, S., Elliott, C. T., Spence, M., Walsh, C., & Dean, M. (2017). Four years post-horsegate: An update of measures and actions put in place following the horsemeat incident of 2013. *Npj Science of Food*, 1(1), 5.
- Ceranic, S., & Bozinovic, N. (2009). Possibilities and significance of HAS implementation (halal assurance system) in existing quality system in food industry. *Journal Biotechnology in Animal Husbandry*, 25(3/4), 261–266.
- Cheng, N. (2016). Many Malaysians cannot tell the difference between real and fake stories. The Star Online. December 3, Retrieved from: <http://www.thestar.com.my/news/nation/2016/12/23/falling-for-it-hook-line-and-sinker-many-malaysians-cannot-tell-the-difference-between-real-and-fake/#0c1zeH4B3C1cv0r99>.
- Curl, J. (2015). The significance of food fraud in Australia. *Australian Business Law Review*, 43(4), 270–302.
- Dankers, C. (2003). Environmental and social standards, certification and labelling for cash crops. Rome. Retrieved from: <http://www.fao.org/docrep/006/y5136e/y5136e00.htm>.
- Department of Chemistry. (2017). Halal. Retrieved from <http://www.kimia.gov.my/v3/en/about-us/environment-health-division/halal-2.html>.
- Department of Standards Malaysia. (2017). SAMM publication. Retrieved March 31, 2017, from: <http://www.jsm.gov.my/samm-publication#.WOPFGdJ97IU>.
- Elliott, C. (2014). *Elliott review into the integrity and assurance of food supply networks-final report: A national food crime prevention framework*. Department for environment, food & rural affairs food standards agency.
- Evershed, R., & Temple, N. (2016). *Sorting the beef from the Bull: The science of food fraud forensics*. Bloomsbury Publishing. Retrieved from: https://books.google.com.my/books?id=_vaiCgAAQBAJ.
- FAO. (2006). *Strengthening national food control systems: guidelines to assess capacity building needs*. Rome: Food and Agriculture Organization of the United Nation.
- FAO, & WHO. (2003). *Assuring food safety and quality: Guidelines for strengthening national food control systems*. Rome.
- Fischer, J. (2015). Halal, diaspora and the secular in London. In F. Bergeaud-Blackler, J. Fischer, & J. Lever (Eds.), *Halal Matters: Islam, politics and markets in global perspective*. Routledge.
- Fuseini, A., Wotton, S. B., Knowles, T. G., & Hadley, P. J. (2017). Halal meat fraud and safety issues in the UK: A review in the context of the European union. *Food Ethics*, 127–142. <https://doi.org/10.1007/s41055-017-0009-1>.
- Global Halal Support Centre. (2017). *Publication*. Retrieved March 31, 2017, from http://www.ghsc.com.my/publisher/ghsc_industry_infokit.
- Giovannucci, D., & Reardon, T. (2001). *Understanding grades and standards and how to apply them. In a guide to developing agricultural markets and agro-enterprises (giovannucci)*. Washington: The World Bank.
- Hafiz, M., Mohamed, M., & Ab, M. S. (2014). Conceptual framework on halal food supply chain integrity enhancement. *Procedia - Social and Behavioral Sciences*, 121, 58–67. <https://doi.org/10.1016/j.sbspro.2014.01.1108>.
- Halim, M. A. A., & Salleh, M. M. M. (2012). The possibility of uniformity on Halal standards in organization of Islamic countries (OIC) country. *World Applied Sciences Journal*, 17, 6–10.
- Harvey, R. (2010). *Certification of halal meat in the UK*. Cambridge: The University of Cambridge.
- Hava, E. (2009). *New organization to sort out rotten apples in European halal food market*. Sunday's Zaman. October 4.

- HDC. (2017). Fatwa. Retrieved March 31, 2017, from: http://www.hdcglobal.com/publisher/cdh_fatwa.
- HMA. (2007). Problems discovered in the industry. Retrieved December 16, 2010, from: http://hmacanada.org/industry_problems.aspx.
- HMC. (2009a). Necessity to form a monitoring committee. Retrieved December 16, 2010, from: http://www.halalmc.co.uk/about_hmc/need_monitoring.html.
