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Emerald

British Food Journal

Halal Integrity in the Food Supply Chain

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Halal Integrity in the Food Supply Chain

Abstract

Purpose: This paper argues that there is an absence of halal integrity within the conventional stages of a food chain. This paper adapts the understanding of the different stages and argues the need to develop a critical consciousness for halal integrity within the food chain to address the needs of the ever-growing Muslim consumers’ market. The aim of this paper is to propose a definition of halal integrity using farm to fork and global food supply chain models.

Design: The study includes a review of priori literature and media reports regarding cross contamination of food products with haram (forbidden) components. This background will be used to conceptualise halal integrity using farm to fork and a global supply chain models.

Findings: Different interpretations of halal – what is permitted and what is prohibited – exist for the different schools of Islamic legal thought and within the customs of different countries. In order to ensure that food production is embrative of the religious needs of the global Muslim customer market, this paper utilises the farm to fork and global supply chain models to foster a critical awareness of halal needs. Halal integrity should be clearly presenting the details of the halal status of the product and assuring that the requirements for halal as stated are met. Halal integrity not only deals with permitted and prohibited foods, but that the halal status of the food products (i.e. from raw materials until it reaches the consumers) should not be breached (i.e. no cross contamination with haram products / methods and no ill intents). A formal definition of halal integrity has been proposed.

Research limitations: The SWOT analyses serve as a guideline as the analysis done may be outdated as the environments are constantly changing.

Originality/value – This research although academic is meant to have a real value in improving the integrity of the halal food supply chain, providing value to the food industry, to countries that are concerned about this supply chain and to Muslim consumers. Halal integrity is crucial to the success of the emerging halal market.

Keywords: food supply chain; halal; halal certification; haram; Islam; Muslims; traceability

Introduction

Halal is an Arabic phrase for something that is permitted according to Islamic law (Riaz and Chaudry 2004). These principles extend beyond dietary requirements and underpin all types of human conduct for adherents of the Islamic faith, including beliefs, actions, diet, clothes, modes of earnings,

relationships, etc. The term 'halal' with reference to food covers all the aspects starting from the farm and ending at the table of a halal observant home. Halal food must be free of any components that Muslims are prohibited from consuming, which is known as haram. Based on Qur'ānic guidance (Qur'an, 2:168, cited in Chandia, 2015), all foods are halal except those that are specifically mentioned as haram. Haram foods can be divided into several main categories, and include any products derived from or contaminated with these prohibited materials, ~~e.g. such as~~, carrion, blood, pig, permitted animals slaughtered incorrectly, and intoxicants. Recently, examples of haram contamination and dishonest behaviour with halal certified products highlight (Table 1) areas of concern to Muslim consumers as they are dependent on the food industry and policy makers to assure the integrity of the halal supply chain. Food processors may choose to use pork derivatives, other non-halal slaughtered meats and gelatine to substitute meat products because they are cheap and readily available (Aida *et al.*, 2005). This raises the question of what is halal integrity and what measures can be taken to assure that products are produced and handled with integrity? The paper aims to provide an eclectic appreciation of relevant sources, critically understand their nuances and implications to bridge the needs of halal integrity within the food chain. This is supported by providing a critical independent analysis which presents an ethical framework that is more embrative of the religious needs of more than 1.5 billion (and ever-increasing) people of the world and (arguably) is very pragmatic for ~~both operational and strategic implementation and monitoring both local producers and exporters alike~~. This paper will ~~define halal integrity and~~ attempt to conceptualise the context of halal using the farm to fork and global supply chain models to define halal integrity develop operational and strategic conceptual frameworks. The ~~frameworks models~~ will assist food manufacturers, food traders and policy makers to ensure the halal integrity of the local and global food supply chains.

Insert Table 1 here

Methodology

A desktop review of priori literature ~~on primary religious and academic sources were conducted and~~ mMedia reports of cross contamination of halal food products and fraud-related cases were collated to present the data (~~in~~ Table 1). ~~The literature research was conducted by using various databases like EBSCO, Science Direct, Taylor and Francis Online and news. Keywords such as pork or porcine detection, halal food, haram and mislabelling were used in the databases. -in order to acquire a coherent narrative on emerging themes and trends-~~ This is followed by a critical independent analysis to conceptualise integrity in the context of halal present two conceptual frameworks that are embrative of the religious needs of Muslim customer market using a farm to fork model and a global supply chain model. SWOT analyses were carried out to demonstrate the internal (i.e. strengths and weaknesses) and external environments (i.e. opportunities and threats) faced during international halal food trade. -The models are then used to define halal integrity.

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Halal

The halal and haram are clear as is seen in a number of Qur’anic verses. Table 2 shows examples of verses related to eating. Some foods, however, are mashbūh (doubtful), which is often the most controversial, since the standards classifying materials as doubtful are more subjective. Examples of permitted, prohibited and mashbūh foods are provided in Tables 3 and 4.

Insert Table 2 here

Insert Table 3 here

Insert Table 4 here

Halal food supply chain (operational level)

A halal food supply chain starts with sourcing various permitted raw materials and preparing them accordingly (e.g. such as, proper halal slaughter and no cross-contamination with haram products). During all stages of halal production, it is crucial that the food is sourced lawfully, i.e., free from corruption, dishonesty and with no malicious intention (Figure 1). For example, only permitted species are farmed and these halal species do not consume haram feed provided by humans. However, if eaten naturally, then this is not an issue. The schematic diagram below highlights the different stages where halal integrity needs to be considered and preserved (Figure 1).

Insert Figure 1 here

Many of the major stages found in the food supply chain (Soon and Baines, 2013; Soon *et al.*, 2012) are identified below alongside pertinent notions of halal and its impact on that phase.

Agricultural Phase: The inputs (e.g. such as seedlings, plantlets, fertilisers, pesticides, irrigation water, feed, and veterinary products) used during this phase need to be sourced and used according to legal requirements. Irrigation water for produce and crops, drinking water in animal husbandry production, and water sources from where aquaculture products are grown/marine products (including freshwater fish) are caught should be safe and not within the vicinity of pig farms or run-off from pig farms.

