

Halal Critical Point Assessment for Chicken Broiler Upstream Operations

Mohd Hasli Ramli^{1*}, Arief Salleh Rosman^{1*}, Muhammad Talhah Ajmain @ Jima'ain^{1*},
Adi Md Sikin^{2*}, Mohammad Aizat Jamaludin^{3*}

¹ Faculty of Science Social and Humanities, Universiti Teknologi Malaysia, Malaysia

² Faculty of Applied Sciences, Universiti Teknologi MARA, Malaysia

³ International Institute for Halal Research and Training (INHART), International Islamic University Malaysia (IIUM), Malaysia

*Corresponding Author: hasli@graduate.utm.my , aswar@utm.my , muhammadtalhah.j@utm.my ,
adisikin@iium.edu.my , mohdaizat@iium.edu.my

Received: 25 September 2023 | Accepted: 16 November 2023 | Published: 1 December 2023

DOI: <https://doi.org/10.55057/ijbtm.2023.5.4.10>

Abstract: *Halal critical point (HCP) in the poultry business focuses has been only emphasized at the slaughter process and downstream production of chicken meat products. However, there is no extensive investigation on the implementation of HCPs at the upstream stage of broiler supply before it is transferred to halal slaughterhouses. This research aims to assess the halal critical point (HCP) involved in commercial broiler farming operations that might be halal critical, and therefore needs halal risk control. There are seven phase of operation in the broiler process, includes brooding, growth, feed withdrawal, medicine withdrawal, catching procedure, logistics, and slaughterhouse. The qualitative research approach using document analysis and semi-structured interview was used to gather more in-depth information and the halal critical controls were proposed. The findings of this research could assist the industry in maintaining the halal integrity of poultry-based products. Thus, enhance the halal authorities responsible for drafting halal development policy in the improvement of the halal management system along the broiler supply chain.*

Keywords: Halal Critical control, chicken broiler, broiler supply upstream, halal integrity

1. Introduction

A business operator obtaining for Malaysian halal certification is required to establish a Halal Assurance Management System (HAMS) (JAKIM, 2020a). In this regard, the Malaysian Halal Management System (MHMS) guideline and the Malaysian Domestic Halal Certification Procedure Manual (MPPHM) have become the main reference for establishing a HAMS since 2020. There were several requirements for HAMS including establishing a halal risk assessment and developing effective control mechanisms to prevent any haram contamination at each stage or procedure of the business operation (JAKIM, 2020b). This requires accurate knowledge of Islamic studies as well as a few details and having a clear halal procedure. To fulfill the requirements, the industry actors must offer full documentation, including standard operating procedures (SOPs), raw material control, and a documented halal critical point (HCP) plan (JAKIM, 2020b). The HCP is viewed an important auditable element to give evidence that a business activity is free from any potentially prohibited elements which deviate from the principles of halalan and tayyiban.

The demand for chicken products in Malaysia has grown over the years. According to data from the Malaysian Department of Veterinary Services, 179 million birds were produced in 2019 with an annual production of 200 million birds by 2020 (Department of Veterinary Services, 2021a). The poultry industry is expected to expand with total poultry output, as well as the rate of consumption of chicken meat (Department of Veterinary Services, 2021b). In parallel to this, purchase power in the halal status of meat products among the Muslim community has been steadily increased in Malaysia (Jamaludin et al, 2018). In this regard, several instances of unlawful contamination in halal animal husbandry operations were reported. For example, a farmed fish pond in Selangor was reported to using najis status animal carcasses as a feed (Mustakim, 2015). Also, non-Muslim breeders were allegedly using carcasses, chicken intestines, and pig internal organs in livestock ponds in Perak as reported by local newspaper sources (Bernama, 2015).

To safeguard the halal status of poultry products for Muslim consumption, Department of Islamic Development of Malaysia (JAKIM) have published fatwas on the provision of halal livestock fed with faeces, known as al-Jallalah animals. The National Council for Islamic Religious Affairs Malaysia's 73rd fatwa stated that fish raised in livestock ponds and the like is prohibited to eat if the fish is intentionally kept in an environment contaminated with faeces or deliberately given faeces as fish feed such as flesh pigs and carcasses. Besides, subsections 4.5.1.1.1 (h) and 4.5.1.1.2 (c) of Malaysian Halal Standards in Halal Food-General Requirement (MS 1500: 2019) Third Revision prohibited aquatic animals from being fed najis purposefully and continually (Department of Standards Malaysia, 2019). This underscores the livestock as an important source of halal meat for customers when it comes to supplying halal food.

There are several previous studies that have been obtained discussing the importance of halal system management in the processing of chicken meat products. From Mohtar, Amirrordin, and Haron (2014) stressed that the halal management system should be assessed starting from the hatching phase of eggs. However, the implementation of the halal assurance is was not extensively discussed in detail on the overall poultry supply chain. Mor over, halal regulation on poultry has only focused on logistic transportation from farm to slaughterhouse (Omar, Jaafar, and Osman, 2012). Nurulaina, Rahman, and Abdullah (2017) did not emphasise the status of halal integrity on animal feed sources. Similarly, Razaly & Zakaria (2018) highlighted that the implementation of HAMS does not focus on the starting activities of the broiler production chain, but instead on the receiving of live chickens pre-slaughter, the slaughter process, and the manufacturing of downstream chicken meat products.

