



# Eleven shades of food integrity: A halal supply chain perspective

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## ABSTRACT

**Background:** Food integrity is not only related to the good quality of the food product, nonetheless, it distresses closely more on the health, safety, religious and cultural matters. Weaknesses in handling, monitoring, processing and other factors along the food's supply chain outbreaks the recent food integrity scandal. These outbreak food integrity scandals could be prevented if clear aspects that affect the food integrity were embraced along the food supply chain. This article is aiming to highlight the factors affecting food integrity in the context of the halal food supply chain and their potential for future research.

**Scope and approach:** This review attempts to provide a wider view of supply chain management in the halal food industry. Attention is drawn to the literature on other food industries and the results there are put in the context of the halal food setting. In this review, it emphasizes the factors could be monitor or control that contributes to the problem of food integrity.

**Key findings and conclusions:** Eleven 'shades' of food integrity in the halal supply chain are offered, which can be categorized into four supply chain dimensions, related to raw materials, production, service, and the consumer. Each shade is defined and aligned with the results in the literature, and areas for future research are suggested. Theoretical and managerial implications are provided. The 'shades' highlighted can be used and considered by managers as fundamental insights to ponder in safeguarding the integrity of halal products.

## 1. Introduction

Recent food integrity scandals in Europe have shaken public confidence in the food they consume. In the past, public concern typically focused on better-quality products and safer food (Lupien, 2007). But the horse meat scandal in the UK, together with a plethora of product recalls in recent years (see Table 1), has heightened consumer concerns concerning food integrity (i.e., whether the food product is exactly what is stated on the label), especially as it relates to health, safety and religious and cultural requirements. Governments and consumers will always want "contaminated" products to be removed from the marketplace as quickly as possible.

Ensuring food integrity is difficult with today's global food supply chains, due to their length and complexity (Ali, Tan, & Ismail, 2017; Manning, 2016, 2017). Currently, managers mitigate food quality risks and supply chain vulnerability through various food quality standards (e.g., ISO 9000, GMP and HACCP) and regulations (e.g., EU directives and US FDA regulations) (Herck & Swinnen, 2015; Mol, 2014). Certification is a widely used mechanism to control the integrity and marketing of halal foods across supply chains (Farouk, 2013; Lam & Alhashmi, 2008; Shambavi, Sitalakshmi, Ramanan, & Subhadra, 2011;

Van der Spiegel et al., 2012). Indeed, certification forces firms to comply with multiple standards and is necessary both to maintain a competitive advantage in the market and to reassure stakeholders in the firm. However, ensuring compliance with multiple standards is neither easy nor cheap for the firm (Caswell, Bredahl, & Hooker, 1998; Farouk, 2013, pp. 547–557). Despite the advantages of standards and certification, their disadvantages are not overlooked in the literature. In particular, their efficiency and sustainability are doubted in the current setting of intricate supply chains, especially from the firm's perspective (Roth, Tsay, Pullman, & Gray, 2008). In general, the weaknesses of standards and audits in various industries have been highlighted in the literature (e.g. Power, 2003; Sroufe & Curkovic, 2008). Numerous studies have contributed to the debate over the efficiency of standards in dealing with issues of food integrity and supply chains, and their findings are not conclusive (see Gotzamani, 2005; Magkos, Arvaniti, & Zampelas, 2006; Swinnen & Vandemoortele, 2009; Trienekens & Zuurbier, 2008).

In order to provide a clearer context of food integrity that has a corresponding supply and demand in practice, this paper reviews food integrity from the halal perspective. The information gathered from the literature can be used to understand the challenges of halal food

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**Table 1**  
Selected cases of food integrity events in recent years.

Product	Country	Year	Description
Candy products	Spain	2016	Detection of different animal species in candy products (Muñoz-Colmenero, Martínez, Roca, García-Vazquez, 2016)
Chicken sausages	Italy	2015	Detection of pork DNA in chicken sausages (Pinto et al., 2015)
Cadbury	Malaysia	2014	Contamination of pork in halal certified chocolate (Tan et al., 2017)
Beef patty burger	UK	2013	Horse meat is detected in beef burgers (Premanandh, 2013)
'Halal' pork	China	2013	Pork was artificially treated to look like beef (Hamid, 2013)
Sausages, pizza, ready meals containing pork	EU	2009	Irish pork products were contaminated by dioxin in the animal feed used on pig farms (Tse & Tan, 2011)
Melamine in Chinese milk products, including milk powder	China	2008	Contamination of milk and infant formula, as well as other milk-based products due to adulteration with melamine. (Maruchek et al., 2011; Roth et al., 2008)

integrity in specific as well as valuable to the other types of food. Moreover, this review also identifies the indirect challenges that we termed as 'shades' that the industry faces in order to ensure the safeguarding of food integrity particularly from the halal perspective. Section 2 reviews the literature on the challenges and shortfalls that arise in food control mechanism, hence affected the food integrity. Section 3 presents the eleven shades as a multidimensional concept of food integrity. Section 4 concludes with a summary of the findings, implications, limitations, and potential topics for future research.

