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The potential risks related to halal and toyyiba in the poultry supply chain integration system: A review

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Abstract

Halal chicken supply is typically acquired by following the slaughtering process according to Islamic *Shari'ah* law and according to the procedures and requirements established by halal certification agencies. However, implementing halal concepts, particularly in the chicken processing industry, only focuses on downstream halal and toyyib (HT) concepts, specifically during the slaughter and processing phases of chicken-based products. Attention is not given to the live chicken care phase in poultry farms, especially in determining the potential risks of halal and toyyiba that may arise in every commercial chicken farming activity. This paper used a narrative review approach to analyse articles, journals, guidelines, and relevant standards to explore the potential risk of the HT concept that may occur throughout chicken farming operations. Six potential risks of halal non-compliance were identified, including farm location selection, design of housing system, chicken feed meal source, medication source, farm biosecurity systems and environments capable of negatively impacting the quality of chicken meat products, potentially affecting the halal status of the produced chicken meat. Furthermore, this paper can significantly impact integrated poultry industry players and regulatory authorities. JAKIM is a primary guide and adds value in maintaining halal integrity to benefit Muslim and non-Muslim consumers by ensuring the sourcing of halal chicken meat.

1. Introduction

The foremost aspect of nutrition and the local food industry in Malaysia revolves around poultry-based food products, offering a vital source of high-quality animal protein for daily consumption among Malaysians, encompassing processed chicken products and fresh chicken meat (Jamilah, 2015). As guided by *Shari'ah* law, ensuring adherence to halal slaughtering procedures is imperative in regulating and monitoring the production of chicken products, including slaughtered chickens and processed derivatives, as outlined by the *Qur'an*, *hadith*, and *fatwas*. They adhere to *Shari'ah* law, and slaughtering chickens is essential to upholding the standards of toyyib (pure and wholesome) and halal (permissible). This ensures the production of high-quality, premium halal products (Jamaludin & Ramli, 2023). To uphold the integrity of halal practices in chicken meat production, stakeholders such as the Department of Islamic Development Malaysia (JAKIM) have spearheaded initiatives to establish standards like the Malaysian Halal Management System (MHMS), ensuring compliance with halal requirements (Abdullah & Rahman, 2018).

In this regard, the production of chicken meat products, whether slaughtered chicken products or by-products of chicken meat, must be regulated and strictly monitored through the verification of halal certificates from JAKIM; the aspects of halal assurance and the implementation of the halal

concept are not given more focused attention in the broiler supply chain, especially at the live chicken rearing stage as well as the care process in the livestock farm. Accordingly, this review paper discusses the implementation and implications if halal and toyyiba (HT) is implemented at the broiler-rearing stage in a commercially integrated farming system.

2. Background

The demand for food sources containing chicken meat, whether in raw meat or chicken meat-based products, is increasing in Malaysia. Additionally, the population of Malaysia is growing at a rate of 0.2% every year. As of 2021, the total population is 32.67 million (Department of Statistics Malaysia, 2022). The self-sufficiency rate through poultry production has remained above 100%, which is in line with the high demand for chicken meat supply. As a result, the commercial broiler farming sector operated by integrated company organizations has also increased to meet the country's demand for raw chicken meat (Jeffrey, 2020; Suzalina & Fahmy, 2022). The integrated farming chain includes a business run by a company organization called an "integrator" that owns the entire chain in the broiler production system, starting from the breeding process of egg hatching to the processing and marketing of chicken meat to consumers (Mohd Syauqi, 2015; Nurshuhada *et al.*, 2021). The integrator company also has an animal feed processing plant, one of the main requirements for productive and efficient poultry-rearing activity (Chye, 2020; Mohd Syauqi *et al.*, 2015).

Issues related to meat consumption have raised concerns among the Muslim community regarding the halal integrity of chicken meat products, particularly about the slaughtering process. A recent report in KOSMO! Revealed that chickens sold in Manir, Kuala Terengganu, were not slaughtered according to legal requirements. This is an alarming issue, and the Department of Religious Affairs of Terengganu inspected the matter to confirm whether the chicken sold was not slaughtered correctly (Adlan, 2021). Similarly, in Bangladesh, farmers inject tens of millions of cattle with a steroid substance called 'Dexamethasone' to fatten them up quickly and reduce operating costs. This practice has a negative impact on the animal's health and poses serious health risks to consumers, which is unacceptable. In Malaysia, pig enzymes in the form of protein hydrolysis are used as a catalyst for the growth of farmed chickens, raising concerns among the public and the Malaysian Consumer Association (FOMCA). They have urged authorities to investigate the matter, and it is essential to address this issue in the broader context of broiler production, particularly in terms of animal feed provided during the animal husbandry stage on the farm (Berita Harian, 2014). These issues highlight the need for stricter regulations and more comprehensive monitoring to ensure that the meat products available in the market are both halal and safe for human consumption. It is crucial to take immediate action to address these concerns and ensure the well-being of both animals and consumers.

