

HALAL ASSURANCE AT FARM LEVEL IN THE POULTRY SUPPLY CHAIN

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Article history

Received date : 20-4-2020
Revised date : 21-4-2020
Accepted date : 14-7-2020
Published date : 1-10-2020

To cite this document:

Ramli, M. H., Rosman, A. S., SIKIN A. M., Jamaludin, M. A., Ajmain, M. T. (2020). Halal Assurance at Farm Level in the Poultry Supply Chain. *Journal of Islamic, Social, Economics and Development (JISED)*, 5(31), 1 – 11.

Abstract: *Halal Assurance System (HAS) develop by JAKIM has undergone several revisions in its requirement since 2011. HAS is currently practised at the downstream of poultry supply chain focusing only on the slaughtering and production stage of chicken products. Despite of the importance and significance to comply the HAS's halal critical point (HCP) at each step-in poultry processing industry, there are still limited studies emphasizing the HAS the implementation at the upstream level. Thus, this study focuses on the qualitative methodology approach through documentation analysis to obtain sources of information on the importance of HAS and the elements of halal risk control (HRC) in broiler chicken farm activities. Finding shows that there are five elements in the broiler chicken farms that have been identified as HRC includes livestock food and drink, medical, farm biosecurity, infrastructure, and logistics. So, implementing of HAS in the broiler chicken farm is important to maintain the transparency and integrity of halal certification policies in the HRC at the upstream level of halal food supply chain. This study also suggested that HAS can be applied on other livestock sectors such as ruminant and fish for safeguarding the halal status of meat supply chain in Malaysia.*

Keywords: *Halal assurance system, broiler chicken farm, Halal risk control, supply chain, Halal control point*

Introduction

Halal Assurance System (HAS) is the halal management tool using the principle of *halalan toyyiban* in order to maintain the halal integrity of product meant for the market who observes the religious teaching of Islam (Hassan, Arif, & Sidek, 2015; Rahman & Abdul, 2017). It was developed comprehensively ‘*from farm to consumer*’ in the food supply chain and the industry is required to provide the procedures and guidelines specific to their operation to meet the requirements for Halal certification (Shafii & Zain, 2015).

HAS is established to identify, control and monitor any element that is non-compliant to the halal principles in the entire food supply chain (JAKIM, 2010). The implementation of HAS by the food industry players in Malaysia is considered to be very important in securing halal status of food products. HAS does not only focus on getting halal certification from Jabatan Kemajuan Islam Malaysia (JAKIM), but also increasing the level of consumer’s confidence in the production of halal food products. Therefore, every single practice of food processing operation must be aligned to the principles of *halalan toyyiban* (Kohilavani *et al.*, 2013; Syed Fazal Ur Raheem, Neio, & Demirci, 2018). In doing so, the identification of a possibility of haram contamination and its control management or better known as Halal Control points (HCPs) are the key elements in HAS. It is important to emphasize that the evaluation of halal risk should be carried out through the entire supply chain rather than only on primary production (Pazim *et al.*, 2009).

Problem Statement

HAS need to be implemented to prevent cross-contamination of raw materials and processed products from the haram sources. The current implementation of HAS in the poultry industry only focuses on the primary processing. However, the chain of primary processing only begin at transferring live chickens from the farm to the slaughtering house (Omar *et al.*, 2012). It is not extended to the entire supply chain, which should originate from farm to retails. Mohtar, Amirnordin, and Haron (2014) explained that the principle of *halalan toyyiban* must be observed in every point of food supply chain. In the view of poultry supply chain, it is important to emphasize the basic criteria of the HAS, which is the determination of the HCPs at each step or process involved including the broiler chicken farm industry.

Research Objectives

This study is to identify the elements involved as halal risk control points in HAS implementation from the breeding to the slaughtering stage of chicken at the broiler chicken farm industry.

Literature Review

Commercially bred chickens originated from a species of forest chicken, scientifically known as ‘*Gallus gallus domesticus*’. (Dohner, 2001; Appleby, Mench & Hughes, 2004). This chicken species was cross-bred, resulting in the breed of broiler chicken farm with high resistance to diseases, high meat yield and fast growth period (Jamilah, 2015). Raw or processed poultry products are synonymous with Malaysian’s menu. Chicken meat is one of the most consumed food among Malaysia’s consumers for its high protein source and the chicken meat products are mostly from commercially raised poultry breeds (Norimah *et al.*, 2008).

