



The halalan thayyiban supply chain in handling blood products of slaughtering cattle, chicken, and pig for feeding and handling al-jallalah (cattle, chicken, and catfish)

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ABSTRACT

Blood from the slaughter of cattle and chicken, is an economically valuable waste that can not be disposed into the environment. Its application in animal feed requires careful consideration of the composition and potential impact. The Indonesian Ulema Council issued a Fatwa regarding the Law on Livestock Animals Fed with Unclean Items. From a Sharia perspective, the feed composition is crucial, since it needs to be free from unclean ingredients to prevent animals from becoming classified as Al-Jallalah (Livestock Animals Fed with Unclean Items). To ensure compliance with the religious guidelines, it is necessary to implement a quarantine (Al-Istibra) or purification period (Istihalah). Therefore, this study aimed to analyze the halalan thayyiban supply chain in the management of blood from slaughtering ruminants (cattle), poultry (chicken), and pig for feed. Implementation of good practices in managing blood from slaughterhouses was assessed. The suitability of feed labels, including the presence of prohibited ingredients, adherence to good practices, and the application of Al-Istibra or Istihalah in cattle and chicken farms, as well as catfish farming units, was evaluated through questionnaire interviews and conformity scores. The results showed that 2 out of 7 (seven) objects received lower scores due to the limited effectiveness of the Waste Water Treatment Plants (WWTPs) and unclear regulations regarding the use of blood. Based on the suitability value of the feed label, 1 (one) out of 8 (eight) objects received a lower score for failing to meet technical requirements. The feed was contaminated, and there were no operational procedures for implementing Al-Istibra or Istihalah.

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1 Introduction

In 2019, the slaughter in Indonesia both within and outside slaughterhouses, was recorded at 1,930,620 livestock, with beef cattle dominating at 1,102,256 heads. This was followed by 507,565 pigs, 181,783 goats, 108,472 sheep, 28,028 buffalo, and 2,516 horses (BPS 2020). In addition, the chicken population in 2020 reached 3,308,081,024, comprising broiler, free-range, and laying chickens in sequential order (BPS 2021). When converted to the amount of blood produced from the slaughter processes, the volume is abundant and often used in various industries such as lysine supplements, vitamin stabilizers, milk substitutes, and nutritional components (Mandal 2014). It is important to acknowledge that the provision of feed to livestock, poultry, and aquatic animals is the basic right of living creatures to obtain the best food. Studies have been conducted on the use of ingredients such as blood for animal feed. For example, a ration containing a 20% mixture of sunflower leaves and blood meal was efficiently used and tolerated by the weaned rabbits. Furthermore, adding 4% blood meal to the diet had the best effect on body weight gain, feed conversion, and age at first egg laying (Utomo *et al.* 2014). It is important to acknowledge that the inclusion in animal feed rarely exceeds 5% for all types of animals, including livestock, poultry, and aquatic animals (Khawaja *et al.* 2007; Utomo *et al.* 2014; Ramadhan *et al.* 2015). However, the use of blood as a feed source has generated considerable controversy. According to the Al-Hanafiyah (Az-Zaila'i) school of thought, blood that gushes out of the body is classified as mughallazah uncleaness. Similarly, the Al-Malikiyah school of thought views large quantities of blood to be unclean. In the Ash-Safiiyah School, any uncleaness not classified as heavy or light, including non-pig blood, is automatically considered mutawassithah. This is in accordance with the words of Allah SWT QS An-Nahl (16) Verse 115, "Indeed, Allah has only forbidden you carrion, blood, pork, and animals

slaughtered by not mentioning the name of Allah, but when forced to eat, without desire or transgressing limits, indeed, Allah is Most Forgiving and Merciful."

In reality, blood of land animals is considered unclean and used by the society (*al-ma'fu anhu*) even in small amounts. The haram law of blood and carcasses are interrelated due to the unclean nature.

According to Islamic law, feeding animals with unclean substances is prohibited to ensure that the meat remains suitable for human consumption. The Hadith of the Prophet Muhammad SAW mentions Al-Jallalah animals, stating,

"From Abdullah bin 'Amr in marfu' that the Al-Jallalah animal cannot be eaten until it has been fed grass for 40 days." (HR Al-Baihaqi).