The implementation of the concept of HT is crucial, especially when it comes to rearing broilers on farms. This ensures that halal integrity is maintained in terms of halal slaughtering procedures as prescribed by Islamic *Shari'ah* law and other aspects such as the sources of animal feed meal, and the veterinary drugs administered to the animals. Compliance with the concept of HT is examined to ensure that all external factors that may impact halal compliance are addressed, including giving kindness or welfare to animals during rearing on the farm (Ramli *et al.*, 2020). This is because factors such as a conducive environment, logistics transport, and health management have the potential to impact the integrity of the halal status at the initial stage of the supply of chicken meat products (Mokhtar & Munir, 2017). This paper aims to investigate the halal management requirements necessary during the broiler production stage in the commercial broiler integration sector. Additionally, the researcher will discuss and propose the potential risks of non-compliance with halal or shariah law in farming activities. This approach can be used to develop a more holistic halal management system that aligns with the 'From Farm to Fork' concept.

This paper explores the halal management requirements necessary during the broiler production stage in the commercial broiler integration sector. Additionally, this study will identify and discuss the potential risks of non-compliance with halal or *Shari'ah* law in farming activities. This approach helped identify HT's needs and potential risks, enabling the researchers to determine the best course of action. Overall, implementing the halal assurance system at the farm level can positively impact the industry players in the broiler farming sector, and the potential risk of HT can be used as a new approach to implementing the halal management system at the level of broiler farming.

3. Literature review

3.1 Halal and toyyib

The term "halal" is derived from Arabic; its essential words are 'halla, Cahill, and Hillan' (Man & Yahya, 2014). The term refers to something legal and permissible under Islamic teachings. Conversely, the opposite of halal is "haram", which means forbidden or prohibited in Islam. Haram is something that is strictly prohibited by religion, and those who engage in it will face punishment from *Allah* The Almighty (Kamisah, 2016). It is important to note that halal is closely related to the demands of *Shari'ah* as it is a significant aspect of Islamic teachings and practice. From an Islamic perspective, the concept of 'halal' is a crucial aspect of the lives of Muslims. 'Halal' refers to what is allowed or permissible according to *Shari'ah*, and it encompasses not only dietary aspects but also other aspects of life in various fields, including religion, health, and economics (Idris *et al.*, 2022). This aligns with *Allah* The Almighty's command regarding the importance of consuming what is halal as a religious duty and emphasizes that the intake of halal and wholesome food is for the health and well-being of human life, as mentioned in His words:

يَا أَيُّهَا النَّاسُ كُلُوا مِمَّا فِي الْأَرْضِ حَلَالًا طَيِّبًا وَلَا تَتَّبِعُوا خُطُوَاتِ الشَّيْطَانِ إِنَّهُ لَكُمْ
عَدُوٌّ مُبِينٌ

"O humanity! Eat from what is lawful and good on the earth and do not follow Satan's footsteps. He is truly your sworn enemy."
(Surah al-Baqarah verse 2:168)

"Toyyib" is a term that describes something good, beautiful, or the opposite of evil. It can also mean something delicious and healthy, bringing peace to the human soul (Idris *et al.*, 2022; Ismail & Ahmad, 2021). When talking about food, it refers to the harmful effects of unsafe food on consumers. Modern toyyib is centred around food safety, cleanliness, and nutritional value that can benefit a healthy mind and body (Alzeer *et al.*, 2018). In this study, toyyib is closely related to handling methods, using clean equipment, and managing halal livestock that conform to Islamic law. This concept needs to be followed to ensure that farmed chicken is free from illegal or dubious elements and is considered halal, clean, and pure for consumption.

In the context of applying the concept of HT in selecting food and beverage sources entails multiple benefits and wisdom, particularly in prioritizing halal and wholesome options. This practice not only contributes to the Muslim community's physical, emotional, and spiritual well-being but also serves as an act of worship to *Allah* The Almighty. Furthermore, opting for quality and safe food promotes a healthy and productive society, devoid of the potential risks associated with consuming non-halal and unsafe food. In the context of Islam, the importance of consuming halal food and beverages has a profound impact on human life, both in terms of physical and spiritual aspects. As the foundation of purity of the soul and the body, the *Qur'an* emphasizes the necessity of choosing excellent and pure sustenance, as *Allah* says:

يَا أَيُّهَا الَّذِينَ آمَنُوا كُلُوا مِن طَيِّبَاتِ مَا رَزَقْنَاكُمْ وَاشْكُرُوا لِلَّهِ إِن كُنتُمْ إِيَّاهُ
تَعْبُدُونَ

"O believers! Eat from the good things We have provided for you. And give thanks to Allah if you truly worship Him alone".
(*Surah al-Baqarah* verse 2:172)

The *Qur'anic* verses emphasize the Islamic principle of cleanliness, encompassing both physical and spiritual purity. Consuming halal food ensures adherence to this principle, safeguarding physical and spiritual well-being according to *Allah* The Almighty's demands (Abdullah & Rahman, 2018). Prohibited foods in Islam, like pork, present health hazards (Khan, 2023), reinforcing the prohibition from the *Qur'an* and *hadith* sources to uphold individual life quality. Halal food selection fosters ethical development among Muslims, instilling values like discipline, responsibility, and integrity (Khoirul Anwar, 2018). Thus, halal principles promote health and purity and nurture moral and spiritual growth.