- HMC. (2009b). Problems discovered in the "halal" industry. Retrieved December 16, 2010, from: http://www.halalmc.co.uk/about_hmc/industry_problems.html.
- Internet World Statistic. (2016). Asia marketing research, Internet usage, population statistics and Facebook information. Retrieved March 31, 2017, from: <http://www.internetworldstats.com/asia.htm>.
- Isa, N. M., Baharuddin, A., Man, S., & Chang, L. W. (2015). Bioethics in the Malay-Muslim community in Malaysia: A study on the formulation of fatwa on genetically modified food by the National Fatwa Council. *Develop. World Bioeth.*, 15(3), 143–151. <https://doi.org/10.1111/dewb.12057>.
- Ismail, Z., & Ehsan, A. H. (2010). Halal nutraceutical Market: Issues and challenges. *SEGi Review*, 3(2), 96–117.
- Jagadeesan, P., & Salem, S. (2017). Progress and challenges associated with Halal authentication of consumer packaged goods. *Journal of the Science of Food and Agriculture*, 97(14), 4672–4678. <https://doi.org/10.1002/jf>.
- JAKIM. (2014). *Manual procedure for Malaysia halal certification*. Putrajaya: Jabatan Kemajuan Islam Malaysia (JAKIM).
- JAKIM. (2017). JAKIM and state religious authorities (MAIN/JAIN). Retrieved January 17, 2018, from: http://www.halal.gov.my/ckfinder/userfiles/files/cb/CB_List_LATEST.pdf.
- Jaswir, I., Elwathig, M., Mirghani, S., Salleh, H. M., Ramli, N., Octavianti, F., et al. (2014). An overview of the current analytical methods for halal testing. In *Contemporary issues and development in the global halal industry*. <https://doi.org/10.1007/978-981-10-1452-9>.
- Jia, C., & Jukes, D. (2013). The national food safety control system of China – a systematic review. *Food Control*, 32(1), 236–245. <https://doi.org/10.1016/j.foodcont.2012.11.042>.
- Johnson, R. (2014). *Food fraud and "economically motivated adulteration" of food and food ingredients*.
- Joint FAO/WHO Codex Alimentarius Commission. (1997). *Codex alimentarius: General guideline for use of the term "halal"*. Rome.
- Jukes, D. (2014). Fundamentals of food legislation. In Y. Motarjemi (Ed.), *Encyclopedia of food safety*. London: Academic Press.
- Kalla, H. K. (2015). Cadbury and pig DNA: When issue management intersects with religion. *Journal of Islamic Marketing*, 20(4), 468–482.
- Kamaruddin, S. B. (2014). JAKIM hints at sabotage in tainted Cadbury issue. Retrieved January 18, 2018, from: <http://www.ukm.my/news/archives/tahun-2014/july-2014/jakim-hints-at-sabotage-in-tainted-cadbury-issue/>.
- Latif, I. A., Mohamed, Z., Sharifuddin, J., & Mahir, A. (2014). A comparative analysis of global halal certification requirements. *Journal of Food Products Marketing*, 20(1), 85–101. <https://doi.org/10.1080/10454446.2014.921869>.
- Malaysian Digest. (2017). MCMC hauls in 6 for spreading fake news on Facebook. Retrieved January 18, 2018, from: <http://malaysiandigest.com/frontpage/29-4-tile/690946-mcmc-hauls-in-6-for-spreading-fake-news-on-facebook.html>.
- Mansourian, B. P., Mahfouz, S. M., & Wojtezak, A. (2009). Medical sciences - volume II. Retrieved from: https://books.google.com.my/books?id=Js_VCwAAQBAJ.
- McElwee, G., Smith, R., & Lever, J. (2017). Illegal activity in the UK halal (sheep) supply chain: Towards greater understanding. *Food Policy*, 69, 166–175. <https://doi.org/10.1016/j.foodpol.2017.04.006>.
- MDTCC. (2017). *Enforcement of Halal*. Retrieved March 31, 2017, from <http://www.kpdnkk.gov.my/index.php/en/enforcement-of-halal-labels>.