Slaughtering Phase: It is permitted to slaughter animals without stunning to meet Jewish and Muslim religious requirements (EU, 1993). The slaughtering phase is a key stage as differentiation between halal and non-halal meat occurs at this point (Bergeaud-Blackler 2007). According to Lever and Miele (2012), the practice of religious slaughter in this case addresses the qualification of halal and is

comparable to other credence attributes that refer to the method of production rather than the intrinsic characteristics of the product. Hence all operations that occur downstream should guarantee the separation and integrity of halal products (Bergeaud-Blackler 2007). For halal it is required to use the Islamic method provided that the animals are slaughtered by a Muslim slaughterman. The Muslim slaughter person must be an adult male or female of sound mind familiar with the process of slaughtering. A trained slaughter person will be more efficient and will minimize the damage to the skin and carcass (Riaz and Chaudry, 2004). It is an absolute requirement that animals are slaughtered according to the halal method. The Muslim slaughter person must sever the front part of the neck, severing carotids, jugulars, trachea and esophagus without reaching the bone in the neck while pronouncing the name of God and with a swift blow (Riaz and Chaudry, 2004). It is preferable to turn the animal or bird towards Makkah (Mecca) before slaughtering although this is only a secondary requirement. The slaughtering of ruminants and poultry should preferably be done by hand. It is mandatory to pronounce the name of God while slaughtering the animal. It suffices to say Bismillah (in the name of God) once (Riaz and Chaudry, 2004). However, in general practice, especially for large animals, the slaughter person pronounces the name thrice as Bismillah Allahu Akbar, Bismillah Allahu Akbar (Riaz and Chaudry, 2004).

Processing Phase: This often involves two sub-processes – assembling the materials needed and the actual processing of these materials. All ingredients including processing aids and materials used with food contact surfaces as well as the equipment must be halal, sourced legally, safe, and used according to legal requirements. Packaging and labelling must be clear and honest (i.e., no adulteration or mislabelling) (Ballin *et al.*, 2009; Ballin, 2010).

Storage Phase: It is important that products are stored and segregated from haram products to avoid cross-contamination. What is acceptable “segregation” is the responsibility of the halal certifying agency. Food packaging (ranging from primary, secondary and tertiary packaging) play a role in ensuring products are kept sealed to reduce potential contamination.

Logistics: Throughout the food supply chain, the logistics service provider plays a crucial role in ensuring that the raw materials, ingredients, packaging materials, storage and transportation of halal products is done so that they do not become contaminated with haram products.

Audit: The traceability of halal products requires proper tracking of the actual product and certification of its halal status by a local Islamic authority and/or a reputable certification body. The drive for profit should not lead to compromising of the halal integrity. Although audit can only provide a snapshot of compliance with halal requirements, it is not feasible for any authority to monitor the whole chain, hence the need to have faith in the wholesomeness of the product (Alqudsi, 2014).

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153 | Figure 1 illustrates the application of halal integrity at the local operational level within a food
154 | production (i.e. animal husbandry, aquaculture) or processing.—However, as the halal food trade and
155 | personal travel increases, how can the authenticity of the halal status of a food product be assured?
156 |

British Food Journal

Halal Global Supply Chain (strategic-level)

The question of authenticity is paramount to this debate particularly as the halal food trade and travel increases. The global halal food trade is primarily linked with the rise in the global Muslim population and the increase of transnational trade. In 2010, there were 1.6 billion Muslims with a projected growth to 2.2 billion people by 2030 at an average annual growth of 1.8% (Pew Research Center, 2011). ~~This will make the Muslim population just over one quarter of the world population, representing a 35% increase since 2010. Australia, Canada, Europe and U.S.A. are emerging with growing Muslim populations and as major markets for halal trade and consumption (Alqudsi, 2014).~~ The rise in population will undoubtedly boost the growth of the halal consumer market and sales. In 2011, this halal product market was worth a staggering US \$2.3 trillion of which just over 50% of the market (US \$1.4 trillion) was for food and beverages (Ahmad *et al.*, 2011). ~~To be part of the market can be potentially beneficial for non-Muslim countries to have Halal certification and labelling (Demirci *et al.*, 2016; Ruzevicius, 2012). This equated in 2012 to just less than 17% of the global food and beverages market and is projected to rise to US \$1.8 trillion by 2018, capturing approximately 20% of the global market (Arab News, 2016). Further, with the growth of the Muslim population the halal travel industry is projected to grow too. In 2015 the "Muslim travel market was worth US \$145 billion with 108 million Muslim travellers representing 10% of the entire travel economy." This halal tourism market is projected to grow to US \$200 billion by 2020 representing over 13% of the tourism market and this will further increase the need for halal food and beverages (Halal Tourism, 2015).~~

With the expected growth of the halal food sector, the issue of global sourcing of raw materials and ingredients will require new efforts to assure halal traceability between countries. This is where traceability, identity preservation techniques, and the integrity of the halal certifying bodies can all contribute. As also noted by the Codex Alimentarius Commission (CAC/GL 24 – 1997), the term halal is subjected to different interpretations by the different schools of thought or jurisprudence – particularly Shāfiʿī, Hanbalī, Mālikī, Hanafī in the Sunni tradition. But they do not differ with respect to haram. The differences between the legal schools of thought revolve around technicalities that must be respected.

It should be noted that there is unanimous agreement regarding what constitutes a most perfect slaughter. This is the requirement for a healthy and alive lawful animal to be slaughtered by a Muslim reciting '*In the name of Allah, Allah is the Greatest*' cutting all four tubes or vessels – trachea, esophagus and both external jugular veins, although the question of reversible stunning remains controversial. Beyond the extent of permitted reversible stunning, differences exist about the details of which tubes in the neck need to be cut. Imām Shāfiʿī is of the view that it is obligatory to cut the trachea and the esophagus whilst the dominant view of Imām Mālik is to cut into the trachea and both external jugular veins. Imām Ahmad b. Hanbal has two views reported. One stipulates all four tubes being cut and the other is in agreement with Imām Shāfiʿī. Imām Abu Hanīfā is of the opinion

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195 that three of the four tubes, irrespective of whichever three, should be cut. To this end, there is also
196 agreement on the cutting point (where the throat meets the upper part of the chest) and the need to
197 cut a minimum of two tubes (Uthmāni Mufti, 2006).