Therefore, the objective of the present study is to assess potential halal critical point at commercial broiler farms. This study also explored effective control measures for ensuring halal integrity in broiler farms, as well as assessments of poultry farming activities which have the potential to be halal risk.

2. Literature Review

2.1 Halal assurance management system (HAMS) requirements

The main principles of HAMS is to prevent any contamination of haram materials in the production of products (Anuwar, Tamkin, Roslan & Nor, 2017; Anwar, 2018). HAMS is a halal management system to help identify the halal status of raw materials and finished which are guaranteed and monitored by the industry (Sawari & Ghazali, 2014 and Muhammad Mazuan & Zalina, 2018). The HAMS guidelines published by JAKIM in 2020 outlines ten

requirements that must be adhered to control the risk of contamination of illegal substances in the products specifically and hence the halal assurance management system can be carried out efficiently. The requirements primarily emphasized in this study includes the implementation of halal risk control and the control of raw materials used. The requirements for HAMS were outlined at Table 1.

Table 1: Element requirements in HAMS. Quoted from the Malaysian Halal Management System Manual 2020 (JAKIM, 2020a).

Halal Assurance Management System (HAMS)
<ol style="list-style-type: none"> 1. Halal policy 2. Establishment of Halal Committee 3. Internal halal audit 4. Halal risk control 5. Raw material control 6. Halal training 7. Traceability 8. Review of HAMS documents 9. Laboratory analysis 10. Ritual cleansing

The standards pertaining to food safety such as MS1480 for Food Safety According to Hazard Analysis and Critical Control Points (HACCP) and MS1514 for Good Manufacturing Practices (GMP) and MS1500 are also referred to strengthen and complement the requirements of HAMS for the production of safe and halal food products (Sani & Dahlan, 2015). To specifically address issues in the broiler industry, Malaysian Good Agriculture Practice (MyGAP) and Livestock Farm Practice Scheme (SALT) are integrated following the requirement of the Department of Veterinary Services Malaysia (Ibu Pejabat Perkhidmatan Veterinar, 2012).

2.2 Chicken Broiler farming activity

The poultry industry in Malaysia generally practices integrated farming encompassing feed supply, chicks and mature broilers to the downstream market of the food chain. industrial coordination has resulted in a sufficient supply of raw material in the chicken meat-based industry supply chain (Mohd Syauqi, Mohd Zaffrin & Hasnul, 2015). In such practice, farm location, poultry housing system design, feed and chick health management and logistics. are required by the broilers to ensure optimal production with minimal operating costs. In addition, practices that promote animal welfare such as farm infrastructure and biosecurity (e.g. vaccination and diseases prevention) and logistics could contribute to the risk of halal and tayyib (Ramli, Rosman & Ajmain, 2020). Therefore, these areas were explained and identified to determine the HCP at the livestock operation level.

First, a broiler farm is an area with infrastructure facilities that serve to carry out livestock activities from the ‘day-old chicks’ (DOC) until the chicks achieved the required body weight (Department of Veterinary Services, 2012). In Malaysia, 60% of poultry farms use an intensive livestock housing system or better known as a closed-house system (Mohd Syauqi et al., 2015). This system is preferred for its latest technology in the design of housing systems, disinfection, pest control and environmental control. According to Mohd Syauqi et al. (2015), the closed-house system is a systematic livestock housing system to provide a more comfortable environment and can have a positive impact on the operational efficiency of broiler production. It covers aspects of good animal health management, effective biosecurity systems as well as efficient livestock feed management.

Omar et al. (2012 and 2013) explained that animal welfare is an important aspect of halal compliance at the animal husbandry level. The practice of animal welfare leads to healthy and quality, which is also in agreement with Islamic teachings that encourage humans to give kindness to livestock. In addition, other elements that influence the quality of meat supplied as well as aspects of halal non-compliance are the level of farm hygiene, farm location, and design of chicken coops provided. Giriraj (2014) stated that the open-type coop design also gives freedom to poultry animals as well as better quality of health. However, in this context, it was found that covered coops not only provide comfort to poultry but also reduce the risk of disease infection and the arrival of other animals from outside the coop which is a major contributor to zoonotic disease infection.

Second, health care management is paramount to obtain chicks meeting the required specifications at the hatchery centre (Youn, 2012). In this regard, animal care in a poultry farm is categorized into natural and artificial brooding (Quentin, 2012, Youn 2012). Natural brooding refers to protection and heat given to the chicks by hens (Department of Veterinary Services Malaysia, 2010; Quentin, 2012). In contrast, artificial breeding refers to chick care that mimic the behaviour of hens (Hassan & Raiyana, n.d; Giriraj, 2014). This artificial brooding should be extended until the chicks reach the age of two weeks because the rate of development and growth occurs rapidly during this period of time. Resulting from good health care management of the chicks, the optimal development and growth of broilers can be achieved and benefits the farmers in terms of livestock productivity. After brooding, the growth phase of broiler chicks in the coop should take place continuously until they reach the slaughter weight and hence are ready to be delivered to the slaughterhouse.

Animal feed and medicines such as vaccines, antibiotics and hormones must not contain element of najis contributing the element of doubts (syubahah). The dosage of vaccines and antibiotics must be controlled not to exceed the regulatory level for the safety of livestock, environment and human (Marni, Marzura & Suliana, 2017; Shahdan, Regenstein & Rahman, 2017). Hormones are used to reduce maturation period and increase the weight of animals. However, its excessive dosage could potentially be carcinogenic and lead to low immunity in human body. Sharif & Mohd Izhar (2017) also stated that food or medical resources, which are harmful to animals and humans against the principles of maqasid syariah which emphasizes five criteria namely preserving religion, life, intellect, lineage and property that provide benefits to humans in the world and the hereafter.