3.2 Halal food management in Malaysia

The halal food industry in Malaysia has been expanding since the 1970s, parallel to the growth of the manufacturing industry and the advancements in food technology. JAKIM, which is the government body responsible for halal certification, began a halal certification system as early in the year 1974, and now the system is increasingly expanding to meet the needs of the Muslim industry and consumers, particularly in the halal verification of food products and Islamic use. (JAKIM Portal, 2024). To ensure the quality of halal food, JAKIM references the MS1500:2019 standard, which was first developed in 2004 and revised in 2019 to align with evolving certification requirements (Department of Standards Malaysia, 2019). The Malaysian Standards Department developed the Halal Standard as the primary guideline for halal food preparation and handling. Halal certification applications now require adherence to the halal assurance system, which incorporates standards such as MS1480 (Hazard *et al.* Points) and MS1514 (Good *et al.* for Food) to strengthen product requirements (Sani & Dahlan, 2015). The introduction of the 'Malaysian Halal Management System- MHMS manual in 2019, based on JAKIM guidelines, further enhances halal product integrity and quality (JAKIM, 2020; Hassan *et al.*, 2015).

The Halal Assurance System (HAS) has the goal of obtaining the Malaysia Halal Certification Certificate and increasing the trust of Muslim consumers, strengthening the halal integrity, and preventing potential contamination in the production process of halal products (Khoirul Anwar, 2018). Although HAS primarily focuses on the halal food industry and Islamic products, it can have a significant impact if extended to the halal animal husbandry sector. Therefore, this study primarily focuses on identifying and explaining the importance and implications of implementing HT on the initial supply chain of chicken meat, before the live chicken undergoes the halal slaughtering process. The implementation of the Halal Assurance System (HAS) can be categorized into two scopes: Internal Halal Control System (IHCS) for small industries and HAS for large and medium-scale industries. IHCS involves essential elements of the halal management system to obtain halal certificates, while HAS requires compliance with 10 more comprehensive elements. However, there are differences in the elements of HAS requirements published in earlier versions, particularly in the aspect of documentation requirements. The HAS procedure proposed by JAKIM integrates halal standards such as MS1500, Malaysia's Halal Certification Procedure Manual (MPPHM), MHMS, and other standards related to food safety systems to ensure halal integrity and effective halal traceability. (Dahlan *et al.*, 2016; Razaly & Zakaria, 2018).

After a thorough analysis of JAKIM HAS's scope, it can be concluded that it has a more specific scope in determining the requirements for halal certification in the Islamic consumer product manufacturing sector. This study aims to develop the HAS management manual and highlight the impact of implementing the HT concept in every broiler chicken farming activity while identifying elements of halal non-compliance that may occur. Therefore, the following section will elaborate on explanations and discussions related to the integrated broiler chicken farming system.

3.3 Broiler poultry farming integration chain system in Malaysia

Malaysia's poultry farming and processing sector is proliferating due to the high demand for chicken meat. This growth has been chiefly driven by companies that supply broiler chickens to the integrated chicken meat supply chain sector, which caters to the needs of the chicken meat-based food processing industry (Rasak & Sallahuddin, 2016; Shaban & Alabboodi, 2019). Broiler farming integration chain now contributes to almost 75% of the national economy, surpassing other farm animals (Majid & Hassan, 2014; The Poultry Site, 2018). This study focuses on the upstream chain of broiler livestock integration, as the breeding sector plays a crucial role in the upstream system of chicken meat supply. In this regard, this section provides an overview of the concepts, approaches, and goals in livestock farming to help researchers meet the objectives of their study.

Furthermore, the term broiler chain integration refers to a commercially oriented business. Industry players pioneer this integration concept to supply livestock and chicken meat products in the broiler industry chain (Serin *et al.*, 2011). As explained in the previous section, the integration of the broiler chain aims to increase the efficiency and effectiveness of the flow of chicken meat in the domestic and overseas markets (Hassan *et al.*, 2019; Majid & Hassan, 2014; MyCC, 2014; Mohd Syauqi *et al.*, 2015). Therefore, the integration of broiler farming involves various levels in the chain from upstream to downstream, as briefly illustrated in Figure 1, which involves joint venture cooperation between companies as integrators and farmers through contractual agreements (Benalywa, 2019).

This study focuses on the breeding phase of broiler chickens up to the production of fourth-generation broilers for commercial broiler farms. It also investigates the animal feed production process. The care of broiler breeding chickens is crucial at the initial stage of broiler chicken farming to ensure the supply of high-quality breeding generations, particularly for the final generation of broiler chickens. This includes the care of broiler chick offspring imported from foreign companies managing cross-breeding processes. The breeding parent stock, typically the third generation, produces fertile breeding eggs and, ultimately, the fourth-generation broiler chickens, the final products in the upstream chain. Quality and care of chicken breeds are vital for producing high-quality broiler eggs. Selection of chicken breeds is crucial as it influences the quality of chicken meat at the end of the production chain and affects disease resistance and overall poultry meat production.