198
199 Whilst there are differences regarding secondary details, there is agreement on the need to allow
200 blood to first flow out of the live animal (Regenstein and others 2003; Qu’ran 6:145; Uthmani 2006).
201 Because of these differences, Kamali (2008) suggested the setting up of an international Shariah
202 advisory forum to develop a leadership role in dealing with this issue and similar issues, and to advise
203 on and resolve areas to minimise differences. These types of international standards may assist in the
204 harmonisation and recognition of halal standards. Whilst it would be helpful to achieve some degree
205 of harmonisation and recognition of halal standards, the practicalities are much more complex and
206 can become politicised to where there is an effort to impose a secular view on the religious
207 communities. An example of such an attempt to tell the religious communities that believe in religious
208 slaughter what to do was an EU funded project. The Religious Slaughter: Improving Knowledge and
209 Expertise through Dialogue and Debate on Issues of Welfare, Legislation and Socio-economic Aspects
210 (DIALREL) (www.dialrel.eu) was carried out to provide a platform to share and address issues
211 relating to religious slaughter between stakeholders and interested parties in 2006-2010 (DIALREL
212 2010). But, this attempt was not seen as a dialogue rather it was received as a monologue and
213 imposition of secular thought with limited attention given to religious slaughter practices and
214 engagement with religious communities (Regenstein, 2010).

215
216 The key to improved halal integrity in international trade is transparency so that consumers can make
217 informed decisions (Alqudsi 2014; Farouk *et al.* 2016). The certifying agency located and supervising
218 in one country must clearly define the standards used for any particular product, especially with
219 respect to slaughter. It must also assure that the company/slaughter/products comply with the
220 standard it has announced. In many cases agencies will certify products using different standards for
221 different countries and thus the certifying agencies need to also be sure to maintain product integrity
222 and only send a product to a receiver under a different certifying agency that meets that agency’s
223 standard (Figure 2). Halal standards are used to make halal production more unambiguous (van der
224 Spiegel *et al.*, 2012). Ideally the role of governments as accreditation bodies is to assure that the
225 companies and the certifying agencies are saying what they do and doing what they say. Having
226 governments staying out of certification but focusing on accreditation means that the Muslim citizens
227 in any one country will have access to products that meet their different standards and the certifying
228 agencies can compete to best serve consumers. In practice this generally means that competing
229 certifying agencies tend to help police each other.

230
231 Insert Figure 2 here
232

There are different interpretations of halal by the different schools of thought and these are modified by the customs of different countries. Figure 2 raises the issue of where a local Islamic authority's halal certificate is not recognised by an agency in a different country. Even with the adoption of a standardised or benchmarked halal standard, countries or certification bodies may still choose to remain independent. A certification body such as JAKIM from Malaysia recognises 54 certification bodies from 32 foreign halal certification bodies countries and 4 authorities but delisted 4 certification bodies (Halal Malaysia Official Portal 2016). But are those rejections based on alternate interpretations of halal, non-compliance with halal requirements, or a political decision? In addition to cross recognition of halal certification bodies, at times local government bodies do not have the resources to carry out inspections globally and are required to outsource responsibilities to Muslim organisations around the world such as Islamic Food Council of Europe (IFCE) and Islamic Food and Nutrition Council of America (IFANCA) to carry out inspections. This triggers a transnational governmentality on a global scale (Fischer, 2016).

Thus governments are encouraged to take on the accreditation role to strengthen the whole system, while removing themselves from certification. There are attempts to harmonize halal standards which may benefit the food trade and operational efficiency across countries. Analyses of harmonisation or maintaining independent halal standards will result in different strengths, weaknesses, opportunities and threats. SWOT analyses were divided into two categories in Figure 2 to provide a guideline for countries that opt to select standardised halal standard or choose to have an independent halal standard certification. Countries that opt to use standardised halal standard may benefit from increased cost efficiency and increased food trade. However, there are also threats that there will be reduced variety and freedom of practise according to different schools of thought. Countries that choose to use independent halal standards may benefit from increased competition and the potential to save cost as no benchmarking is required. Meanwhile, although independent halal standards ensure the freedom to adopt halal practices according to their school of thought (and the country's tradition), a reduction in food trade and lack of food choices may prevail. ~~Analyses of harmonisation or maintaining independent halal standards will result in different strengths, weaknesses, opportunities and threats.~~ Hence, Figure 2 is presented as a strategic global halal supply chain model to provide pragmatic information for countries or certification bodies to better serve Muslims with different traditions. However, the SWOT analyses serve as a guideline as Ab Talib and Abdul Hamid, (2014) reported that SWOT analysis done may be outdated as the environments are constantly changing. In addition to relying on halal standards and certification, laboratory analyses can be used to monitor specific haram ingredients in raw materials and food products such as the presence of porcine and alcohol (van der Spiegel et al., 2012), identification of animal species in food (Aida et al., 2005, 2007) and origin of food product (Ebeler, 2007). According to Fauzi and Mas'ud (2009) scientific justification and results of laboratory analyses can provide additional information for local and regional Islamic authorities to evaluate the halal status of the products.