The supply of drinking water to livestock must be also considered in halal risk assessment. Nawab et al. (2018) stressed that a clean and adequate source of water is needed to facilitate the digestion of food taken and can lower the body temperature, thus to reduce stress during rearing. Youn (2012) also emphasized the need for an adequate water supply to reduce mortality due to dehydration. In these regards, the source of water must be free from a microorganism, chemical and physical contamination. This is because polluted water can adversely affect livestock by being the medium for the transmission of zoonotic disease to both the animals and consumers.

Third, the delivery of chickens to slaughterhouses is an exception for halal compliance. Shahdan et al. (2016) explained that logistics play an important role in ensuring that raw materials, finished food products and even livestock are not contaminated with non-haram substances. Omar et al. (2012 and 2013) also stressed that the process of transporting livestock should adhere to halal procedures recommended in standards such as MS1500: 2019, MS2400-1: 2019 and MHMS 2020. These standards require that the vehicles used to transport animals

to slaughterhouses must not be used to transport animals with non-halal status. Animal welfare must be taken into consideration in the delivery of chickens to slaughterhouse (Abdul Rahman, 2017). In addition, the practice of animal welfare which promotes compassion and human ethics when handling livestock is also mentioned in Quran, hadith, ijma' and qiyas.

The chickens to be transported to slaughterhouses should not be caged in the basket for a long period, as it may be prone to bodily injury and even death (Grandin, 2017). Sira (2017) stated that if the animal welfare is not practiced before slaughter, the chicken meat will be 'makhroh' to be consumed. Khan et al. (2018) explained that there is an decrease in the pH of the meat when chicken is under stress. The stress due to the conversion of glycogen into lactic acid via a process called rigour mortis. However, pH value exceeding 7 or neutral there will be high potential of microbial contamination, which results in shorter shelf life of meat.

From the above discussion, it is clear that in the livestock sector, broiler care requires control methods that focus on HAMS to ensure the level of safety of livestock products to provide benefits and confidence to consumers who consume meat products. Apart from compliance with the tayyib concept, the use of halal management systems such as MHMS and existing halal standards can further strengthen halal compliance on the flow of livestock activities so that every activity performed is not only safe but also meets the requirements of Islamic law. Following this, among the factors that influence halal non-compliance include feed and drinking water sources, animal welfare aspects including farm cleanliness, farm location, type of shed used as well as logistical transportation activities. It has potential halal risks that must be evaluated and determined.

2.3 Determination and control of halal critical risks

Halal critical point (HCP) is generally adapted from well-established Hazard Analysis Critical Control Point (HACCP) standard of MS1480:2019 (Dahlan & Sani, 2016, Department of Standards Malaysia, 2019a). The standard outlines seven main principles to implement a food safety control system to ensure that food products produced are free from hazards. Based on the standard, a critical control point is defined as a point, operational step or process in the food chain where preventive control measures are established to prevent any food safety hazards to an acceptable level. Therefore, HCP is the method of determining the halal control point and the development of a halal risk management plan to be implemented by organizations applying for halal certification (JAKIM, 2020a). HCP in the current study refers to the control of critical points at which there should not be a contamination of non-halal or dubious materials starting from the activity of raising chicks to the slaughtering of chicken.

Prior to determining HCP, halal risk assessment is conducted by using the 'Halal Control Point Risk Matrix Assessment' adapted from the Malaysian Halal standard of MS2400-1:2019, which is known as Halal Supply Chain Management System - Part 1: Transportation- General Requirement (Department of Standards Malaysia, 2019b). Based on the standard, HCP can be carried out more systematically by determining the level of halal risk that is likely to occur at each step of the activity or process. The halal risk assessment matrix was shown at Table 2. The halal risk code classification was adapted from the MS2400-1: 2019 guidelines.

Table 2: Halal critical point (HCP) risk assessment matrix adapted from MS 2400-1: 2019 (Department of Standards Malaysia, 2019b)

Likelihood	Severity/ Impact					
	Insignificant		Moderate		Critical	
Likely	Moderate	4	Significant	7	High	9
Moderate	Low	2	Moderate	5	Significant	8
Unlikely	Low	1	Low	3	Moderate	6

Table 3: Halal risk classification as adopted from MS 2400-1: 2019 (Department of Standards Malaysia, 2019b)

Ranking level	Likelihood	Impact	Code
9	Likely	Critical	High
8	Moderate	Critical	Significant
7	Likely	Moderate	
6	Unlikely	Critical	Moderate
5	Moderate	Moderate	
4	Likely	Insignificant	
3	Insignificant	Moderate	Low
2	Moderate	Insignificant	
1	Unlikely	Insignificant	

To determine the level of potential halal risk, there are several strategies before the halal risk management plan is developed. First, a complete process flowchart of broiler operation needs to be developed. Second, the likelihood of halal risk on each step of the process involved is assessed based on Table 3. Third, the broiler rearing activity is evaluated in terms of determining the degree of severity or risk impact. Finally, HCP can be determined based on the framework of the risk code classification as shown in Table 3.