4. Materials and methods

This paper employs a narrative review approach to identify HT's potential risks on the broilers' integrated supply chain. Data was collected by carrying out specific searches on reputable and high-quality databases. The databases used

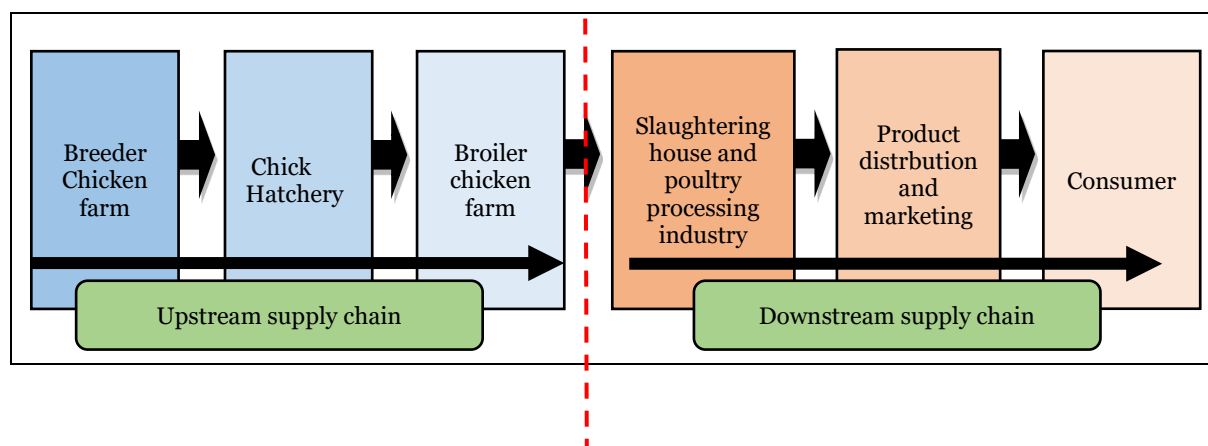


Figure 1: Poultry integration supply chains described by Serin *et al.* (2011).

included journals and articles indexed by SCOPUS, Web of Science, MyCite and MyJurnal, academic literature collections published in Malaysia. The selection of secondary data was taken through the SCOPUS website and Google Scholar, where accessibility of the data allowed the researcher to analyse the requirements of the study's scope and discuss the study's final findings. Meanwhile, the data search uses keywords and phrases relevant to the study context. Among the general keywords used in the search for data sources are "Halal and Tayyiba", "Integration Poultry System", "Broiler Chicken Farming" and "Poultry Halal Integrity". Apart from that, analysis was also made against primary and secondary reference sources to know in detail so that the discussion of the findings can be explained more clearly and coherently.

This paper also used various reference sources such as the Malaysian halal management system guidelines by JAKIM Malaysia, Malaysian standards related to halal, guidelines from the Malaysian Veterinary Services Department related to broiler farming, and the commercial farming system management manual. It also involved sources from the *Qur'an*, *hadiths*, and published *fatwas* related to the halal context to identify and suggest potential halal risk elements in broiler chicken production. The analysis and discussion aim to emphasize the importance of halal integrity and the consideration of food safety (toyibba) in ensuring that halal chicken meat products are produced in line with the 'From Farm to Fork' concept throughout the broiler chicken supply chain.

5. Potential halal risk in chicken broiler farming management

Factors such as farm location, animal feed and medication sources, biosecurity, logistics, and environmental management in broiler chicken farming are discussed. The paper also addresses elements related to halal compliance to ensure that farming activities maintain halal integrity and adhere to the concept of HT.

5.1 Farm location selection

To achieve the best production results and minimise operating costs, it is essential to adhere strictly to many elements in broiler farming. Two of the most critical aspects of the livestock operation are the design of the chicken housing system and the farm location. These factors impact the quality and productivity of the poultry products produced by the livestock farm. Choosing a suitable site for infrastructure and facilities is a crucial aspect of the commercial poultry farming sector. To

ensure the proper operation of the processes involved in maintaining the health and care of farm animals, a good location is crucial and necessitates adherence to many conditions (Giriraj, 2014). Thus, the choice of a strategic livestock farm location permits the growth of chickens at an optimum rate and guarantees the comfort of the livestock. Therefore, choosing the right place may result in lucrative profits for the breeder. The choice of agricultural regions must also incorporate biosecurity measures to safeguard animals from external influences, including environmental conditions, human interference, and threats from pests or predatory animals that may compromise livestock health (Susanti *et al.*, 2016). According to the study by Maduka *et al.* (2016), inadequate infrastructure for livestock management can lead to animal disease outbreaks. This could potentially harm the overall functioning of the poultry farm.