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273 One step to better cooperation but while maintaining minor differences related to the schools is the
274 halal standard developed by the Turkish Halal Certification Centre (GIMDES) that incorporates
275 different Schools of Islamic law. A tick (✓) image in the logo can be added beside the appropriate
276 schools of law (i.e. Shāf ī, Hanbalī , Mālikī , Hanafī) according to which rules the certified company
277 has complied (Figure 3). The certification can represent one or even all of the schools of law
278 (GIMDES, 2015). But given that Turkey is predominantly a Sunni country, to date this form of
279 certification does not address the Shi’a schools. It also implies that the application of standards by
280 schools is sufficient. In some cases, e.g., where fish are considered halal, it is apparent that there
281 are also different customs in different countries that reflect the different schools but lead to
282 differences within each school.
283
284 Insert Figure 3 here
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286 Malaysia recognises the significance of halal assurance of food and consumer products produced
287 globally. It currently accepts products and premises certified by a number of Islamic certification
288 bodies and authorities. Globally, JAKIM recognizes 54 foreign halal certification bodies (Halal Malaysia
289 Official Portal, 2016). Additionally, JAKIM recognizes 4 national authorities that will be able to provide
290 guidance for consumers when purchasing halal goods or patronizing certain premises overseas (Halal
291 Malaysia Official Portal, 2016). It should be noted that Malaysia is one of the few Muslim countries
292 that recognises percussive stunning as acceptable for reversible stunning (Halal Malaysia Official
293 Portal, 2016).
294
295 **Halal Integrity**
296 A farm to fork food supply chain is not only concerned about food but also the origin, transparency,
297 potential for fraud and adulteration, increasing consumers’ confidence, traceability (traceback and
298 track forward) and quality issues (Hoorfar et al. 2011). Manning and Soon (2014) suggested that the
299 term food integrity should be used to describe foods that are properly represented for exactly what
300 they are. So halal integrity would be again clearly presenting the details of the halal status of the
301 product and assuring that the requirements for halal as stated are met. Food safety is part of halal
302 integrity as wholesomeness (tayyab) is a parallel requirement for halal, i.e., food should be pure,
303 lawful and good for human consumption. Zulfakar *et al.* (2014) proposed a conceptual framework for
304 halal food supply chain integrity which encompasses protective and preventive measures to ensure
305 food products remain halal from production until they reach consumers. Halal integrity should also
306 demonstrate that the product remain halal throughout the supply chain, are free from any activities
307 that might breached the halal status (intentionally or unintentionally) (Zulfakar et al. 2012). Others
308 are proposing more specific halal control points (Kohilavani *et al.* 2012; Kohilavani *et al.* 2013),

control points for halal slaughtering of poultry (Shahdan *et al.*, 2016) and halal compliance critical control point (Kamaruddin *et al.* 2012) for various production systems. There are certainly challenges in ensuring halal integrity in the food supply chain as production, processing and transportation require different companies at various stages. Alqudsi (2014) had reported that it is a difficult task to maintain halal integrity of the whole supply chain as it requires constant monitoring and resources in terms of capital and trained staff. However, the demand for halal food products from consumers and the drive from the supply side theory of religion (i.e. expansion of halal markets because of production sides' initiative in creating more halal food) will spur the need to ensure halal food status is maintained. Halal certification bodies play an important role in certifying halal food products and services whilst governments should play an active role as accreditation bodies or to provide independent validation in order to police the halal food chain. If halal integrity is maintained ~~at the operational level~~ across the supply chain regardless of whether the chain is within one country or multiple countries, then one will have a global halal supply chain with integrity (Figure 2). Halal integrity is crucial to the success of the emerging halal market. A formal definition of halal integrity might be articulated as:

'the assurance of safe (pure), quality (good) and free from mal-practice (lawful) food from farm to fork'

Conclusion

The ideas of halal and haram are clear within Islamic teachings. It is important also to understand that halal is a way of life and embraces good conduct and righteous deeds. It is in this context that halal integrity should be understood. This paper utilises the farm to fork and global supply chain models to foster a critical awareness of halal needs. Taking into consideration the origins of food products, production and facilities ~~(i.e. operational level)~~, global sourcing of ingredients and raw materials, food trade and halal as a way of life leads to a definition of halal integrity. SWOT analyses serve as a guideline for countries that opt to select standardised halal standard or choose to have an independent halal standard certification. Countries that opt to use standardised halal standard may benefit from increased cost efficiency and increased food trade while countries that choose to use independent halal standards may benefit from increased competition and the potential to save cost as no benchmarking is required. It is recommended that the key to improved halal integrity in international trade is transparency and required concerted effort from food supply chains, policy makers, halal certification & accreditation bodies and research institutions. Halal integrity is crucial to the success of halal market – if the halal status of the food product is breached (e.g. did not follow halal slaughtering method, cross contamination with haram products, ill intentions), this will render the product haram. In response to the initial questions raised in this paper, i.e., what is halal integrity and what measures can be taken to assure this – a formal definition of halal integrity has

been proposed. ~~Halal integrity is need both operationally and strategically to ensure that the halal status of food products remains intact.~~

References

Ab Talib, M. S. and Abdul Hamid, A. B. (2014), "Halal logistics in Malaysia: a SWOT analysis", *Journal of Islamic Marketing*, Vol. 5, No. 3, pp. 322-343.

Adam, M. (2016), "The fiqh of halal and haram animals", available at <http://www.central-mosque.com/index.php/General-Fiqh/the-fiqh-of-halal-and-haram-animals.html> (accessed 12 March 2016).

Ahmad, H., Fazlullah, A., Borham, A.J., Hashim, H. and Razak, M.A. (2011), "Halal studies in universities: A way forward to manage halal business", *International Journal of Arts and Science Conference* (IJAS2011) 3 June, Austria.

Aida, A. A., Che Man, Y. B., Raha, A. R. and Son, R. (2007), "Detection of pig derivatives in food products for halal authentication by polymerase chain reaction-restriction fragment length polymorphism", *Journal of the Science of Food and Agriculture*, Vol. 87, No. 4, pp. 569-572.

Aida, A. A., Che Man, Y. B., Wong, C. M. V. L., Raha, A. R. and Son, R. (2005), "Analysis of raw meats and fats of pigs using polymerase chain reaction for Halal authentication", *Meat Science*, Vol. 69, No. 1, pp. 47-52.