The chicken had been normally reared in a cage at night by the villagers before commercial poultry became a norm. This commercial practice of rearing chicken has changed over the years due to the high demand for chicken meat in Malaysia. For example, automation in broiler chicken farms was developed for feeding foods and giving medicines to the chicken all in one place (Premier, R. (Ed.), T; Hassan & Raiyana, n.d; Youn, 2012; Ariffin *et al.*, 2015; Baluch *et al.*, 2017).

Broiler industry management in Malaysia mostly operates as ‘*integrator*’ which controls all activities such as feed meal and egg production, breeding, hatchery, broiler farming, meat processing and retail. These activities are all integrated in a system known as the vertical integration system (Serin *et al.*, 2011; QSR Trading Portal, 2013). An example of broiler chicken farming industry in Malaysia was shown in Figure 1.

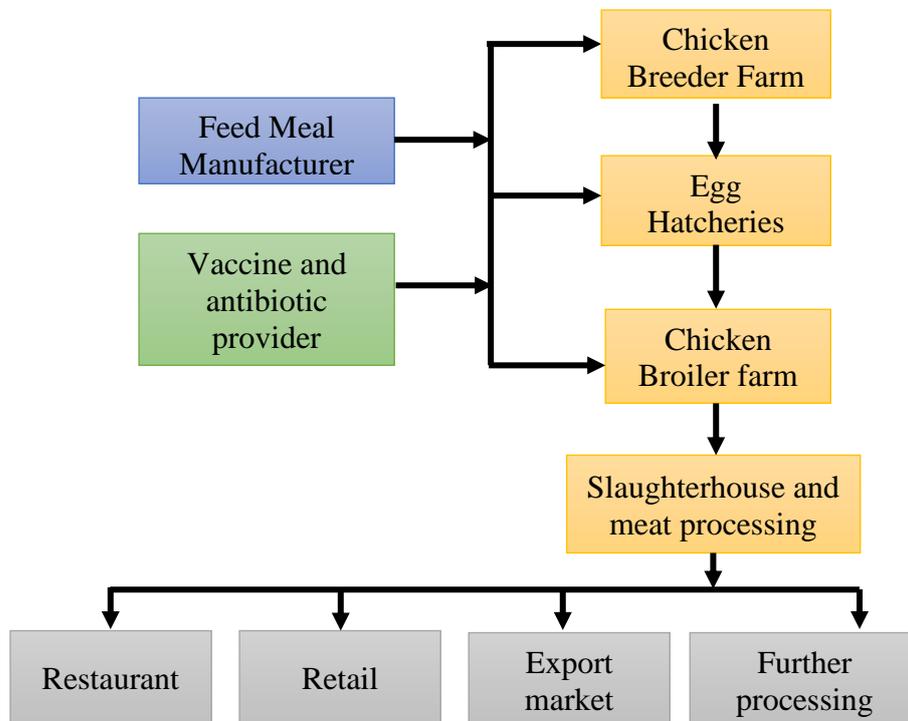


Figure 1: Integration system of poultry farming industry in Malaysia as described by Serin *et al.* (2011).

Halal Assurance System (HAS) is seen as a new system introduced primarily to the food industry in Malaysia. However, the development of halal control points (HCPs) which one of key elements in HAS has not been widely discussed in the animal husbandry industry. The determination of the HCPs, whose approach is adopted from ‘*Hazard Analysis Critical Control Point*’ or HACCP focuses more on the selection of raw materials to the finished product, particularly in processing of raw chicken meat, halal food manufacturing and logistics (Sani & Dahlan, 2015; Dahlan and Sani, 2016). The guidelines for HACCP in Malaysia was published in MS1480 (Second Revision) standard in 2019 (Department of Standard Malaysia, 2019). Based on the guidelines, critical control point (CCP) is defined as a point, operational step or

stage in the process at which is essential to prevent any significant food safety hazard to an acceptable level.

The combination of HACCP principles and Halal concept was a backbone in the development of HAS (Kohilavani *et al.*, 2013; Lau, Jamaludin, & Mei Soon 2016; Rejaii & Arianfar 2016 and Demirci *et al.*, 2016). This integration will not only safeguard the integrity of halal foods from any risk of haram contamination, but also to assure the food safety. Demirci *et al.* (2016) stated that the incorporation of HAS and HACCP system is still new. Hence, the Muslim scholars and Halal authority should work in a collaborative manner to harmonize certain religious terms and requirements into the existing HACCP guidelines.