- Mehmood, M. I. (2015). Islamic concept of fatwa, practice of fatwa in Malaysia and Pakistan: The relevance of Malaysian fatwa model for legal system of Pakistan fatwa in Islamic law. *Mehmood, Arts Social Science Journal*, 4(9), 46–51. <https://doi.org/10.4172/2151-6200.1000118>.
- Minkus-McKenna, D. (2007). The pursuit of halal. *Progressive Grocer*, 86(17), 42.
- Motarjemi, Y., Moy, G., & Todd, E. (2014). *Encyclopedia of food safety*. London: Elsevier. Retrieved from: <https://books.google.com.my/books?id=tz-9oAEACAAJ>.
- Muhamad, N. (2011). Fatwa ruling in Islam: A Malaysian perspective on their role in muslim consumers behaviour. In Ö. Sandıkcı, & G. Rice (Eds.), *Handbook of Islamic marketing*. Edward Elgar Publishing.
- Musa, N., Muslim, N., Omar, M. F. C., & Husin, A. (2014). The Cadbury Controversy: Blessings in disguise? In Z. Zakaria, N. A. A. Hamid, & S. Z. Ismail (Eds.), *Contemporary issues and development in the global halal industry* (pp. 165–175). <https://doi.org/10.1007/978-981-10-1452-9>.
- Nasohah, Z. (2005). Undang-undang penguatkuasaan fatwa di Malaysia. *Islamiyyat: Jurnal Antarabangsa Pengajian Islam*, 27(1), 25–44.
- National Fatwa Council. (2015). *Kompilasi pandangan hukum Muzakarah Fatwa Kebangsaan bagi Hal Ehwal Ugama Islam Malaysia*. Shah Alam: JAKIM. Retrieved from http://www.islam.gov.my/images/ePenerbitan/KOMPILASI_MUZAKARAH_MKI_2016.pdf.
- Nor'azman, N. (2014). JAKIM employs stringent procedure in determining halal status. Retrieved January 18, 2018, from: <http://kpdnkk.bernama.com/featuresEn.php?id=1046504>.
- Rafida, A. R. N., Alina, A. R., Syamsul, H. K. M. W., Mashitoh, A. S., & Yusop, M. H. M. (2013). The Academia's multidisciplinary approaches in providing education, scientific training and services to the Malaysian halal industry. *Middle-east Journal of Scientific Research*, 13, 79–84. <https://doi.org/10.5829/idosi.mejrs.2013.16.s100213>.
- Ramli, N. (2010). Laws and regulations on halal production. Retrieved from: http://irep.iium.edu.my/16117/1/HALAL_LEGAL_CONTROL-USIM-HDC_HEP_1_2010-2.pdf.
- Rezai, G., Mohamed, Z., & Shamsudin, M. N. (2012). Non-Muslim consumers' understanding of Halal principles in Malaysia. *Journal of Islamic Marketing*, 3(1), 35–46. <https://doi.org/10.1108/17590831211206572>.
- Riaz, M. N., & Chaudry, M. M. (2004). *Halal food production*. Florida: CRC Press LLC.
- van Ruth, S. M., Huisman, W., & Luning, P. A. (2017). Food fraud vulnerability and its key factors. *Trends in Food Science & Technology*, 67(June), 70–75. <https://doi.org/10.1016/j.tifs.2017.06.017>.
- Ruth, S. M. van, & Granato, D. (2017). *Food identity, authenticity and Fraud: The full spectrum*. Multidisciplinary Digital Publishing Institute.
- Rutsaert, P., Regan, A., Pieniak, Z., McConnon, A., Moss, A., Wall, P., et al. (2013). The use of social media in food risk and benefit communication. *Trends in Food Science & Technology*, 30(1), 84–91. <https://doi.org/10.1016/j.tifs.2012.10.006>.
- Food Safety and Quality Department. (2017). Potential laboratory services food safety and quality. Retrieved from: <http://fsq.moh.gov.my/v5/ms/keupayaan-perkhidmatan-makmal-makanan-kkm-dikemaskini-2014/>.
- Salama. (2015). Malaysia: Jakim appoints TPM Biotech as halal panel laboratory. Retrieved March 31, 2017, from: <http://halalfocus.net/malaysia-jakim-appoints-tpm-biotech-as-halal-panel-laboratory/>.