Al-Bukhārī, M. (trans. Muḥammad Muḥsin Khān) (n.d.), *The Translation of Meanings of Al-Sahīḥ al-Bukhārī*, (vol. 1-9), Dār al-Fikr, Beirut, Lebanon.

Al-Mawsu'a al-fiqh al-Kuwaitiyyah (n.d.). vols. 1-45. Wizaratul al-awqaaf wa al-sh'awn al-Islamiyyah 1404/1984 – 1427/2006

Al-Qardawi, Y. (2013) (trans.). El-Helbawy *et al.* *The Lawful and The Prohibited in Islam*, Kuala Lumpur: Islamic Book Trust

Al-Qazwini, M. (n.d.) *Sunan Ibn Mājah*, Kitāb al-Aṭ'imah, Chapter 31, Hadith 3314, (vols. 1-2), p. 1102, Dār al-'Ilmiyyah, Beirut, Lebanon.

Alqudsi, S. G. (2014), "Awareness and demand for 100% halal supply chain meat products", *Procedia – Social and Behavioral Sciences*, Vol. 130, pp. 167-178.

Al-Zuhayli, W. (2002) (vol. 4) *Al-Fiqh al-Islam wa Adilatuhu*, Syria: Damascus: Dar al-Fikr, pp. 2790-2792]

Arab News (2016), "Halal food market grows to \$1.1 trillion industry", available at <http://www.arabnews.com/news/economy/614871> (accessed 12 March 2016).

Ballin, N. Z. (2010), "Authentication of meat and meat products", *Meat Science*, Vol. 86, No. 3, pp. 577-587.

Ballin, N. Z., Vogensen, F. K. and Karlsson, A. H. (2009), "Species determination – Can we detect and quantify meat adulteration?" *Meat Science*, Vol. 83, No. 2, pp. 165-174.

BBC News (2013), "Leicester schools halal lamb burger contained pork", 9 May, available at: <http://www.bbc.com/news/uk-england-leicestershire-22466068> (accessed 3 April 2015).

BBC News (2013), "Leicestershire schools' flu vaccine contains gelatine", 17 September, available at <http://www.bbc.com/news/uk-england-leicestershire-24113970> (accessed 3 April 2015).

- Bergeaud-Blackler, F. (2007), "New challenges for Islamic ritual slaughter: A European perspective", *Journal of Ethnic and Migration Studies*, Vol. 33 No. 6, pp. 965-980.
- 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*, Special Edition (2014), pp. 455-460.
- CAC, Codex Alimentarius Commission (1997), *CAC/GL 24-1997 General guidelines for use of the term "Halal"*, Codex Alimentarius Commission.
- 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*, Vol. 32, No. 2, pp. 440-449.
- Chandia, M. (2015), *Translation of the Holy Qur'an*, Azhar Academy, London.
- Demirci, M. N., Soon, J. M. and Wallace, C. A. (2016), "Positioning food safety in halal assurance", *Food Control*, Vol. 70, pp. 257-270.
- Demirhan, Y., Ulca, P. and Senyuva, H. Z. (2012), "Detection of porcine DNA in gelatine and gelatine-containing processed food products – Halal/Kosher authentication", *Meat Science*, Vol. 90, No. 3, pp. 686-689.
- DIALREL (2010), "Encouraging dialogue on issues of religious slaughter", available at: <http://www.dialrel.eu/> (accessed 24 January 2016).
- Doosti, A., Ghasemi Dehkordi, P. and Rahimi, E. (2011), "Molecular assay to fraud identification of meat products", *Journal of Food Science and Technology*, Vol. 51 No. 1, pp. 148-152.
- Di Pinto, A., Bottaro, M., Bonerba, E., Bozzo, G., Ceci, E., Marchetti, P., Mottola, A. and Tantillo, G. (2015), "Occurrence of mislabelling in meat products using DNA-based assay", *Journal of Food Science and Technology*, Vol. 52, No. 4, pp. 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*, Vol. 16, No. 5, pp. 391-394.
- Ebeler, S. E. (2007), "Enantiometric analysis as a tool for authentication of foods and beverages", In, Ebeler, S. E., G. R. Takeoka and P. Winterhalter (Eds.). *Authentication of food and wine*, Vol. 952, pp. 39-49.
- Eliasi, J. R. and Dwyer, J. T. (2002), "Kosher and halal: Religious observances affecting dietary intakes", *Journal of the American Dietetic Association*, Vol. 102 No. 7, pp. 911-913.
- EU (1993), "Council directive 93/119/EC of 22 December 1993 on the protection of animals at the time of slaughter or killing", Available at: http://ec.europa.eu/food/fs/aw/aw_legislation/slaughter/93-119-ec_en.pdf [Accessed 7 June 2016]
- Farouk, M. M., Pufpaff, K. M. and Amir, M. (2016), "Industrial halal meat production and animal welfare: A review", *Meat Science*, doi: [doi:10.1016/j.meatsci.2016.04.023](https://doi.org/10.1016/j.meatsci.2016.04.023)
- Fauzi, A. M. and Mas'ud, Z. A. (2009), "Instrumentation techniques for potential application in halal products authentication. 3rd IMT-GT International Symposium on Halal Science and Management, 21-22 December 2009, Kuala Lumpur, Malaysia.