2.4 Halal critical point

The application of the halal concept is not limited to raw materials used in the production of finished food products alone but includes a more comprehensive concept of food safety starting from the upstream level of the food chain is the livestock sector that produces food raw materials until the product is ready to be consumed. The findings of this study further confirm the findings of Mohd Hafiz et al. (2012) and Mohtar et al. (2014) who stated that consumer perception of the concept of halal only applies to finished products and not at the initial stage. Therefore, the concept of halal is not limited to the raw materials used in producing the final product but includes a broader concept that is starting from the initial stage of production of raw materials again.

3. Methodology

The case study approach is typically used to gather detailed information and explain a phenomenon holistically on the events studied (Chua, 2014). Likewise, Uzairiah (2017) stressed that case studies are used to explore things that are not yet known and studied inductively. The use of case studies involves a process of exploration and explanation of processes, causes and consequences which could then be used to develop a theory. Therefore, a qualitative research approach was used to gather important information on broiler operations in the current study by document analysis and semi-structured interviews. For example, several literature sources have been selected including journals, articles, standards and guidelines related to broiler farming activities are used. To further strengthen the research data, five

respondents were selected by purposive sampling to obtain more in-depth information to solve the research question which is to explore and identify what the HCPs are involved in broiler farming operations in livestock farms. The recorded results of the interviews were then transcribed into verbatim form and then analyzed using NVIVO software to obtain the categories and themes of the study. As a results, a flow chart of broiler farming activities as well as a halal risk analysis framework was formed.

4. Results and Discussion

The flow chart of commercial broiler operation was developed based on the interviews and review of relevant documents. This provides a backbone for the halal risk assessment, which includes possible halal hazards, halal control mechanisms and corrective actions for halal non-conformance. As shown in Figure 1, the broiler operation consists of 12 steps, starting from pre-receiving of chicks to slaughter of chickens. There were seven HCPs identified which include the brooding phase (HCP1), growing phase (HCP2), feed withdrawal (HCP3), medication withdrawal (HCP4) and catching process (HCP5), logistic (HCP6) and slaughtering (HCP7). Each HCP was then assessed in terms of the level of risk and the control measure of each HCP was explained as shown in Figure 1.

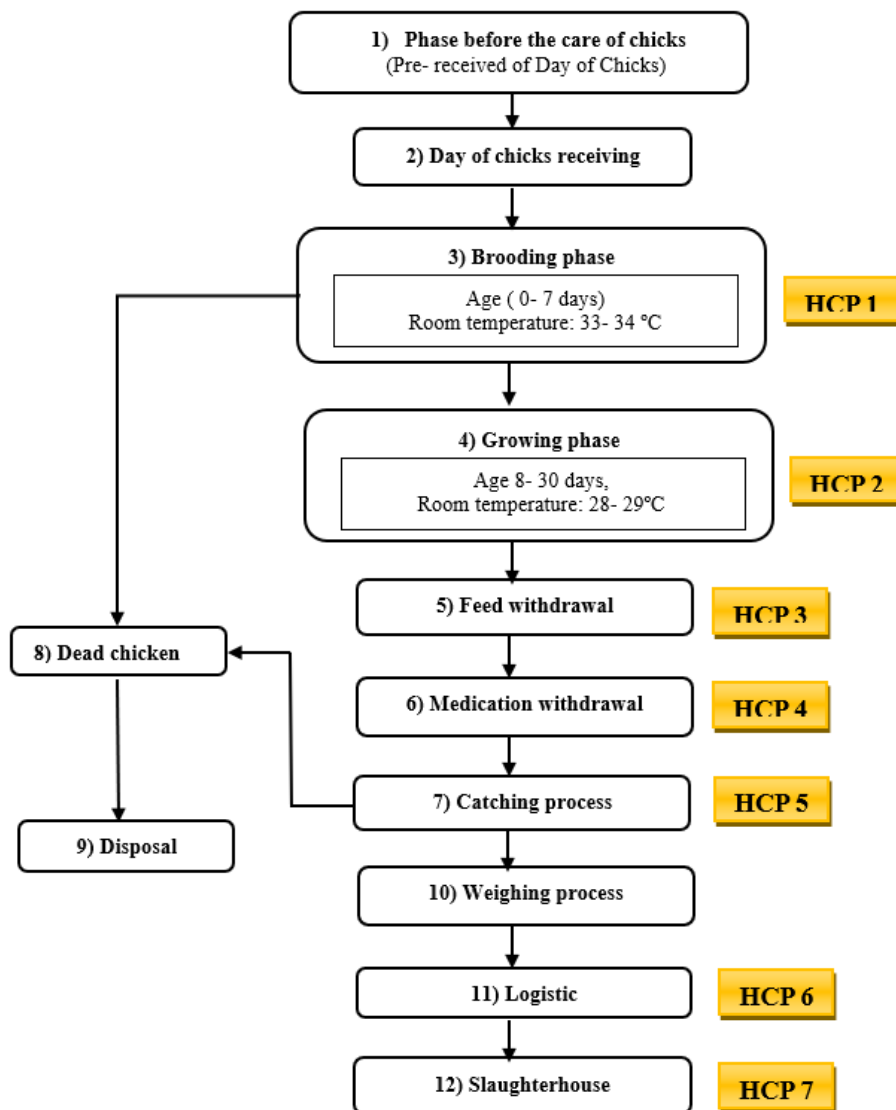


Figure 1: Halal critical points (HCPs) of broiler operations.

a) HCP 1 Brooding phase

As shown in Figure 1, the broiler operations consist of 12 main activities. The earliest activity is the preparation of coop facilities before the arrival of new chicks. This includes cleaning and disinfection of the coop facilities including food and drink containers. The cleanliness of the coop is very important to prevent any microbial contamination which results in disease transmission to the chicks. The cleaning and disinfection will take 14 days before the receipt of chicks for the hatching process of 7 days at temperatures between 33°C and 34°C. Following that is the brooding phase, which involves intensive rearing for a week in the coop. Based on Table 2, it was found that the halal risk is considered significant due to manual handling by farm workers.