Al-Jallalah animals, including four-legged mammals, poultry, and fish, are those that are halal to eat but prohibited when their primary diet consists of dirt and impurities. These animals become halal for consumption only after being subjected to a process called Istihalah. The term etymologically comes from the root word (*ha-wa-la*) which means change. It also originates from the word which means to bring change. In the concept of science, synonyms for the word Istihalah are transformation (exchanging all characteristics and properties) and chemical decomposition (decomposition) (Nuryani & Kashim 2014). As the country with the second-largest Muslim population globally, Indonesia has established regulations and standards for animal-based feed mixtures. Since 2006, the Minister of Agriculture has implemented Regulation Number 482/Kpts/PD.620/8/2006, prohibiting the importation of Blood meat due to its risk of transmitting Bovine Spongiform Encephalopathy (BSE) (Kementan 2006). Additionally, the MUI issued the Indonesian Ulema Council Fatwa Number 52 of 2012 concerning the Law on Livestock Animals that are Fed with Unclean Items (MUI 2012).

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Table 1: Recapitulation of total weight, NKmax, NKmin, IK, and suitability categories for each study object

No	Recapitulation	Slaughterhouse			Livestock and cultivation units			
		Cattle	Chicken	Pig	Cattle		Chicken	Catfish
					MPS	TMPS		
1	Total weight	501	438	355	441	197	94	211
2	Maximum conformance value (NKmax)	1,503	1,314	1,005	1,323	591	282	663
3	Minimum conformance value (NKmin)	0	0	0	0	0	0	0
4	Conformity interval (IK)	501	438	335	441	197	94	221
5	Suitable category (S)				> 66.67			
6	Inappropriate category (S)				33.33-66.67			
7	Non-Conforming category (TS)				< 33.33			

MPS = Making own feed, TMPS = Not making own feed

In a broader concept, maintaining the halal integrity of animal-origin food products from upstream to downstream is crucial. Muslims are required to consume halal food and avoid prohibited items to ensure health and reflect good behavior (Yousef 2010). According to Omar *et al.* (2012), adherence to both halal and thayyib principles is essential throughout the supply chain. While similar to conventional supply chains, halal systems differ in their adherence to Sharia law, including specific management processes and documentation (Bahrudin *et al.* 2011). Tieman (2011) further explained that a halal supply chain should avoid contamination, which is addressed through Halalan Thayyiban Critical Control Points (HTCCP). This approach, akin to the Hazard Analysis Critical Control Point (HACCP) system, focuses on preventing halal products from becoming non-halal by evaluating critical control points. To maintain halal status, products need to remain uncontaminated by non-halal items throughout the supply chain. Implementing Halalan Thayyiban Supply Chain (HTSC) and HTCCP evaluations ensures that halal status is preserved within broader supply chains, including food product supply chains. An assessment by Omar & Jaafar (2011) in the poultry industry applied HTCCP at critical points, focusing on handling blood from the slaughter of ruminants (cattle), poultry (chicken), and pig, as well as handling Al-Jallalah.

2 Methodology

2.1 Data Types and Sources

This study adopted both quantitative and qualitative methods. Primary data were collected from respondents through interviews using questionnaires, and supplemented with a conformity assessment based on regulations and standards. The study objects were slaughterhouses for cattle, chicken, and pig in the DKI Jakarta and West Java areas, alongside cattle, chicken farms, and catfish cultivation units in West Java.

2.2 Study Stages

The following is an overview of the flow of halalan thayyiban critical control points (HTCCP) from slaughterhouses to farms and cultivation units for handling blood from slaughter (Figure 1).

In the first stage, interviews were conducted to evaluate the implementation of good practices and handling of blood from slaughterhouses for chicken, cattle, and pig. The scope of the interview relates to the profile of the slaughterhouse, organizational structure and description of the division of tasks, and special data, including observation of blood storage (HTCCP2), processing (HTCCP3), and perception of HTCCP. Subsequently, a conformity inspection of slaughterhouses was performed using the Seputra format (2015) to evaluate the implementation of good practice methods for blood handling. The inspection followed established regulations (HTCCP1), including: (1) Law Number. 41 of 2014 concerning Amendments to Law Number 18 of 2009 concerning Animal Husbandry and Animal Health (UU 2014), (2) Minister of Agriculture Regulation Number 13/Permentan/OT.140/1/2010 concerning Requirements for Ruminant Slaughterhouses and Meat Handling Units (Kementan 2014), (3) Minister of Agriculture Regulation Number 11 of 2020 concerning Certification of Veterinary Control Numbers for Animal Product Business Units (Kementan 2020), (4) SNI 01-6159-1999 concerning Slaughterhouses (BSN 1999a), (5) SNI 01-6160-1999 concerning Poultry Slaughterhouses (BSN 1999b), (6) SNI 99002: 2016 concerning Halal Slaughter of Poultry (BSN 2016), (7) SNI 99003-2018 concerning Halal Slaughter of Ruminant Animals (BSN 2018), and (8) HAS 23103 Guidelines of Halal Assurance System (HAS) Criteria on Slaughterhouses (LPPOM MUI 2012).