The HCP determination will ensure that the halal control clearly identify, evaluate and validate no haram substances contaminate the products. Thus, the principles of *halalan toyyiban* must be observed throughout a food supply chain. There are several opinions from the previous studies on the determination of HCPs. Purnomo *et al.* (2018) stated that HCPs can be identified from the raw materials and processing methods using Shariah principles through al-Quran and Hadiths as key guidelines. Shahdan *et al.*, (2016) mentioned that HCPs can be determined through '*Halal Decision Tree- HDT*'. The development of HCPs using a HDT must be based on al-Quran, Hadith and five categories of Shariah such as (i) *fard* (compulsory), (ii) *mandub* (circumcision), (iii) *jaiz/mubah* (must), (iv) *makrooh* (disagree) and lastly is (v) *haram* (forbidden).

Kohilavani *et al.* (2013) and Mohd Bakri, Maarof & Norazmir (2017) stated that process or activity with potential haram elements must be identified before HCPs are determined using a HDT. However, HAS guidelines established by JAKIM simply states that HCPs need to be identified without elaborating further how it could be done. The proper procedures and instrument are not clearly discussed to determine potential HCP. In this regards, the Malaysian Halal Standard MS 2400-1: 2019 (Halalan Toyyiban- Management System Requirements for Transportation of Goods and Services Chain Cargo- First Revision) (Department of Standards Malaysia, 2019) proposed '*Halal Risk Control Point (HRCP) Matrix Assessment*' to systematically define HCPs. A risk matrix table to evaluate the degree of possible haram risks (i.e. likelihood) and severity (i.e. impact) at every step of the activity or process is also explained in the standard. To further clarify the matrix, descriptions on risk classification based on the risk ranking level along with risk classification code are presented. This matrix is considered as a sufficient tool to identify and assess the HCPs at broiler chicken farm.

The scope of this article is to identify all the elements in broiler chicken farming operation which may influence the validity of HAS in poultry supply chain. The elements identified which will facilitate the poultry industry in managing halal risk at farm level include the source of animal feed and livestock medications, farm infrastructure, farm biosecurity and logistics.

Halal Risk Point in Broiler Chicken Farming Industry

Animal Feed

Many tend to optimize their farm's production by providing dirty and impure food to the livestock at a lower cost. Therefore, the most significant issue in livestock animal farming activities is often related to animal feed. For example, the farmers intentionally feed their

livestock with food waste and derivative of severe *najs* (*mughallazah*). This involves providing food that sources of *najs* to livestock be categories as *al-Jallalah* animals (Jamaludin *et al.*, 2017). In Shariah, *al-Jallalah* animals are considered as haram sources until it is quarantined. So, it lead to be one of the halal critical point (HCP) in determined the raw material to be looking for in sustain halal supply chain.

The source of broiler chicken feed is crucial element to determine the HCPs at animal husbandry sector. Unfortunately, industrial wastes such as chicken blood, feathers, fats and carcasses were often used as animal feed, which were believed to contain nutrients necessary for the animal growth (Mead, 2004). On the other hand, the haram substance used in animal feed is categorized as impurities, which may lead to health hazards to consumers. This is clearly stated in the Quran regarding the haram source and its derivative in food consumption. Allah SWT said:

“He has only forbidden (haram) to you dead animals, blood, the flesh of swine, and that which has been dedicated to other than Allah SWT. But whoever is forced [by necessity], neither desiring [it] nor transgressing [its limit], there is no sin upon him. Indeed, Allah SWT is Forgiving and Merciful.”

(al-Baqarah, 173)

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(an-Nahl, 115)

The issue of animal feed with substances that do not meet Islamic law has been widely discussed in Malaysia. For example, the use of internal organs and pig sewage as animal feed by the farmers was identified to reduce the production costs without an awareness on the principle of *halalan toyyiban* (Nurulaina *et al.*, 2017). Jamaludin *et al.* (2017) emphasized that livestock farming should provide a *halalan toyyiban* source of animal feed to not only ensure the halal status of the meat, but also prevent cross-contamination should the status of animal feed is ambiguous. Any potential of cross-contamination in the feeding operation must be considered as HCP if the haram sources were identified. This is because the entire supply chain could be considered as haram should the live chickens had been fed with haram sources such as faeces continuously (*al-Jallalah*). According to Abdullah, Khaled and Ahmed (2010) stated that animal feed sources containing high levels of *Aflatoxins* and heavy metals can harm livestock health and that animal growth will be disrupted. This may lead to cardiovascular system attacks, kidney failure and even bone disease the weak to the chickens. Therefore, the safety issue of animal feed should be emphasized so that it is safe and does not endanger the health of livestock and may subsequently have adverse effects on human health.