In event that dead chicks were found, disposal of dead chicks must be carried out immediately to prevent any spread of disease to the healthy chicks in the enclosure. The carcasses should be collected and disposed of effectively by incinerating or burying it in the ground. Prior to disposal, culling unhealthy or sick chicks by cutting the blood vessels in the neck is utmost necessary in the event that these dead chicks could be potentially used to feed the farmed fish. To safeguard the disposal process, the intrusion of wild animals or migratory birds into the farm needs to be monitored. Also, the personnel hygiene of farmer workers and the cleanliness of well-maintained equipment need to be observed to eliminate the risk of contamination from pathogenic microorganisms. Therefore, each broiler operator must refer the procedures set by the authorities. Therefore, brooding should be identified as HCP. At this stage of the brooding phase, the implementation of the farm's biosecurity program takes an important role to ensure the health of the chicks kept is free from any disease infection and also can reduce the mortality rate. In the Islamic perspective, the practice of giving an animal welfare to chicks is emphasized. This is because the aspect of controlling the temperature of the coop's environment can reduce stress and also provide comfort to the chicks during the brooding at the first day until 7th day rearing. Therefore, this brooding phase should be considered as the first HCP in this study.

Vaccination is an important activity for the health care of the chicks. It is to prevent any zoonotic disease from infecting the chicks that can bring impact on operational productivity and mortality. Therefore, the administration of suitable vaccine and its dosage must comply to the regulatory body such as Department of Veterinary. The compliance must also include the use of recognized and approved vaccine and the vaccine should be prescribed by a trained veterinarian. The vaccine must not contain any substance that is haram in Islam to maintain the halal integrity and eliminate the doubt of the halal status of meat products among Muslim consumers.

b) HCP 2 Growing phase

After 7 days of brooding phase, the chicks enters the growth phase in which intensive care will take place up to the age of 30 days. The chicks will be given sufficient food and drink to meet the specified specifications. The chick's health must also be monitored and stress-free environment must be provided in the coop. Overall, animal welfare must be emphasized by being compassionate caged chicks. The chicks should not be physically hurt be free from thirst and hunger in a comfortable environment for its emotional well-being. Considering the very delicate handling of chicks at this stage, the growing phase should be significant for halal risk. In this regard, one of the aspects of halal control that needs to be taken into account during the broiler chicken care process is animal welfare, which is based on the demands of the Quran and Hadith. In the broiler chicken farming industry, the handling of chickens as well as the application of humane handling towards animals is an important aspect to produce a healthy

and quality chicken supply to the slaughterhouse. This is consistent with animal welfare practices based on ethical principles involving the relationship between humans and animals. This not only has a positive effect on the health of farm animals but the high mortality rate due to psychological disorders faced by animals can be reduced. Therefore, the handling of farm animals in the context of animal welfare needs to be well managed so as not to hurt, injure and put stress on the animals. Therefore, the aspect of animal welfare is one of the elements of halal risk that should be given attention in the growth stage because it is able to give effect on halal compliance.

c) HCP 3 Feed withdrawal

Feed withdrawal refers to stopping any feeding to broilers within six hours before capture. This procedure should be fully controlled by the farm workers as well as the veterinarian. The risk of microbial contamination especially from *Escherichia coli* and *Salmonella* is highly likely during post-slaughter evisceration if this procedure was not carried out. The process of evisceration refers to the removal of the internal organs of chickens after de-feathering. The internal organs which still contain feed are capable of contaminating raw meat products during evisceration. Also, physical contamination of stone, wood, dust and plastic may potentially cause physical injury to consumers and thus become a food safety concern. In the perspective of halal, feed withdrawal gives a significant impact to compliance with the principles of *tayyib*. For example, Therefore, it is appropriate that this feed withdrawal activity is considered as HCP.

d) HCP 4 Medication withdrawal

Similar to feed withdrawal vaccines and antibiotics are not given to broilers within 7 days before capture. Prior to this stage, the administration of vaccines or antibiotics must follow the procedures and requirements of the DVS. The dosage allowed is also closely monitored by the veterinarian on duty. The withdrawal period is aimed at eliminating any residual elements of the medication in the muscles and internal organs of poultry. Improper administration of vaccines and antibiotics such as non-compliance to prescribed withdrawal period will potentially leave the residue of vaccine or antibiotics at the point of meat consumption. Therefore, the medication and its scheduled monitoring should be carried out by farm workers and it should be verified by the third party through periodic inspections and laboratory analysis. Not only that medication withdrawal raises food safety concern, it is also in agreement with the principles of *tayyib* that halal food we consume should not be harmful to human health due to the presence of chemical residues in the meat. In this case, the residues of chemical substances still found in meat not only have an impact on farm animals but also have a high potential to have long-term adverse effects on humans such as carcinogenic and also allergies. Therefore, this activity should be classified as the fourth HCP in broiler farming activities.