When selecting a farm location for broilers, it is essential to consider specific prerequisites. It is inadvisable to establish these farms in places that are shielded by steep terrain since this can result in inadequate ventilation, which could disrupt the growth process of the birds. Furthermore, the farm's proximity to neighbouring animal farms must be considered. The fundamental objective of selecting a farm location should be to ensure access to neighbouring farms, thereby minimising the risk of transmitting zoonotic illnesses to surrounding farms. The guidelines provided by Aviagen (2018) and Poultry Hub (2019) state that the optimal distance between livestock farms and other farms should range from three to five kilometres. In contrast, the regulations provided by the *Jabatan Perkhidmatan Veterinar* (2006) specify that the distance between farms should not exceed 0.5 kilometres. Hence, it is apparent that the proximity of broiler farms plays a pivotal role and carries a significant risk of transmitting disease outbreaks to neighbouring farms.

According to halal standards, farms that produce halal food must not be located near pig farms, which are considered haram (forbidden) or "*mughallazah*" animals. This requirement is highlighted in the Halal Standard MS1500:2019, which states that halal premises should be situated away from food processing facilities and non-halal animal farms (as outlined in subsection 4.2.6). It is also vital that the premises involved in halal food production are far away from pork processing areas and pig farms to avoid any risk of contamination. However, these guidelines only cover the manufacturing process of food products and do not focus on the level of halal animal husbandry. If a chicken farm is located near a pig farm, there is a risk of cross-contamination through equipment and human contact, which could result in haram

food. Environmental concerns exist, as natural water sources and artificial ponds may become contaminated with excrement and sewage waste from pig farming facilities.

Not only is this matter essential and emphasised in the existing halal standard, but this aspect of selecting the location of livestock farms is also closely related to the concept of '*Maqasid al-shari'ah*' in Islamic teachings. *Maqasid al-shari'ah* coincides with the realization of the main objective or purpose of the Islamic religion, which is to provide goodness and benefit to humans in this world and the hereafter. Ramli *et al.* (2017) explained that *maqasid al-shari'ah* is more focused on things that bring good (*maslahah*) and prevent harm (*mafsadah*) in human life on earth. The application of the concept is not only specific to the community but also to human beings of different races and religions. In general, the concept of *maqasid al-shari'ah* includes five essential criteria for safeguarding the interests of Muslims, which include protection and preservation of life, faith, intellect, lineage and finally, protection of property (Mohd *et al.*, 2018; Tuan Muda, 2021).

Livestock farms should be located in areas that meet the necessary standards to ensure the well-being of human life. This is because the location of the farm is considered a '*Dharuriyyat*', which means a fundamental and essential obligation in terms of *maqasid al-shari'ah*. If the set standards are not met, there is a risk of diseases spreading among the animals or contamination with harmful elements. This can lead to an increase in operation costs and negatively impact the breeder's economy. Additionally, it has the potential to spread zoonotic diseases to humans, which can be a significant health risk. For example, flies from livestock farms can disturb life and give adverse health to humans. Therefore, ensuring that the farm's location complies with halal standards is crucial, as it can affect the quality of meat produced and the well-being of the surrounding communities. Omar *et al.* (2012) emphasized that halal production should not only focus on the production of halal products but also ensure that it does not have a negative impact (*mafsadah*) on the environment and the lives of the surrounding communities.

5.2 Design of the housing system

It is widely known that nearly 60% of poultry farms in Malaysia use the intensive livestock housing system, also known as closed houses (Mohd Syauqi *et al.*, 2015). This system offers various benefits, especially in terms of management. It utilizes modern technology in designing cages and farm infrastructure, as well as bacteria and pest control and pollution control. According to Mohd Syauqi *et al.* (2015), the closed cage system is a well-organized livestock housing system that provides a more comfortable coop environment and can positively impact the success of broiler production operations. It involves good animal health management, an effective biosecurity system, and efficient food and drink management for livestock.

The closed cage system differs from the open coop system as it confines the broilers within the coop at all times to regulate their movement and behaviour during the care process. Typically, this closed house features a building structure with walls made of non-perishable materials like concrete (Appleby *et al.*, 2004; Cobb, 2018). The coop's construction structure has an exit and entry air space to ensure smooth airflow inside because it can impact the chickens' growth rate (Nawab *et al.*, 2018; Martins, 2019). Keeping in mind the concept of *maqasid al-shari'ah*, providing a comfortable chicken coop is a '*Hajiyyat*' requirement, where it is vital to ensure the chickens' comfort during their stay. Suppose the chickens feel

uncomfortable due to high or low temperatures. In that case, it can impact their growth rate and invite diseases to the poultry, leading to abnormal body shapes and not meeting the weight specifications. This, in turn, can affect the operation cost of the broiler's livestock. The Department of Veterinary Services (2006) reinforces this by insisting that the appropriate cage factor is a crucial element in increasing the productivity of the livestock farm by producing the optimal body weight of the chicken before marketing it to the slaughterhouse.

The closed coop-type poultry housing system that most breeders commonly use has many benefits for the chickens and the breeders. It not only produces a high number of chickens and provides comfort to the poultry, but it also helps avoid the occurrence of diseases, reduces the death rate of chickens, avoids wastage of animal feed, and controls the cost of medicines. Moreover, it provides better infrastructure, which is essential for environmental protection. Providing a housing system for broiler chickens is crucial as it significantly impacts the chickens' health and promotes animal welfare practices, which is highly demanded in Islam. Therefore, it is essential to highlight the potential risks associated with chicken coops to ensure the production of high-quality poultry that conforms to the concept of HT.