The second stage assesses the conformity of feed labels for cattle, chicken, and catfish on farms and cultivation units with regulations, using the inspection table from Seputra (2015). Feed suitability inspections are conducted with reference to specific indicators. These include the presence of prohibited substances (the amount of blood used (HTCCP4)), the packaging label specifying the origin of blood (HTCCP5), nutritional information in the feed products (HTCCP6), and information from the seller confirming the presence of blood (HTCCP7). Additionally, the inspections cover licensing documents, the scope of conformity inspection, and the location and storage space for feed. The regulatory framework (HTCCP1) is harmonized to include (9) Law No. 41 of 2014, amending Law No. 18 of 2009 on Animal Husbandry and Animal Health (UU 2014), (10) Minister

of Agriculture Regulation No. 65/Permentan/OT.140/9/2007 on Guidelines for Feed Quality Supervision (Kementan 2007), (11) Minister of Agriculture Regulation No. 22/Permentan/PK.110/6/2017 on Feed Registration and Distribution (Kementan 2017), (12) Regulation of the Minister of Maritime Affairs and Fisheries No. 55/PERMEN-KP/2018 on Fish Feed (KepKKP 2018), and (13) Minister of Agriculture Decree No. 471/Kpts/OT.210/5/2002 (Kementan 2002).

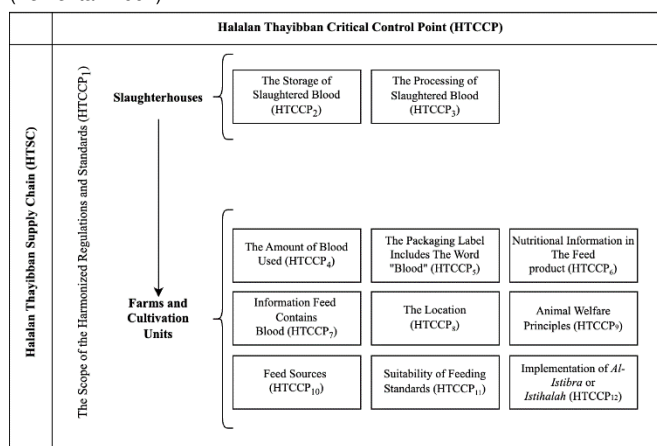


Figure 1: Halalan thayyiban critical control point from slaughterhouse to livestock and cultivation units (modified from Omar *et al.* 2012)

In the third stage, interviews were conducted to evaluate the application of al-istibra or istihalah in cattle, chicken, and catfish farms potentially using blood as a feed substitute, which directly correlates with good practices. The interview focused on the location of the farm and cultivation unit (HTCCP8), animal welfare principles (HTCCP9), feed sources (HTCCP10), suitability of feeding standards (HTCCP11), and implementation of al-istibra or istihalah (HTCCP12). Subsequently, a conformity inspection was conducted to assess the suitability of the livestock or cultivation unit, using the Seputra (2015). The indicators covered feed availability, location, land, water, energy sources, facilities, buildings, building construction and layout, cleanliness of facilities and equipment, preparation of cultivation containers, handling of results, and transportation. These aspects were in line with the following regulations: (14) Law no. 41 of 2014 concerning Amendments to Law Number. 18 of 2009 concerning Animal Husbandry and Animal Health (UU 2014), (15) Decree of the Director General of Animal Husbandry and Animal Health Number 5594/Kpts/T1.040/F/04/2020 concerning Technical Instructions for Assessment of the Application of Cultivation Methods Good Livestock (Good Farming Practices) (Kementan 2020), (16) Decree of the Minister of Maritime Affairs and Fisheries of the Republic of Indonesia Number KEP.02/MEN/2007 concerning Good Fish Cultivation Methods (KepKKP 2007), (17) Regulation of the Director General of Aquaculture Number 65/PER-DJPB/2015 concerning Guidelines for Implementing Certification of Good Fish Cultivation Methods (DJPB 2020), and (18) SNI 8228.4:2015 concerning Good Fish Cultivation Methods Part 4: Freshwater Fish (BSN 2015a).