e) HCP 5 Catching process

Next, live chickens will be placed into a basket with a maximum number of 12 birds. This is to prevent any stress and reduce the mortality during transportation to slaughterhouse. In addition, the capture of broilers should be handled with respect and mercy by holding on to the wings and legs. Throwing the body of animals is cruel as it may cause physical injury. The bodily injury could also lead to quality defects of chicken meat. These procedures are in line with the practice of animal welfare which emphasizes compassion and humanity to animals even before. To ensure that this activity is done properly, the farm must provide specific procedures related to this process as well as scheduled competency training to farm workers so that it complies with the practice of animal welfare. Likewise, the principle of animal welfare

is emphasized in the teachings of Islam based on the Quran and Hadith. Therefore, this activity deserves attention and should be considered as fifth HCP.

f) HCP 6 Logistic

After catching activity, the delivery of chickens to slaughterhouses should be carried recommended less than three hours period. This is because if the broiler is in the basket for too long it can cause stress to occur as well as cause of the death of the chicken. The truck used must be clean and not have any non-halal substance that could affect the quality of live chickens before slaughter. In this regard, the interior of the truck must be thoroughly checked to prevent any cross-contamination of pathogenic microorganisms to live chickens. Furthermore, the truck entering the chicken farm should be disinfected especially its wheels. This is to prevent the risk of spreading the disease into the farm from the external area. These precautions are very much emphasized in farm biosecurity. Also, delivery of live chickens is not exempted from the good practice of animal welfare, which is to provide comfort to the animal during transportation. For example, high temperatures of hot weather can cause live chickens to experience heat stress and eventually death during delivery. Therefore, it is highly recommended that delivery should be carried out in the evening or night. Overall, delivery of live chickens to the slaughterhouse is the last activity of animal welfare at the farm, therefore it should be considered as HCP.

g) HCP 7 Slaughterhouse

On the arrival of slaughterhouse, the live chickens on the truck need to be rested and calmed to prevent any emotional stress and thus reduce mortality. In this regard, the ambient temperature must be kept cooled and the chickens need to be showered to lower its body temperature. A summary for the assessment of HCP identified at broiler operation was shown in Table 4.

Table 4: Halal critical control assessment

Step no.	Step	HCP no.	Potential risk ranking assessment			Impact of halal status	Control measure
			Likelihood	Severity	Risk level		
3	Brooding phase • Chicken disposal • Medication	1	Likely	Moderate	7	Significant	<ul style="list-style-type: none"> • Implement biosecurity system programs. • Undertook the company's internal halal audit to test and verify the effectiveness of records and implementation of activities performed. • Obtain approval for the use of medication from the authority of the 'Department of Veterinary Services Malaysia'.
4	Growing phase	2	Likely	Moderate	7	Significant	<ul style="list-style-type: none"> • Implement biosecurity system programs. • Undertook the company's internal halal audit to test and verify the effectiveness of records and implementation of activities performed. • Obtain approval for the use of medication from the

							authority of the 'Department of Veterinary Services Malaysia'.
5	Feed withdrawal	3	Likely	Moderate	7	Significant	<ul style="list-style-type: none"> • Has a scheduled program for effective food withdrawal. • Inspection and monitoring of feed withdrawals the effectiveness of the food safety system.
6	Medication withdrawal	4	Likely	Moderate	7	Significant	<ul style="list-style-type: none"> • Has a scheduled program for effective food withdrawal. • Inspection and monitoring of medication withdrawals effectiveness of the food safety system.
7	Catching process	5	Moderate	Critical	8	Significant	<ul style="list-style-type: none"> • Animal welfare programs following company SOPs and effective animal welfare program monitoring records.
11	Logistic	6	Likely	Critical	9	High	<ul style="list-style-type: none"> • Have procedures or SOPs related to logistics activities. • Internal halal audit by halal executive officers appointed to verify logistics activities.
12	Slaughter house	7	Likely	Critical	9	High	<ul style="list-style-type: none"> • Slaughterhouse workers should reduce the heat temperature of broiler chicken flocks to provide comfort before slaughter. • Practice animal welfare according to company SOPs.

5. Conclusion and Recommendation

Halal critical point assessment for broiler operations emphasizes the principles of animal welfare and food safety in modern times. This assessment will provide a backbone for an effective HAMS by prioritizing the stages at broiler operations that potentially present halal risks. The steps of broiler operations that are identified as important and hence recommended to be HCP are the brooding and growing phase, feed and medication withdrawal, catching of live chicks, logistics and slaughtering. An effective HAMS imposed to farmers should be in line with the rapid development of the broiler industry. Last but not least, it creates more demand for poultry products as its halal integrity and food safety is safeguarded for public health.

References

- Abdul Rahman, S. (2017). Religion and animal welfare- An Islamic perspective. *Animals* MDPI AG. Retrieved from <https://doi.org/10.3390/ani7020011>
- Anuwar, K., Tamkin, J., Roslan, M., & Nor, M. (2017). Manual prosedur pensijilan halal Malaysia sebagai suatu aplikasi memenuhi keperluan konsep halalan tayyiban : Suatu analisis. *Online Journal of Research in Islamic Studies*, 4(1), 1–16. <http://doi.org/10.15364/ris17-0401-01>
- Anwar, M. K. (2018). The urgency of halal assurance system for product reliability. *International Journal of Islamic Business and Economics*, 2(2), 119–125. <http://doi.org/https://doi.org/10.28918/ijibec>.