Livestock Medication

Zoonotic disease is a serious threat to broiler chicken feed industry. The effects of the spread of the disease can lead to obstruction of growth, efficacy, and low rate of food intake as well as high mortality of broiler chickens. The common viral infections in poultry are *Newcastle disease*, *Avian Influenza (AI)*, *Infectious Bronchitis*, *Infection Bursal Disease*, *Marek's*

Disease, Infection Coryza, Laryngotracheitis Infection, Egg drop Syndrome, Fowl Pox and Fowl Cholera (Jabatan Perkhidmatan Veterinar, 2015a). The prevention of disease is an important and on-going aspect of raising quality livestock and providing good health in the management of poultry farms. The giving of vaccines and antibiotics for livestock is a priority for ensuring good health of livestock.

Vaccines are generally defined as biologic ingredients to enhance immunity to a disease. It contains agents that resemble organisms that cause disease, whether they are weakened or deactivated. The agent will then stimulate the body's immune system to recognize the agent as an impediment and thus protect the host from infections (Jabatan Perkhidmatan Veterinar, 2015a). The use of vaccines on animals is safe and efficient in the production of livestock products and can control the transmission of infectious diseases from livestock to humans (Roth, 2011). Vaccination not only focuses on the general well-being of animals, but also reduces the risk of contamination of harmful bacteria to meat products that affect the quality and safety of food (Wijaksana, Razak & Singh, n.d).

Antibiotics are defined as substances of a veterinary drug produced by microorganisms through chemical synthesis at low concentrations to inhibit growth or kill microorganisms. It is also used to stimulate growth and prevent disease (Jabatan Perkhidmatan Veterinar, 2011). According to Marni, Marzura & Suliana (2017), stated that antibiotic or veterinary drugs are part of different classes of chemicals that function to prevent any virus or bacterial infection and also minimize the potential for repeated infections in livestock. However, the excessive levels of antibiotics or its non-adherent use to the recommended dosage will cause veterinary drug residues in animal muscle (Marni *et al.*, 2017; Shahdan *et al.*, 2017).

Broiler Housing Infrastructure

In the 1960s, the livestock breeding practice was to let the live chickens roam in a free range farm during the day, but kept in cages at night. Over the years, this practice has evolved to an intensive breeding system in which poultry is confined in shelter at all times equipped with other facilities (Youn, 2012). For example, the chicken coop system commonly practice in Malaysia is divided into two types: open and closed system (Jabatan Perkhidmatan Veterinar, 2006). This is to ensure the broiler chickens are healthy and free from any outbreaks of disease in a regularly cleaned environment.

A clean broiler house should have a proper cleaning programme, which includes the cleaning schedule, method of cleaning the broiler's house infrastructure, equipment for poultry drinking and food containers, livestock ventilation system as well as farm biosecurity systems. Youn (2012) stressed out that the activity of broiler housing cleaning must be performed on a regular basis to prevent the accumulation of chicken drops, which could cause the infection and cross-contamination of pathogenic bacteria such as *E.coli*, *Salmonella*, *Listeria monocytogenes* and *Campylobacter* to the livestock and animal feed, respectively. In addition, the accumulation of chicken droppings will also contaminate the atmosphere with high amount of ammonia, which subsequently causes respiratory stress and problems to the livestock.