1
2
3 459 Fischer, J. (2016), "Markets, religion, regulation: Kosher, halal and Hindu vegetarianism in global
4 460 perspective," *Geoforum*, Vol. 69: 67-70.
5 461
6 462 Flores-Munguia, M. E., Bermudez-Almada, M. C. and Vazquez-Moreno, L. (2000), "A research note:
7 463 Detection of adulteration in processed traditional meat products", *Journal of Muscle Foods*, Vol. 11,
8 464 No. 4, pp. 319-325.
9 465
10 466 GIMDES (2015), "GIMDES certification standards", available at:
11 467 <http://www.halalcertificationturkey.com/en/certification-information/certification-standarts/> (accessed
12 468 15 January 2016).
13 469
14 470 Halal Malaysia Official Portal (2016), "The recognised foreign halal certification bodies and
15 471 authorities", available at: [http://www.halal.gov.my/v4/index.php/en/badan-islam/badan-luar-negara-](http://www.halal.gov.my/v4/index.php/en/badan-islam/badan-luar-negara-diiktiraf)
16 472 [diiktiraf](http://www.halal.gov.my/v4/index.php/en/badan-islam/badan-luar-negara-diiktiraf) (accessed 13 January 2016).
17 473
18 474 Halal Tourism (2015), "150 million visitors worth \$200 billion: The story has just begun", available at:
19 475 [http://www.guesthousesofmaldives.com/halal-tourism-150-million-visitors-worth-200-billion-the-story-](http://www.guesthousesofmaldives.com/halal-tourism-150-million-visitors-worth-200-billion-the-story-has-just-begun/)
20 476 [has-just-begun/](http://www.guesthousesofmaldives.com/halal-tourism-150-million-visitors-worth-200-billion-the-story-has-just-begun/) (accessed 29 February 2016).
21 477
22 478 [Hoorfar, J., Jordan, K., Butler, F. and Prugger, R. \(2011\), "Food chain integrity: A holistic approach to](#)
23 479 [food traceability, safety, quality and authenticity", Cambridge: Woodhead Publishing, pp. 1-338.](#)
24 480
25 481 Ibn Al-Hajjāj, M. (1987). *Saḥīḥ Muslim bi Sharh al-Nawawī, Kitāb al-Musāqah*, part 11, vol. 4 (first
26 482 ed.), p. 27, Dar al-Rayyān, Cairo, Egypt.
27 483
28 484 Kamali, M. H. (2008), "Fiqh-based approach to harmonisation of halal standards", *The Halal Journal*
29 485 (May & June), available at: [http://issuu.com/the-halal-](http://issuu.com/the-halal-journal/docs/mayjune2008__20100721_093430/25)
30 486 [journal/docs/mayjune2008__20100721_093430/25](http://issuu.com/the-halal-journal/docs/mayjune2008__20100721_093430/25) (accessed 15 January 2016).
31 487
32 488 Kamaruddin, R., Iberahim, H. and Shabudin, A. (2012), "Halal compliance critical control point
33 489 (HCCCP) analysis of processed food", *IEEE Business, Engineering & Industrial Applications Colloquium*
34 490 (BEIAC), pp. 383-387.
35 491
36 492 Kohilavani, Yang, T. A., Febrianto, N. A., Abdullah, W. and Tajul Aris, A. (2012), "A decision tree
37 493 based approach for the identification of Halal Critical Control Points for slaughtering according to
38 494 Islamic dietary law", *Internet Journal of Food Safety*, Vol. 14, 48-53.
39 495
40 496 Kohilavani, Zzaman, W., Febrianto, N., Zakariya, N., Abdullah, W. and Yang, T. (2013), "Embedding
41 497 Islamic dietary requirements into HACCP approach", *Food Control*, Vol. 34 No. 2, 607-612.
42 498
43 499 Lever, J. and Miele, M. (2012), "The growth of halal meat markets in Europe: An exploration of the
44 500 supply side theory of religion", *Journal of Rural Studies*, Vol. 28, pp. 528-537.
45 501
46 502 Lipes, J. (2013), "Foods mislabeled as halal imports", 18 January, *Radio Free Asia*, available at:
47 503 <http://www.rfa.org/english/news/uyghur/halal-01182013161229.html> (accessed 3 April 2015).
48 504
49 505 Manning, L and Soon, J.M. (2014), "Developing systems to control food adulteration", *Food Policy*,
50 506 Vol. 49 No. 1, pp. 23-32.
51 507
52 508 Muñoz-Colmenero, M., Martinez, J., Roca, A. and Garcia-Vazquez, E. (2016), "Detection of different
53 509 DNA animal species in commercial candy products", *Journal of Food Science*, Vol. 81, No. 3, pp.
54 510 T801-T809.
55 511
56 512 Muslim Food Board (2016), "Importance of halal diet", available at:
57 513 <http://www.tmfboard.net/component/tags/tag/30-doubtful> (accessed 26 March 2016).
58 514
59
60

- Pew Research Center (2011), "The future of the global Muslim population: Projections for 2010-2030", available at <http://www.pewforum.org/files/2011/01/FutureGlobalMuslimPopulation-WebPDF-Feb10.pdf> (accessed 12 March 2016).
- Press Association (2015), "Abattoir clips highly regrettable", 3 February, *Daily Mail*, available at: <http://www.dailymail.co.uk/wires/pa/article-2937224/Halal-slaughterhouse-video-probed.html> (accessed 13 April 2015).
- RASFF, Rapid Alert System for Food and Feed (2013), "RASFF portal", available at: <https://webgate.ec.europa.eu/rasff-window/portal/?event=SearchForm&cleanSearch=1> (accessed 16 January 2016).
- Riaz, M. N., and Chaudry, M. M. (2004). *Halal food production*. CRC Press, LLC., Boca Raton, FL, USA.
- Regenstein, J. M. (2010), "DIALREL recommendations: comments of Prof. Regenstein", available at: <http://www.asidcom.org/DIALREL-recommendations-comments.html> (accessed 15 March 2016).
- Ruzevicius, J. (2012), "Products quality religious-ethical requirements and certification. Economics and Management, Vol. 17, No. 2, pp. 761-767.
- SGS (2011), "Comparing Global Food Safety Initiative (GFSI) recognised standards", available at: <http://www.sgs.com/~media/Global/Documents/White%20Papers/sgs-global-food-safety-initiative-whitepaper-en-11.ashx> (accessed 15 January 2016).
- Shahdan, I. A., Regenstein, J. M., Shahabuddin, A. S. M. and Rahman, M. T. (2016). "Developing control points for halal slaughtering of poultry", *Poultry Science* doi: 10.3382/ps/pew092
- 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*, Vol. 94, No. 1, pp. 115-120.
- Soon, J. M. and Baines, R. (2013). *Managing food safety risks in the agri-food industries*. Boca Raton: CRC Press.
- Soon, J. M., Manning, L., Davies, W. P. and Baines, R. (2012). "Fresh produce-associated outbreaks: a call for HACCP on farms?" *British Food Journal*, Vol. 114, No. 4, pp. 553-597.
- Trenwith, C. (2013), "Fast food giant to pay \$700k for halal mislabelling", *Arabian business*, available at: <http://m.arabianbusiness.com/fast-food-giant-pay-700k-for-halal-mislabelling-498543.html> (accessed 3 April 2015).
- Uthmani Mufti, T.M. (2005), "Legal rulings on slaughtered animals", trans. Nana, A., p. 13, available at <http://freepdfhosting.com/d3a6d6755e.pdf> (accessed 27 February 2016).
- Van der Spiegel, M., van der Fels-Klerx, H. J., Sterrenburg, P., van Ruth, S. M., Scholtens-Toma, I. M. J. and Kok, E. J. (2012), "Halal assurance in food supply chains: Verification of halal certificates using audits and laboratory analysis", *Trends in Food Science & Technology*, Vol. 27, No. 2, pp. 109-119.
- Whitworth, J. (2013), "FSA calls urgent meeting after pork DNA found in halal meat", 4 February, *Food Production Daily*, available at <http://www.foodproductiondaily.com/Safety-Regulation/FSA-calls-urgent-meeting-after-pork-DNA-found-in-halal-meat> (accessed 25 March 2015).
- Zulfakar, M. H., Jie, F. and Chan, C. (2012), "Halal food supply chain integrity: From a literature review to a conceptual framework", 10th ANZAM Operations, Supply Chain and Services Management Symposium, Melbourne, Australia, 14-15th June 2012.