5.3 Feedmeal source

According to Nurulaina *et al.* (2017) and the Department of Veterinary Services (2012), it is crucial to regulate and ensure the quality of animal feed in terms of food safety. This is necessary to guarantee that the nutritional needs of farm animals are met, without causing any harm to humans or animals. Furthermore, according to Youn (2012) and Giriraj (2014), most chicken feed is composed of plant sources and animal waste products such as blood, bones, meat, chicken feathers, and fish meat. According to the *Shari'ah* concept, there are concerns about feeding animals with non-compliant ingredients, such as internal organs, pig faecal waste and sewage from illegal animal husbandry farms, which intentionally become the leading food of farm animals. This occurs because most farmers opt for the easy way to reduce operating costs and do not understand the concept of producing halal food products. The animal feed manufacturing industry, particularly poultry farming, mainly uses raw materials from grain sources. Mead (2004) and Iram *et al.* (2015) explain that animal feed consisting of grain sources can provide enough energy and metabolism for the growth process of broiler chickens. There are guidelines for good animal feeding practices, such as the Codex Alimentarius guide (2008), which ensures that animal food is safe to eat and meets safety standards at the production and farm levels. However, Malaysia's halal certification and standards do not pay enough attention to the production of halal animal feed products despite various issues raised by the Muslim community. Therefore, further research should be conducted to ensure that the source of animal food, especially broiler chicken, which is a popular chicken meat product among Malaysians, is free from any questionable elements according to *Shari'ah* law.

From the perspective of *Maqasid al-shari'ah*, ensuring that poultry food is free from najis elements and is safe for consumption is a requirement for the importance of '*Dharuriyyat*'. If livestock feed is processed with raw materials whose halal status is not known, it can become doubtful (*syubhah*) from the point of view of *Shari'ah* law. Moreover, if the feed is contaminated with mycotoxin fungi, it can harm the poultry and even the health of the meat consumers. Additionally, livestock feed should be free from all the risks,

such as contamination by pathogenic microorganisms and physically and chemically dangerous substances that can threaten the health and life of poultry. Therefore, the concept of *maqasid al-shari'ah*, especially the importance of '*Dharuriyyat*', significantly impacts *maslahah* (goodness) to both poultry and human health. To ensure that animal feed is safe, there are standards used in animal feed management, such as the guidelines developed by the Food and Agriculture Organization of the United Nations (FAO).

Based on FAO guidelines recommendations include detailed information on the code of practice for optimal livestock nutrition, effective animal feed management, and the implementation of the HACCP system. These guidelines aim to ensure the production of animal feed products that adhere to the principles of food safety and quality control. Furthermore, the Codex Alimentarius (2008) specifies the guidelines for preventing animal food contamination caused by hazardous substances like dioxin and aflatoxin, pathogenic bacteria, and harmful additives. Furthermore, the Malaysian government implemented the Animal Food Act in 2009 and has subsequently released multiple guidelines to oversee and examine animal farms. These measures aim to ensure that livestock farms effectively manage the provision of animal feed and adhere to hygiene and food safety standards. This legislation enables authorities to oversee and regulate the quality of animal feed in the animal husbandry industry. The goal is to ensure that animals are healthy, produce high-quality meat, remain disease-free, and adhere to animal welfare standards. Based on the previous discussion, it is evident that investigating the source of ingredients in sacred and halal animal feed is essential for upholding the halal integrity of chicken meat products, as required by Sharia law. This study not only ensures food safety but also compliance with halal standards. This can potentially dissuade the population, particularly Muslim consumers, from acquiring chicken meat that adheres to Islamic law and is deemed halal and safe for consumption.

5.4 Medication source

In the process of raising chickens, both traditionally and commercially, medicinal materials need to be used to ensure the health and well-being of the birds. Vaccines and antibiotics are necessary during the broiler care phase to protect against and prevent diseases caused by pathogenic microorganisms and viruses (Youn, 2012; Department of Veterinary Services, 2015; Khim, 2018). According to Youn (2012), various types of drugs are administered to farm chickens from the chick phase onwards, including vaccines, antibiotics, vitamins, and worm medicine. Chicks are vaccinated as soon as they hatch, typically at one day old, as explained in Cobb's (2013) guidelines. One of the goals of administering vaccines to chicks is to maintain their immunity level against diseases before they are sent to the farm. Aviagen (2018) states that vaccinating farm chickens takes place in several stages, at 7 days, 14 days, and 18 days of age. Vaccination timing depends on the chickens' health level obtained from the chick hatchery. The effectiveness of vaccines on poultry, according to Cobb (2013) and Lohmann (2018), is affected by the level of cleanliness of the coop and the effectiveness of biosecurity measures. If farmed chickens are exposed to high stress and the conditions of the cage facility are not hygienic, then the effectiveness of the vaccine will decrease. Therefore, it is crucial to ensure the effectiveness of vaccines on farm animals, especially broiler chickens, to prevent the spread of infectious diseases that can subsequently spread to humans. This is an essential aspect of animal husbandry activities. It is important to follow a proper procedure while giving medicinal

substances, vaccines, or antibiotics to farm animals, particularly chickens. This involves prescribing medicine suitable for farm chickens, as stated by various guidelines including those from the Department of Veterinary Services (2015), Aviagen (2018), Cobb (2018), and Zsolt Hankovszky (2018). The dosage of vaccines or other medicinal substances must comply with the permitted limits and depend on the type of disease infection the broilers. Furthermore, only approved and authorized medication should be used, and a veterinarian appointed by the integrator company should supervise its administration.