2.3 Data Processing and Analysis Methods

In this study, the desired number of classes was 3 (three). Data on the total weight, NK_{max}, NK_{min}, IK, and suitability categories were presented in Table 1. All data obtained were then analyzed descriptively by comparing with applicable regulations and standards.

$$NK = \sum_{a=1}^n (B \times S) \rightarrow \text{Score NK} = \frac{NK_{total}}{NK_{max}} \times 100 \dots \dots \dots (1)$$

where:

- Nk : Conformity value,
- B : Weight,
- S : Score,

The conformity class interval is calculated using the equation according to Supangkat (2007):

$$IK = \frac{NK_{max} - NK_{min}}{k} \dots \dots \dots (2)$$

where:

- IK : Conformity interval,
- NK_{max} : Maximum conformance value,
- NK_{min} : Minimum conformance value,
- k : Number of classes,

3 Results

3.1 Profile of Ruminant (Cattle), Poultry (Chicken), and Pig Slaughterhouses and Evaluation of Good Practices

According to the Minister of Agriculture Regulation Number 13/Permentan/OT.140/1/2010 (Kementan 2010), a slaughterhouse is a building with special design and construction that meets certain technical and hygienic requirements. It is a place to slaughter animals other than poultry for consumption by the general public. Based on the management patterns, slaughtering businesses are divided into Types I, II, and III. Type I is owned by the regional government and functions as a public service. Type II is privately owned and managed independently or in collaboration with other private companies. Meanwhile, Type III is owned by the regional government and managed jointly with the private sector.

Based on the completeness of carcass withering process facilities, animal slaughtering businesses can be divided into two categories I and II. Category I is without carcass withering facilities, producing warm carcasses, while Category II is with carcass withering facilities, producing chilled and/or frozen carcasses.

The evaluation of good practices in ruminant and pig slaughterhouses was conducted to meet technical requirements. This includes the criteria listed in several regulations and standards relating to good and halal practices (specifically for cattle). In cattle slaughterhouses, there are 43 criteria for good practice, namely main tasks and functions, land and location, supporting facilities, fences, entrance and exit areas, main buildings, animal drop-off and reception areas, animal holding and resting pens, pens isolation, use of productive females, permitted/legal animals, administration and veterinarian offices, canteen, prayer room, employee and clothing changing rooms, bathrooms, toilets, guard house, cooling/withering room, carcass and/or meat loading area, incinerator, waste handling facilities, meat release and distribution room, meat packaging room, fast freezing room, frozen storage room, laboratory, equipment, containers, veterinary public health, workers, employees, halal management team, stunning, manual slaughter, post slaughtering, post-slaughter handling and storage, vehicle and product distribution, pest control and sanitation, use of chemicals, halal policy, education and training, labeling, traceability, handling of non-Halal compliant products, internal audits, and management reviews.

In pig slaughterhouses, the criteria for good practice include main tasks and functions, land and location, supporting facilities, fences, entrance and exit areas, main buildings, animal drop-off, and reception areas, animal holding and resting pens, isolation pens, use of productive females, administrative and veterinary offices, canteen, prayer room, employee and clothing changing rooms, bathrooms, toilets, guard house, cooling/withering room, carcass and/or meat loading area, incinerator, waste handling facilities, release room and meat processing, meat packaging rooms, fast freezing rooms, cold storage rooms, laboratories, equipment, containers, veterinary public health, workers, employees, production activities, vehicles and products distribution, pest control and sanitation, as well as use of chemicals (Figure 2).

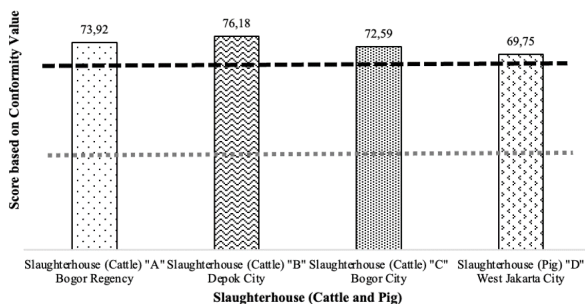


Figure 2: Recapitulation of scores based on NK (Conformity value) for ruminant (cattle) and pig slaughterhouses

Information:

- : Corresponding threshold line (S)
- ...: Inconsistent threshold line (TS)

Several aspects require attention when evaluating good practices in ruminant (cattle) and pig slaughterhouses. The functionality of Waste Water