- Bernama (2015, February 2). Berhati-hati beli ikan keli di pasaran, elak dari sumber diragui. Berita Harian Online. Retrieved from <https://plus.google.com/share?app=110&url=https://www.bharian.com.my/node/32898>.
- Chua Yan Piaw. (2014). Kaedah penyelidikan. Edisi ketiga. McGraw-Hill Education Malaysia Sdn Bhd. McGraw Hill Education.
- Dahlan, H. A., & Abdullah-Sani, N. (2016). "Halal laws": From conception to current challenges. *Persiswa Law Conference*, (August), 103–111.
- Department of Standards Malaysia. (2019). Malaysian standard: MS1500: 2019 (Halal food: General requirement – Third revision). Kuala Lumpur: Standard Malaysia.
- Department of Standards Malaysia. (2019a). Malaysian standard: MS1500: 2019 (Halal food: General requirement – Third revision). Kuala Lumpur: Standard Malaysia.
- Department of Standards Malaysia. (2019b). Malaysian standard: MS2400-1:2019 (Halal supply chain management system- part 1: Transportation- General Requirement) (First revision). Kuala Lumpur: Standard Malaysia.
- Department of Veterinary Services. (2021a). Bilangan Ternakan Ruminan, Babi Dan Ayam/Itik Mengikut Negeri, Malaysia. Retrieved from https://www.dvs.gov.my/dvs/resources/user_1/2021/BPSPV/Perangkaan%202020.2021/1.Malaysia_Perangkaan_Ternakan_.pdf
- Department of Veterinary Services. (2021b). Self Sufficiency Ratio of Livestock Products by Commodity, Malaysia, 2015-2021. Retrieved from https://www.dvs.gov.my/dvs/resources/user_1/2021/BPSPV/Perangkaan%202020.2021/1.Malaysia_Perangkaan_Ternakan_.pdf
- Giriraj, P. (2014). *Handbook of poultry practice*. New Delhi: Venus Books
- Grandin, T. (2017). On-farm conditions that compromise animal welfare that can be monitored at the slaughter plant. *Meat Science*, 132 (2017), 52–58. <http://dx.doi.org/10.1016/j.meatsci.2017.05.004>
- Hassan Noor & Raiyana Salha Rahmat (n.d). *Projek agropreneur: Ayam broiler*. Kuala Lumpur: SAM Synergy Media Sdn Bhd.
- Ibu Pejabat Perkhidmatan Veterinar. (2012). Garis panduan pelaksanaan amalan penternakan baik bagi pensijilan Skim Amalan Ladang Ternakan (SALT), 35.
- Jabatan Perkhidmatan Veterinar. (2010). Pemeriksaan veterinar di ladang ternakan. Kementerian Pertanian Dan Industri Asas Tani Malaysia. No. Dokumentasi: [APTVM 23 (b):1/2010].
- Jabatan Perkhidmatan Veterinar. (2012). Akta Makanan Haiwan 2009. Jabatan Perkhidmatan Veterinar. Malaysia. Retrieved from <http://www.dvs.gov.my/dvs/resources/auto%20download%20images/560a428869e5d.pdf>
- JAKIM. (2020a). Manual prosedur pensijilan halal Malaysia (Domestik) 2020. Jabatan Kemajuan Islam Malaysia. Retrieved from https://smarthalal.com.my/MPPHM_Domestik_2020.pdf
- JAKIM. (2020b). Manual sistem pengurusan halal Malaysia 2020. Jabatan Kemajuan Islam Malaysia. Retrieved from https://smarthalal.com.my/MHMS_2020.pdf
- Jamaludin, M.A., Abdullah MS, Has-Yun YZ. The emergence of global halal industry ecosystem. *J Halal Ind Serv* 2018; 1(1): a0000006.
- Khan., R & Hongfang., G & Sayed Haidar., A. R., & Abdur., R., & Muhammad Ayaz & Zan., L. (2018). Halal slaughtering, welfare, and empathy in farm animals: a review. *Tropical Animal Health and Production*, 50:1733–1738. <https://doi.org/10.1007/s11250-018-1644-1>