According to *Maqasid al-shari'ah*'s perspective, the provision and management of medicinal substances involve not only the health care of farm animals but also considerations for human safety and environmental protection. This aligns with the concept of *maqasid al-shari'ah*, which aims to prevent harm and maintain the well-being of human life and the environment, both of which are viewed as *Allah* The Almighty creation. From a halal perspective, the health care of farm animals is linked to animal welfare practices. It conforms to HT and *Shari'ah* law principles, prioritising the goodness and benefit of humans. If the administration of medication to farm animals does not follow the proper procedures and control measures are not adequately implemented, it may cause harm, indicating a failure to follow the concept of HT. The context of Malaysia's halal certification is a topic of concern. It has been observed that only a few sources of vaccines used on humans have been certified as halal by JAKIM. However, the vaccine material used on farm animals does not receive the same level of attention. This has prompted researchers to suggest that vaccine ingredients used on halal livestock should also be given due consideration. It is not enough to evaluate vaccines solely on their safety aspects. The ingredients used in the vaccine must also adhere to the halal concept. Furthermore, when evaluating medicinal substances such as vaccines used on broiler chickens, it is essential to consider whether they align with the principles of shariah in Islam. The source of the vaccine content is a crucial factor in this regard. The raw materials present in the vaccine should be thoroughly examined and evaluated in terms of the level of halal risk they may pose. The potential presence of haram materials, as per the *Qur'an* and *hadith*, must be scrutinised and evaluated.

5.5 Farm biosecurity

Modern intensive poultry farming implements biosecurity systems to ensure the production of high-quality and safe meat for consumers. These systems primarily focus on preventive measures to mitigate the risk of spreading infectious diseases among agricultural products and livestock (Department of Agriculture, Fisheries, and Forestry, 2009; Department of Veterinary Services, 2006; Farmbiosecurity, 2018). Maduka *et al.* (2016) emphasize that biosecurity aims to prevent or impede the transmission of zoonotic diseases from intrinsic or extrinsic sources within farm areas. Essential procedures include maintaining cleanliness and sanitation, eliminating bacteria, controlling chicken movement and transportation, and isolating infected poultry. Negro-Calduch *et al.* (2013) elaborate on how effectively implemented biosecurity systems can minimize disease prevalence in livestock, enhance farm management, and prevent avian influenza outbreaks. Cleanliness and sanitation are crucial aspects as they directly relate to preventing biological contamination.

Oliveira *et al.* (2018) identify internal and external biosecurity as pivotal factors in preventing endemic infections in livestock. Internal measures involve cleaning and eliminating bacteria

within facilities. In contrast, external measures focus on protecting livestock from environmental risks, such as wearing protective clothing, sanitizing before handling livestock, and quarantining diseased animals. Steenwinkel *et al.* (2011) affirm that visitors adhere to biosecurity protocols, including practising good personal hygiene and disinfecting boots before entering poultry farm areas. Proper management of poultry carcass waste, as highlighted by the Department of Veterinary Services (2010; 2019), is essential to prevent disease spread. Standard disposal methods include burying in the ground or incineration process (Dafwang *et al.*, 2011).

However, in the context of halal food sources, Nurulaina *et al.* (2017) emphasise that using end-products from the chicken carcass rendering process raises concerns regarding compliance with Islamic law, particularly in animal feed production. Therefore, the content of animal feed containing processed products from animal carcasses must be studied and refined in terms of the concept of '*istihalah*' which refers to the transformation of a substance into another substance in terms of its physical and chemical properties (Jamaluddin & Wan Mohamed Radzi, 2009). As a result, although the scope of Malaysia's halal certification and halal standards does not focus on the production of animal feed, the process of disposing of chicken carcasses or farm waste following the procedures established by the authorities can mitigate the risk of the spread of zoonotic infections, not only among farm chickens but also potentially affecting human health. Following the appropriate medicine prescription for broilers is essential when giving farm animals medicinal substances, vaccines or antibiotics. This is because guidelines from the Department of Veterinary Services (2015), Aviagen (2018), Cobb (2018) and Zsolt Hankovszky (2018) emphasize that the use of vaccines or other medicinal substances should adhere to the permitted dosage and depend on the type of disease infection faced by broilers. Additionally, the medication used must be approved and authorized by the Department of Veterinary Services (DVS) and monitored by a veterinarian appointed by the integrator company organization.