## 2. Challenges to food integrity posed by modern supply chain

The traditional food supply chain was predominantly regional and mostly comprised small to medium-sized independent local businesses (Roth et al., 2008). This ensured visibility and control along the supply chain (Tse & Tan, 2011). Hearnshaw and Wilson (2013) argue that shorter supply chains are more effective than longer ones. In addition, a smaller market permits greater attention to be given to each specific product, and the greater accuracy of sales forecasts associated with such markets is a further factor aiding quality control. Furthermore, direct interaction between sellers and buyers facilitates the control of food products and promotes their integrity. In essence, the greater degree of control in such a marketplace minimizes the risk of the members of supply chain being opportunistic or violating the trust needed for good business relationships and shared values. Similarly, Lyles, Flynn, and Frohlich (2008) argue that where there is trust, there is an expectation that partners in the supply chain will be capable of performing the tasks expected.

However, the food industry has changed markedly in recent times. Increasing population has made the market demand for food more complex and heterogeneous and it is suggested by Trienekens, Wognum, Beulens, and van der Vorst (2012) that every stage of the supply chain needs to be market-oriented. Further, researchers find that globalized supply chains are more difficult to manage than domestic supply chains (MacCarthy & Atthirawong, 2003; Meixell & Gargeya, 2005). Additionally, consumers nowadays are concerned not only about better-quality, safer food but more on the integrity of the food (Ali et al., 2017; Elliott, 2012; Manning, 2017; Soon, Chandia, Regenstein, & Mac, 2017). Thus, food scandals and the academic literature both indicate the inadequacy of the standards and regulations that as a mechanism that currently being used to ensure the safety and integrity of food products.

The general aims of the standards and regulations are: (i) to improve supplier standards and consistency, and to avoid product failure; (ii) to eliminate unnecessary multiple supplier audits (e.g. those conducted during a firm's supplier selection process); (iii) to support consumers' and retailers' objectives by transferring their demands to parties upstream in the food supply chain; and (iv) to provide concise information about production processes, especially in the investigation of food incidents (Ali et al., 2017). However, standards alone cannot guarantee functionality within a particular firm or supply chain (Gotzamani, 2005; Sroufe & Curkovic, 2008), especially when the standard focuses

on production methods rather than on the products themselves (Polo-Redondo & Cambra-Fierro, 2008). Additionally, the applicability of standards to the complete food supply chain is arguable, as a specific standard is ideal only for a certain part of the supply chain (Trienekens & Zuurbier, 2008).

There are many reasons depending solely on the current food controlling mechanism is non-sustainable, due to, among other things: 1) 'institutionalization', whereby the industry has been bounded by specific laws and legislation to a much greater degree than hitherto, including the widespread introduction of certification; 2) greater competition, which leads to businesses being more profit oriented and seeking cost minimization that changes the relationship between firms in the supply chain; 3) more efficient logistics, which has increased the reach of supply and demand; and 4) changes in ingredients to overcome the perishability of food products. Current food supply chains are complex and controlling food integrity becomes an enormous challenge.

First, institutionalization has unintentionally made the supply chain less visible. In short, the normality of food standards has become norms and affecting the supply chain (Wong & Boon-Itt, 2008). Most food laws and regulations have focused on firms as their main targets rather than the whole supply chain, where they can be seen to be more readily effective and applicable. In turn, however, firms have tended to concentrate most of their quality assurance efforts within their own factories, at the expense of attending to related issues which may nonetheless affect their supply chain. The self-focused production has diminished the direct connection between suppliers and buyers, and limit the interactions between firm representatives. Seen in this light, the literature argues that a lack of visibility in the supply chain increases the risk of product recalls. Lack of visibility led to the horsemeat scandal of 2013, the investigation of which was unable to find the responsible actors. This reflects the claim made by Lyles et al. (2008) that a reliance on trust (in this case, certification) is inappropriate when testing of quality is difficult. Policy-makers and consumers have reacted by demanding yet more regulations (Maruchek, Greis, Mena, & Cai, 2011). As a result, more private food standards have been developed since the 1990s, alongside globally accepted standards in the food industry, such as Good Agricultural Practices (GAPs); Hazard Analysis of Critical Control Points (HACCPs); and International Organisation for Standardisation (ISO) (Trienekens & Zuurbier, 2008). Despite with myriad of laws, regulations, standards, technologies and tools are available for in the food industry, scandals continue to arise especially when involving with non-tangible issues like food integrity.

Second, the considerable increase in competition in the food industry in recent times has meant that firms need to achieve a greater competitive advantage, that is, to offer the same product quality at a lower price. In response, increasing number of firms in the supply chain take a pro-active role in quality improvement (Aung & Chang, 2014; Beulens, Broens, Folstar, & Hofstede, 2005; Taylor, 2006). However, when the buyers in the supply chain are more inclined to be more cost-aware when the quality of the products offered by suppliers are similar (Zhu, Zhang, & Tsung, 2007). Moreover, competitive advantages gained

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