Treatment Plants (WWTPs) and Incinerators should be prioritized to ensure recommendations for Upaya Pengelolaan Lingkungan (UKL) and Upaya Pemantauan Lingkungan (UPL). This enables the production of waste that maintains environmental sustainability. Outdated WWTPs are not operating optimally to generate wastewater suitable for disposal into water bodies, and this issue demands urgent resolution. The meeting angle between walls and floors, currently not curved with a radius of 75 mm, and the angle between the walls not curved with a radius of 25 mm, should be repaired to comply with regulations. Employee health checks should be conducted regularly, at a minimum of once a year, to ensure well-being. Replacement land needs to be prepared to maximize slaughterhouse development, specifically with road access for cattle transport vehicles and meat transportation, separate bathrooms and toilets in clean and dirty areas, and proper doors leading to the production room. Additionally, effective use of each room should be ensured, avoiding the mixing of newly arrived cattle with those already in holding pens. Regular water quality monitoring is essential, and the existence of graves behind the slaughterhouse is considered to be a barrier to the external environment. The formation of a Halal management team is crucial to ensure compliance. For pig slaughterhouses, the installation of a designated pig herding route (gangway) from the holding area to the slaughterhouse is strongly recommended.

In the poultry slaughterhouse, the evaluation of good practices was conducted to meet technical requirements. This includes the criteria listed in several regulations and standards relating to good and halal practices. The criteria for good practice in chicken slaughterhouses were location and land, facilities, fences, entrance and exit areas, main buildings, administration and veterinarian offices, employee rest areas, canteens and prayer rooms, employee restrooms and changing clothes, showers, toilets, waste processing facilities, incinerators, guard house, foot dip and hand washing facilities, halal policy, workers, employees, halal management team, education, training, permitted/legal animals, pre-slaughter, equipment, containers, stunning, manual and mechanical slaughter, post-slaughter, post-slaughter handling and storage, labeling, vehicles and product distribution, veterinary public health, fast freezing room, frozen storage room, poultry meat room, laboratory, traceability, handling of non-Halal conformity products, internal audits, management reviews, insect, rodent and/or other pest control programs, disinfection and cleaning programs, and chemicals (Figure 3).

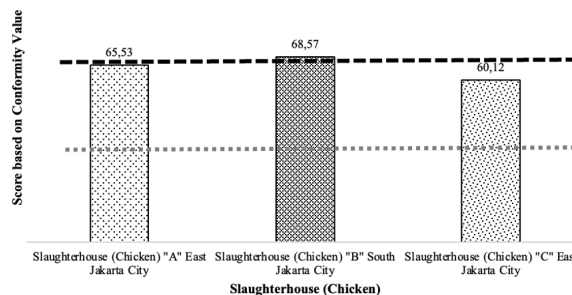


Figure 3: Recapitulation of scores based on NK (Conformity value) for chicken slaughterhouses

Information:

- : Corresponding threshold line (S)
- ...: Inconsistent threshold line (TS)

Several aspects require attention when evaluating good practices in chicken poultry slaughterhouses. The functionality of WWTPs and incinerators needs to be ensured to receive recommendations for UKL and UPL. This is essential for managing waste in an environmentally sustainable manner and preventing pollution. Considering that Chicken RPHU is located in the densely populated Pulogadung Industrial Area, strict adherence to regulations is critical. A key concern is the mixing of newly arrived chicken with those already in the cage, as well as the simultaneous transport of live and slaughtered birds, both of which should be avoided. Structural adjustments are also necessary where the angles between walls and floors are not curved with a 75 mm radius, and where wall-to-wall angles lack a 25 mm radius. These modifications are essential to meet regulatory requirements. Hand-washing facilities should be hands-free, and foot dips are required. Employee health needs to be maintained through regular check-ups regularly at a minimum of once a year. Additionally, there should be a focus on the implementation and effectiveness of the 11 Halal Guarantee System Criteria, as chicken is a critical product requiring a Halal Certificate for distribution. Secure storage for employees' personal items is needed, with lockers in changing rooms. Finally, when slaughtering animals, it is advisable to use a stand or rail to maintain hygiene standards.

3.2 Evaluation of Blood Handling Results from Slaughterhouses (HTCCP2 and HTCCP3)

Handling of blood from slaughterhouses follows different standards. In some cases, blood is processed in WWTPs, either by collaboration with various WWTP providers or through usage as a feed substitute.

Alternatively, it may be supplied directly to fish farming units. The table below presents an overview of handling of blood from cattle, chicken, and pig slaughterhouses (Table 2).