In Islamic teachings, the management and regulation of medicinal products are not only restricted to the well-being of livestock. They also take into account the safety of humans and the environment. This is in line with the *maqasid al-shari'ah* concept, which aims to eliminate harm and evil to safeguard human life and the environment, both of which are creations of *Allah* The Almighty. Concerning halal standards, the health of farm animals is closely tied to animal welfare practices. It adheres to HT and *Shari'ah* law principles, which promote human benefits and well-being. If the administration of medication to farm animals does not follow proper procedures and control measures, it can cause harm, indicating that the HT concept is not entirely followed.

5.6 Environment

The outbreak of diseases is a serious threat to the broiler farming sector and can be devastating for breeders if the livestock becomes infected. Therefore, every broiler farm or other farm animal should establish a livestock health program to ensure the health and safety of the chicken meat products they produce. Three main principles are practised in poultry health care: disease prevention, identification of the initial stages, and follow-up treatment of infected diseases (Cobb, 2018). The health management of poultry generally covers three components, namely the management of the coop's cleanliness and the coop equipment's facilities, the use of vaccine and antibiotic materials, and the farm biosecurity

system.

The coop they live in must be clean to ensure that broiler chickens are in a healthy condition and free from any disease outbreaks. The cleaning management method refers to a method of cleaning the infrastructure of buildings for livestock purposes, equipment used such as drink and food containers, ventilation systems of coop, and hygiene facilities for livestock farm workers. In this regard, chicken excrement is disposed of on a scheduled basis because the accumulated excrement can cause the spread of pathogenic bacteria such as *E. coli*, *Salmonella*, *Listeria monocytogenes* and *Campylobacter* contaminate the food and drink of livestock (Youn, 2012). To avoid any health problems for farmed chickens, the chicken excrement needs to be separated and disposed of away from the farm area so that the breeding activities of insects such as flies, which are the main vectors of pollution and sources of harmful microorganisms, can be contained.

It is essential to focus on pest control and the management of farmed broiler chickens' health for optimal conditions. Integrated pest management should be carried out on every livestock farm to prevent pests from entering farm areas and chicken coops (Maduka *et al.*, 2016). Velkers *et al.* (2017) also state that pests can transfer bacteria or viruses to livestock feed and drink, negatively affecting the safety of poultry food and drink. For example, rats are one pest that should be avoided entirely and controlled. They can cause damage to property and farm equipment, and their presence can also contaminate animal feed sources. Rats are carriers of viruses that are dangerous to humans, and they can carry up to 35 types of zoonotic infections (Mohan & Saktivel, 2015). Therefore, the cleanliness and management of food and drink resources should be emphasized. The food storage room must be clean and free from any biological contamination to prevent the spread of dangerous viruses and infections. The biosecurity practices related to raising poultry are crucial to ensure that the meat produced is safe for human consumption (Cobb, 2018). The biosecurity practice is closely related to the *maqasid al-shari'ah* concept from the HT perspective. If rodents spread infection, it could lead to the death of poultry and affect human health through meat products. This aligns with the concept of '*Dharuriyyat*' which requires maintaining cleanliness of the chicken coop area to prevent harm to chickens and spread to the environment. Farm biosecurity procedures stress the cleanliness of workers, who must wear dedicated clothing and sanitize their hands and boots before entering the coop area. This is also linked to *maqasid al-shari'ah* requirements that ensure worker safety from diseases caused by zoonotic infection vectors. The study's focus on broiler care activities in the farming chain covers aspects of health and food safety management, as well as external factors that may impact health levels and potential risks affecting the quality of chicken meat production at the end of the chain.

6. Conclusion and recommendations

The demand for chicken meat products is increasing in the Malaysian community. In response, JAKIM authorities have implemented various initiatives to strengthen the halal assurance system. These initiatives include developing procedures and manuals related to halal management and verifying Malaysia's halal certificate. However, research on halal integrity and compliance has only focused on chicken slaughtering activities in slaughterhouses and the manufacturing of downstream products of chicken meat. Little attention has been given to the supply of live chickens raised at commercial livestock farms that use integrated management

systems. The concept of halal integrity requires attention to all aspects of halal slaughtered chicken, such as the location of the farm, the design of the housing system, the source of feed, the source of medication, the biosecurity system of the farm, and also the care of the environment, which are seen as potential risks to halal non-compliance. Therefore, it is essential to analyze and explain the necessary elements in the management of broiler farming holistically. This will provide new insight and guidance to industry players, especially in the broiler farming industry, and enable them to use the findings of the study as a guide in implementing halal traceability.

The study will positively impact the authorities responsible for halal management, specifically JAKIM, by examining the process of supplying live chickens and the slaughter process. This study's results will contribute to improving and strengthening the halal management system. It will also increase halal awareness and trust among the community, particularly consumers, by ensuring that the halal integrity of meat sources begins at livestock farms. Additionally, this study presents a new approach for researchers in the field of halal management. Future studies can focus on other non-ruminant or ruminant animal farming activities to assess potential halal risks and develop a halal management system at the upstream level of halal animal husbandry, ensuring that meat-based food products adhere to the halal concept.

7. Copyright

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