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3
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5
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7
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41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

571 Zulfakar, M.H., Mohamed Anuar, M. and Ab. Talib, M.S. (2014), "Conceptual framework on halal food
572 supply chain integrity enhancement", *Procedia – Social and Behavioural Sciences* Vol. 121, pp. 58-67.

British Food Journal

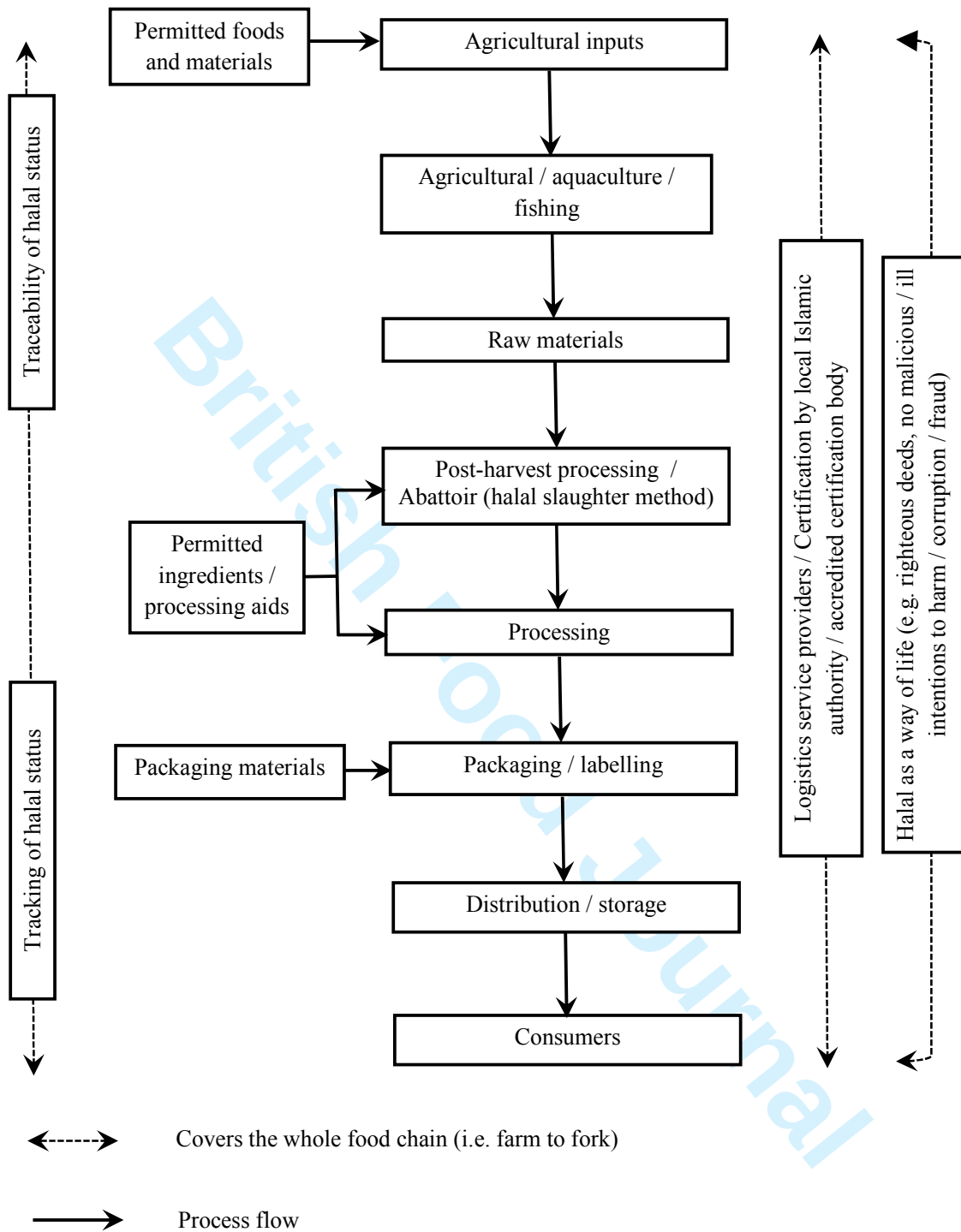


Figure 1. Halal integrity from farm to fork

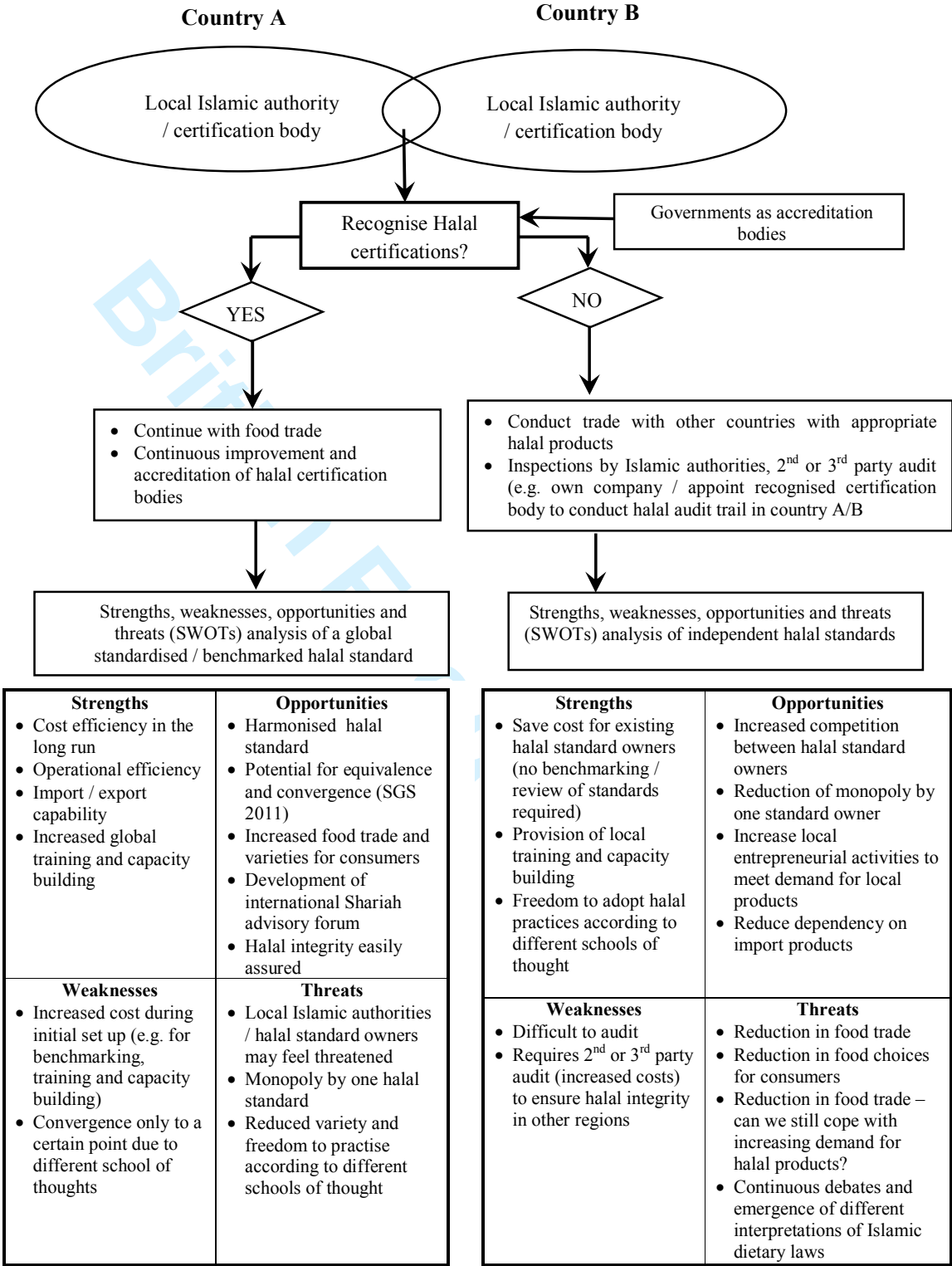


Figure 2. Assuring global halal integrity via recognised halal certification bodies



Figure 3. Example of a Halal certification that incorporates different Schools of Sunni Islamic Law (GIMDES, 2015)

Table 1. Examples of food cross-contamination with porcine products and mislabeling cases

Year	Location	Item	Contaminant	References
2000	Mexico	Sausages and burger paties	Undeclared porcine species meat products	Flores-Munguía <i>et al.</i> , 2000
2005	Italy	Horsemeat sausages	Pork meat was added fraudulently in Italian horse fresh sausages	Di Pinto <i>et al.</i> , 2005
2011	Iran	Halal meats	Unlawful (adulterated) meats containing poultry, pig, donkey and horse meat	(Doosti <i>et al.</i> , 2011).