Table 2: Description of handling of blood from slaughter

Slaughterhouse	Form of processing
Poultry (chicken)	<p>a. Blood is included in slaughter waste and enters the WWTPs. The clotted blood is sometimes used along with chicken carcasses and the remaining intestines are adopted as maggot feed.</p> <p>b. Solid waste in the form of intestinal tips, bones, feathers, carcasses, and blood collected during the slaughter process is transported by the fur waste processor. Some of the carcasses are also used by fish farming units as feed. Blood waste that enters the WWTPs is discharged into small rivers while it is still red.</p> <p>c. Slaughter waste including blood, waste, and intestine contents is processed from the start to enter the WWTPs.</p>
Ruminants (cattle)	<p>d. There was a separate treatment between blood and intestine waste which actually caused foul smell and cattle were reluctant to enter the slaughterhouse environment. Finally, the process was mixed inside (WWTPs) and no blood came out of the slaughterhouse.</p> <p>e. Blood from the slaughterhouse was collected for use as a raw material for animal and fish feed. However, after obtaining halal certification, processes related to bleeding are no longer permitted.</p> <p>f. When there is a maggot cultivation unit, blood and Intestine content waste are used as feed. Blood was used to mix the pomfret and catfish feeds. However, when applying for Halal Certification, the practice of blood exiting the slaughterhouse is no longer enforced.</p>
Pigs	<p>g. Blood waste is released at the beginning of the neck piercing process and is directed to enter the WWTPs along with feces from the cage. Currently, fur, blood, feces, and entrails are no longer permitted to leave the slaughterhouse. However, sometimes some people ask for blood and dirt for religious rituals.</p>

3.3 Evaluation of Good Practices in Livestock and Cultivation Units

The evaluation of good practices in cattle farming was conducted to meet technical requirements. This includes the criteria listed in several regulations and standards relating to Good Livestock Cultivation Methods (HTCCP8, HTCCP9, HTCCP10, and HTCCP11), Good Feed Manufacturing Methods (if the farm also makes its feed), and feed quality control. The criteria for Good Livestock Cultivation Methods comprise location and land, water and energy sources, females and bulls, beef cattle, feed, livestock, and livestock equipment, veterinary medicine, cages, construction and size of cages, other buildings, maintenance patterns (intensive, semi-intensive, and extensive), mating and recording systems, animal disease situations and prevention, animal welfare, environmental conservation, and human resources. These are applied to farms engaged only in cultivation businesses without feed production, with an additional focus on ensuring the absence of prohibited ingredients in feed and appropriate packaging and labeling. For cattle farms performing both cultivation and feed manufacturing business, 26 criteria relating to Good Feed Manufacturing Methods and feed distribution were applied to obtain a distribution permit from the Indonesian Ministry of Agriculture (Figure 4).

Several aspects require attention in evaluating good practices in cattle farming. The distance between sheep and cattle cultivation locations, less than 100 m, necessitates a risk analysis by the district/city office. Additionally, implementing UKL and UPL is crucial to mitigate environmental impact. There is a need for social security that supports work, individual safety, and security. A simple clinic should be established to handle mildly sick livestock. In particular, laboratory tests for feed raw materials are essential. Policies should mandate regular handwashing, the use of special clothing, periodic health checks for employees, as well as a prohibition on smoking, eating, and drinking in unauthorized areas. Adequate facilities need to be provided for the storage of work and personal clothing (Figure 5).

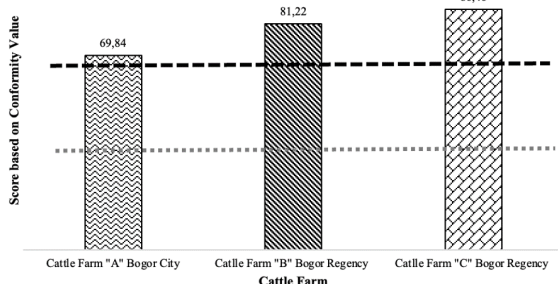


Figure 4: Recapitulation of scores based on NK (Conformity value) for cattle farming
 Information:
 —: Corresponding threshold line (S)
 - - - : Inconsistent threshold line (TS)

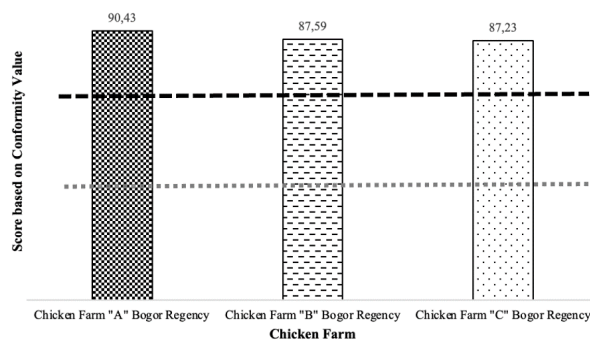


Figure 5: Recapitulation of scores based on NK (Conformity value) for chicken farming