- Shears, P. (2010). Food fraud - a current issue but an old problem. *British Food Journal*, 112(2), 198–213.
- Smith, R., Manning, L., & McElwee, G. (2017). Critiquing the inter-disciplinary literature on food fraud. *International Journal of Rural Criminology*, 3(2), 250–270.
- Soon, J. M., Chandia, M., & Regenstein, J. M. (2017). Halal integrity in the food supply chain. *British Food Journal*, 119(1), 39–51. <https://doi.org/10.1108/BFJ-04-2016-0150>.
- Soraji, A. J., Awang, M. D., & Mohd Yusoff, A. N. (2016). Malaysia halal Trust: Between reality and challenges. In *ADVED 2016 2nd international conference on advances in education and social sciences* (pp. 531–538) (Turkey).
- van der Spiegel, M., Fels-Klerx, H. J., van der Sterrenburg, P., Ruth, S. M., van Scholtens-Toma, I. M. J., & Kok, E. J. (2012). Halal assurance in food supply chains: Verification of halal certificates using audits and laboratory Analysis. *Trends in Food Science & Technology*, 27(2), 109–119. <https://doi.org/10.1016/j.tifs.2012.04.005>.
- Spink, J., Moyer, D. C., & Whelan, P. (2016). The role of the public private partnership in Food Fraud prevention – includes implementing the strategy. *Current Opinion in Food Science*, 10, 68–75. <https://doi.org/10.1016/j.cofs.2016.10.002>.
- Spink, J., Ortega, D., Chen, C., & Wu, F. (2017). Food fraud prevention shifts the food risk focus to vulnerability. *Trends in Food Science & Technology*, 62. <https://doi.org/10.1016/j.tifs.2017.02.012>.
- Stichting-Dier, & Recht. (2010). *Vlees eten in de islamitische traditie*. Amsterdam: Stichting-Dier Recht.
- Talib, H. H. A., & Ali, K. A. M. (2009). An overview of Malaysian food Industry: The opportunity and quality aspects. *Pakistan Journal of Nutrition*, 8(5), 507–517.
- Talib, M. S. A., Hamid, A. B. A., & Chin, T. A. (2015). Motivations and limitations in implementing halal food certification: A Pareto analysis. *British Food Journal*, 117(11), 2664–2705. <https://doi.org/10.1108/BFJ-02-2015-0055>.
- Talib, M. S. A., & Johan, M. R. M. (2012). Issues in halal packaging: A conceptual paper. *International Business and Management*, 5(2), 94–98.
- Technology Park Malaysia. (2017). TPM Biotech sdn bhd. Retrieved March 31, 2017, from: http://www.tpm.com.my/sub/su_bi.php.
- Wahab, N. A., Farah Mohd, Shahwahid Hamid, N. A., Miskam, S., Ager, S. N. S., Abdullah, M., ... Saidudin, W. (2015). Undang-undang halal Malaysia: Isu dan cabaran. In *World academic and research congress* (pp. 122–135). Jakarta: YARSI University.
- Whitehead, A. J. (1995). Elements of an effective national food control system. 6(5), 247–251.
- Wiechman, D. J., Kendall, J. D., & Azarian, M. K. (1996). Islamic law: Myths and realities. Retrieved from: http://www.iium.edu.my/deed/lawbase/ilw_myth_real.htm.
- Zakaria, Z. (2004). Keberkesanan Undang-undang Makanan dan Produk Halal di Malaysia. *Jurnal Syariah*, 12(2), 95–106.
- Zakaria, Z. (2008). Tapping into the world halal market: Some discussions on Malaysian laws and standards. *Jurnal Syariah*, 16, 603–616.
- Zakaria, Z., & Ismail, S. Z. (2014). The trade description act 2011: Regulating "halal" in Malaysia. In *International conference on law, management and humanities (ICLMH'14)* (pp. 2011–2013) (Bangkok).
- Zubaida, S. (2005). Law and power in the Islamic world. I. B. Tauris. Retrieved from: <https://books.google.com.my/books?id=6EFgzjDgxOoC>.