Biosecurity at the farm

Farm biosecurity system focuses on precautionary measures to reduce the risk of spreading the infectious disease to agricultural and livestock products (Jabatan Perkhidmatan Veterinar,

2006; Department of Agriculture, Fisheries and Forestry, Australian Government, 2009; Official Portal of Farm Biosecurity, 2018). It refers to steps involved in preventing the spread of contagious zoonotic diseases from the sources intrinsic and/or extrinsic to the farmland that could potentially infect livestock (Maduka *et al.*, 2016). The measures include close monitoring of the worker's cleanliness and their flow at the farm as people could be the main vectors of the disease to live broilers. The vehicles carrying broiler chickens from farm to slaughter houses should always be kept clean and sanitized. Also, the farm must be fully fenced to prevent any entry of other animals such as dogs, cats or wildlife, which are capable of spreading pathogenic bacteria or virus to live chicken (Calduch *et al.*, 2013). The segregation and/or isolation of infected chickens from healthy ones must be carried out to prevent the spread of diseases. The immediate disposal of dead chickens must be carried out in an appropriate manner to prevent the viral or bacterial cross-contamination to soil, water and the atmosphere. In this regards, Calduch *et al.* (2013) suggested that the best method to dispose dead chickens is by incineration or burying it into the soil. They added that if a live chicken is infected, it must be slaughtered immediately so that it does not become infection vectors to other chickens. Also, the farm management activities such as broiler housing cleaning, poultry wastes disposal and sanitization of floor, wall, feed and drink containers should be scheduled periodically. Other than that pest control measures should also be in place such as the installation of barriers like nets and rodent traps to prevent pests from entering the broiler house.

Logistics

Logistics in the delivery of chickens to the slaughter house is considered as one of the most important activities in poultry supply chain. It is also categorized as one of the halal control points as it covers the welfare of livestock. The Department of Veterinary Services Malaysia (2015) described healthy and comfortable conditions, supplied with adequate food and nutrition are important for the animal welfare. Also, the animal should be safe from any kind of threat and situation, which potentially causes pain and stress. Similarly, Shahdan *et al.* (2017), described that there is less awareness of animal welfare among local community compare to western countries community that have high awareness and strong support on animal welfare. Besides, animal welfare are related with free of pain, hunger and thirst, freedom from fear and distress. Farm animals should be treated nicely especially where animals must have opportunity to enjoy the good environment and life. Good animal welfare levels are also linked to the control of diseases and allowable veterinary medical care, good feed management and good humane treatment (Jabatan Perkhidmatan Veterinar, 2015b; Shahdan *et al.*, 2017).

From Shariah perspective, animal welfare are refer to all animals being raised must be not hunger and thirst, the animals feel comfortable stay in the cage, not suffer any pain, injury or disease. As results the al-Quran verse on *Al-Nahl 16:49* mention about animal welfare on a specific instruction as to treats with kindness, respect and consideration; to be feed, watered and sheltered to animals. This concept had been practiced by halal slaughterhouse and Malay traditional slaughtering (Suhaimi, 2005). Therefore the aspect of appropriate logistic component and condition that be carried out at broiler chicken farming activities must involve from delivery of chicken from farm to slaughter house and other retail places. If the logistic activity does not followed a proper halal compliance procedures, it will result stress disorder to the broiler chicken during delivery process by lorry and this will effect to the quality of meat produced (Shahdan *et al.*, 2016).

Koknaroglu & Akural (2013) recommended that 4-6 chickens should be placed into a cage in a well-ventilated environment to reduce stress to the broiler chicken during transportation to the slaughter house. The live chicken must then be quarantined before being slaughtered to reduce the body temperature and also make the animal calm conditions. The transportation of live chicken by excess number of chicken being loaded into cage will increase stressful level during transportation to slaughter house. To prevent stress level a farmers need to ensure a good air movement within cage which to assure a good ventilation during transportation. Therefore, the chickens are under stress will only cause death but also cause a poor quality of meat to occur after slaughter (Koknaroglu & Akural, 2013; Shahdan *et al.*, 2016). The animal welfare during transportation should always be in line with the Shariah requirement and not permissible in Islam. Therefore, it is important to consider this of logistics at the farm level to the slaughter house as HCP in implementing of HAS management at the broiler chicken farm industry.

Conclusion

One of the main objectives of HAS is to further enhance the integrity of the halal compliance products in the entire supply chain. This will involve the identification of the authentic and halal raw material supply to the end consumers. The current implementation of HAS in the poultry industry in Malaysia is only from the receiving of live birds in a slaughterhouse to processing of chicken carcass. It has not put any emphasis in the husbandry of chicken at farm level. The elements discussed in this paper are important in fulfilling the principle of *halalan toyyiban* and thus the halal assurance management specific to broiler chickens farming. Further study is needed to evaluate the method for determining the HCP and implementing HRC. Thus, the recommended HAS at farm level will further enhance the halal integrity of poultry meat processing in Malaysia.

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