Information:
 —: Corresponding threshold line (S)
 - - - : Inconsistent threshold line (TS)

Good practices in broiler chicken farming are evaluated to ensure compliance with technical requirements. These include criteria listed in several regulations and standards relating to Good Livestock Cultivation Practices (HTCCP8, HTCCP9, HTCCP10, and HTCCP11) and feed quality monitoring. Good Feed feed-making methods were not applicable because feed production was not performed by the study subject. The assessment criteria comprised land and location, water supply and energy sources, livestock tools, and machinery as well as animal health, day-old chicks (DOC), veterinary medicine, type, construction, and layout of buildings, as well as employee management. Additionally, the evaluation covered the quality and safety of feed, including packaging and labeling. This assessment focused on chicken farms engaged solely in cultivation.

Several aspects require attention in evaluating good practices in chicken farming. Facilities need to have a solid and liquid waste processing system. Stakeholder guidance is essential to ensure the provision of high-quality feed for livestock. Additionally, permanent or semi-permanent fencing is necessary to prevent contamination and disturbances that could impact farm operations. The evaluation of good practices in catfish farming units is conducted to meet technical requirements. This includes adherence to criteria outlined in various regulations and standards related to fish feed, Good Fish Cultivation Practices (HTCCP8, HTCCP9, HTCCP10, and HTCCP11), and certification procedures. Assessment criteria comprise the location, source, management, and use of water, construction design, layout and cleanliness of facilities, preparation, and maintenance of containers, and equipment, seed quality, species maintenance, and stocking density, feed and the application, fish health management, waste and environmental, harvest, post-harvest, handling and distribution of results, workers and personnel, training, record and documentation, corrective actions, correction, and verification, as well as control. This evaluation focuses on catfish cultivation units engaged solely in cultivation without feed production (Figure 6).

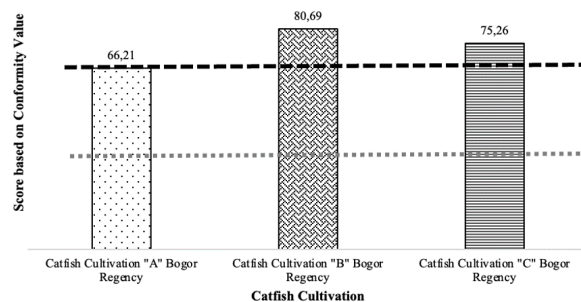


Figure 6: Recapitulation of scores based on NK (Conformity value) for catfish cultivation

Information:
 —: Corresponding threshold line (S)
 - - - : Inconsistent threshold line (TS)

Several critical areas require attention in the evaluation of best practices in fish farming units: The use of slaughterhouse waste, poultry by-products (including blood, intestines, and other discarded parts), and dead catfish as feed should be scrutinized more closely. Additionally, efforts to filter and settle water are essential to ensure water quality, and the standardization of raw water should be implemented. To prevent contamination, it is crucial to process both liquid and solid waste to avoid environmental pollution from waste being discharged directly into rivers. Furthermore, permanent or semi-permanent fencing is necessary to prevent contamination and disturbances that could impact the processes within the cultivation unit.

3.4 Evaluation of the Suitability of Labels that List the Presence of Prohibited Ingredients in Feed and the Application of Al-istibra' or Istihalah (HTCCP12) on Farms and Cultivation Units

The use of unclean feed in farms and cultivation units is prohibited by Islamic law, as it can affect the quality of an animal's meat, raising concerns about the halal status and safety. Furthermore, the inclusion of certain feed components, such as blood meal, can have negative consequences. An increase in the percentage of blood meal in feed correlates with a decline in growth rates. This is in line with Kurniasih (2011), who stated that blood meal exhibits tough characteristics, possibly due to the presence of fibrinogen fibers, causing low digestibility. These properties hinder the breakdown of other feed components, reducing livestock productivity. Additionally, the high isoleucine content in blood meal may pose a challenge, as it can inhibit the digestibility of other feed ingredients. Titin (2011) emphasized that the elevated iron content in blood meal interferes with the absorption of other nutrients, while insufficient amino acid isoleucine can lead to weight loss and a reduction in carcass production.