- Khoirul Anwar, M. (2018). The urgency of halal assurance system for product reliability. *International Journal of Islamic Business and Economics*, 2(2), 119-125. <https://doi.org/10.28918/ijibec.v2i2.1388>
- Marni, S., Marzura, M. R., A. E. A., & Suliana, A. K. (2017). Veterinary Drug residues In Chicken, pork and Beef In peninsular Malaysia In the period 2010-2016. *Malaysian Journal of Veterinary Research*, 8(2), 71-77.
- Md. Sawari, S. S., & Ghazali, M. A. (2014). Amalan Standard Halal Di Negara-Negara Asia Tenggara. *UMRAN - International Journal of Islamic and Civilizational Studies* (EISSN: 2289-8204), 1(1). <https://doi.org/10.11113/umran2014.1n1.12>
- Micheal Youn. (Ed) (2012). *Scientific poultry production and nutrition*. London: Koros Press Limited.
- Mohd Hasli Ramli, Arieff Salleh Rosman & Muhammad Talhah Ajmain@Jima'ain. (2020). Pengoperasian sistem pengurusan jaminan halal di sektor penternakan ayam pedaging: Satu kajian awal. *Sains Humanika*, 12(3), 67-74. <https://doi.org/10.11113/sh.v12n3.1718>
- Mohd Hasli Ramli, Arieff Salleh Rosman, Aqeel Khan, Nurrulhidayah Ahmad Fadzillah, Mohd Al'ikhsan Ghazali, Abdul Basit Bin Samat @ Darawi, Zilal Saari, Mifedwil Jandra & Nor Azwa Omar Jamli. (2020). Halal Risk Control At The Upstream Level Of The Broiler Chicken Supply Chain. *Journal of critical reviews*, 7(7), 1052-1057. <http://dx.doi.org/10.31838/jcr.07.07.191>.
- Mohd Syauqi, N., Mohd Zaffrin, M.A., & Hasnul, H. I (2015). *Broiler industry in Malaysia*. Economic and Social Science Research Centre, MARDI Headquarters. Retrieved from <https://ap.fftc.agnet.org/ap-db.php?id=532&print=1>
- Mohtar, N. M., Amirnordin, N. A., & Haron, H. (2014). *Ayamas Food Corporation Sdn. Bhd: A study on the factors of consumer behaviour towards halal product selection*. *Procedia - Social and Behavioral Sciences*, 121 (September 2012), 166-185. <http://doi.org/10.1016/j.sbspro.2014.01.1118>
- Mokhtar, M. I., & Munir, S. M. I. (2017). Revisiting the fiqh of halal-haram animals: An analysis on Malaysian fatwa relating to animal care and use. In *1st International Halal Management Conference* (pp. 151-161). Sejong University. Retrieved from <http://eprints.um.edu.my/18502/1/0001.pdf>
- Muhammad Mazuan, R., & Zalina, Z. (2018). Pelaksanaan sistem pengurusan jaminan halal di rumah-rumah sembelihan ayam halal dan isu-isu berkaitan: Satu sorotan literatur. *Journal of Shariah Law Research*, 3(1), 105-124.
- Muhammad Mustakim. (2015, January 20). Kolam ternakan keli jijik, meloyakan. *Berita Harian Online*. Retrieved from <https://plus.google.com/share?app=110&url=https://www.bharian.com.my/node/30347>
- Nawab, A., Ibtisham, F., Li, G., Kieser, B., Wu, J., Liu, W., Zhao, Y., Nawab, Y., Lid, K., Xiaoa, M., Ana, L., (2018). Heat stress in poultry production: Mitigation strategies to overcome the future challenges facing the global poultry industry. *Journal of Thermal Biology*. Elsevier Ltd. <https://doi.org/10.1016/j.jtherbio.2018.08.010>
- Nor Amrina Dahlan, Fadilah Abd Rahman, & Azlina Muhammad. (2016). An overview of the halal regulatory framework for halal certification of hotel in Malaysia. *Journal of Applied Environmental and Biological Sciences*, 6, 1-9.
- Nurulaina, S., Rahman, F. A., & Abdullah, N. (2017). Animal Feed: Halal Perspective. *International Conference on Humanities, Social Sciences and Education (HSSE'17)* London (UK), (March), 68-74. Retrieved from <https://www.researchgate.net/publication/316988900>

- Omar, E. N., Jaafar, H. S., & Osman, M. R. (2012). Assessing halal-toyyiban food supply chain in the poultry industry. *International Halal Conference 2012 (INHAC)*, 0(2011), 4–5.
- Omar, E. N., Jaafar, H. S., & Osman, M. R. (2013). Halalan toyyiban supply chain of the food industry. *Journal of Emerging Economies and Islamic Research*, 1(3), 1–12.
- Quentin Perez. (Ed). (2012). *Poultry farming and feed formulation*. London: Koros Press Limited.
- Razaly, M., & Zakaria, Z. (2018). Pelaksanaan sistem pengurusan jaminan halal di rumah sembelihan ayam halal dan isu-isu berkaitan: Satu sorotan literatur. *Journal Of Shariah Law Research*, 3(1), 105-124. Retrieved from <https://ejournal.um.edu.my/index.php/JSLR/article/view/10771>
- Sani, N. A., & Dahlan, H. A. (2015). Current Trend for Food Safety and Halal Measures. *ASEAN Community Conference 2015, Bangi, Malaysia, (November)*, 11–12. Retrieved from <https://www.researchgate.net/publication/291349460>
- Shahdan, I. A., Regenstein, J. M., & Rahman, M. T. (2017). Critical limits for the control points for halal poultry slaughter. *Poultry Science*, 96(6), 1970–1981. <https://doi.org/10.3382/ps/pew427>
- Sharif Mohd Tahiri & Mohd Izhar Ariff Mohd Kashim. (2017). Maqasid Shariah In Modern Foods. *Al-Qanatir International Journal Of Islamic Studies*. Vol. 6. No. 1 (2017). <http://myjms.mohe.gov.my/index.php/alqanatir>
- Sira, A. R. (2017). Religion and Animal Welfare- An Islamic Perspective. *Animals* 2017, 7, 11. <https://doi:10.3390/ani7020011>
- Uzairiah, S. (2017). *Kajian kualitatif dan analisis temu bual. (Cetakan Ketiga)*. Kuala Lumpur: Aras Publisher.