2013	South Africa	Minced meat, burger patties, deli meats, sausages and biltongs	Detection of porcine DNA in various meat products	Cawthorn <i>et al.</i> , 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, 9 May 2013)
2013	UK	Vaccine	Pork gelatin	(BBC News, 17 September 2013)
2013	US	Chicken sandwich	Mislabelled as halal	(Trenwith, 2013)
2013	China	Homemade food products	Mislabelled as halal	(Lipes, 18 January 2013)
2013	Hungary	Pork tenderloins	Pork tenderloins labelled as beef tenderloins	(RASFF, 2013)
2013	Portugal	Poultry meat	Possible cross contamination of poultry meat products with pork meat	Soares <i>et al.</i> , 2013
2014	EU	Packaged chicken	Mislabelled	(Bottaro <i>et al.</i> , 2014)

		sausages		
2014	Turkey	Gelatine products (marshmallow and gum drops)	Products contain porcine gelatine and labelling failed to indicate the use of pork gelatine	(Demirhan <i>et al.</i>, 2012)
2015	UK	Halal slaughter house	Not following halal practices in the slaughtering process	(Press Association, 3 February 2015)
2015	Italy	Chicken sausages	Detection of pork DNA in chicken sausages	Di Pinto <i>et al.</i>, 2015
2016	Spain	Marshmallows, gummies, hard candies and complex candies	Detection of porcine DNA in commercial candy products	Muñoz-Colmenero <i>et al.</i>, 2016