Quality standards for animal and poultry feed are regulated directly by the Directorate of Feed under the Directorate General of Animal Husbandry and Animal Health, Ministry of Agriculture of the Republic of Indonesia. An example of a standard is SNI 3148.2:2017 (BSN 2017) (Concentrate Feed – Part 2: Cattle Cut). Typically, ruminant feed is composed solely of plant-based ingredients or derivative waste, with no inclusion of animal-based components in the mixture. Common feed ingredients include onggok (milled tapioca residue from cassava or cassava) and cassava wheat bran, molasses, coffee husks, palm oil meal, copra cake, CGF (corn gluten feed), and rice bran (rice bran), as shown in Figure 7 and Figure 8. However, cattle farms use a mixture of beer industry dregs as feed. Therefore, further study is needed to determine whether the dregs disrupt the halal integrity of cattle and the derivative products.

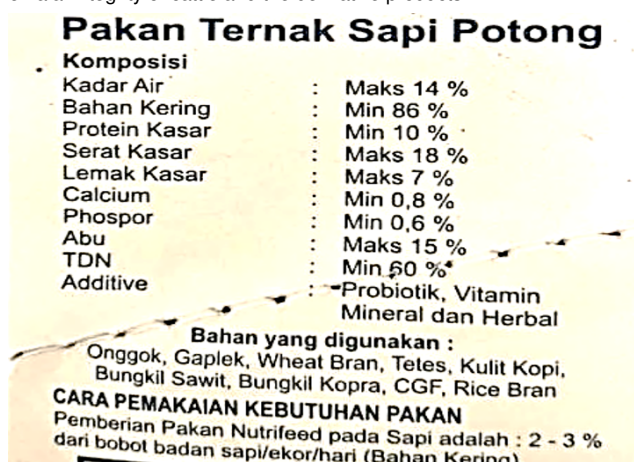


Figure 7: Feed label A of cattle

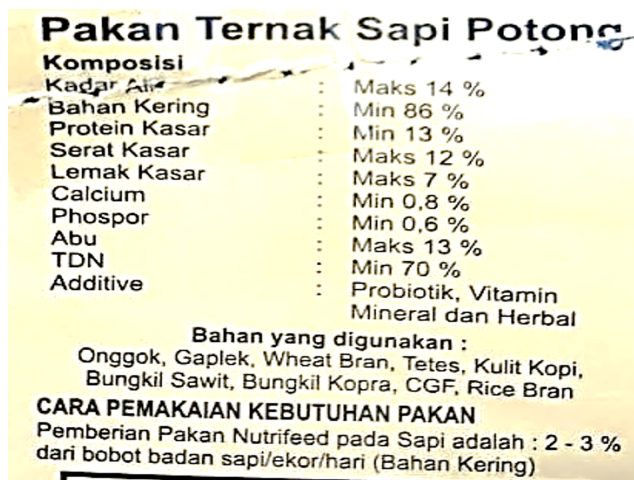


Figure 8: Feed label B of cattle

In accordance with the Decree of the Director General of Animal Husbandry and Animal Health Number 5594/Kpts/T1.040/F/04/2020 (Ditjen PKH 2020) concerning Technical Instructions for Assessing the Application of Good Farming Practices in the feed regulations, "the use of feed mixed with hormones, certain antibiotics, blood, meat, and bones are prohibited". This is because ruminants, such as cattle, dislike the fishy odor

produced from raw materials derived from animal products. Additionally, the prohibition is reinforced by the Decree of the Minister of Agriculture Number (471/Kpts/OT.210/5/2002), which bans the use of meat meal, bone meal, blood meal, meat and bone meal, and other ruminant-derived ingredients in ruminant feed (Kementan 2002).

An example of a standard is SNI 8173:2015 (Pre-Starter (Part 1), Starter (Part 2), and Finisher (Part 3) Broiler Chicken Feed (BSN 2015b). In practice, preventive measures to ensure that these chicken do not fall under the category of Al-Jallah have not been established. Poultry feed ingredients, particularly for broiler chicken, include raw materials of animal origin such as bone meal, meat meal, and meat and bone meal. Manufactured feed typically include a composition of corn, bran, soybean meal, coconut meal, meat and bone meal, wheat shreds, peanut meal, and leaf meal. According to Khawaja *et al.* (2007), incorporating 3% blood meal in broiler chicken rations does not negatively impact the performance of starter and finisher broilers. Increasing supply of blood meal reduces body weight due to the low levels of sulfur amino acids and isoleucine. Other manufactured feeds have a composition of ingredients in the form of yellow corn, rice bran, soybean meal, meat and bone meal, and vegetable oil, as shown in Figure 9 and Figure 10. Further investigation is required to determine whether meat and bone flour interfere with the halal integrity of chicken.

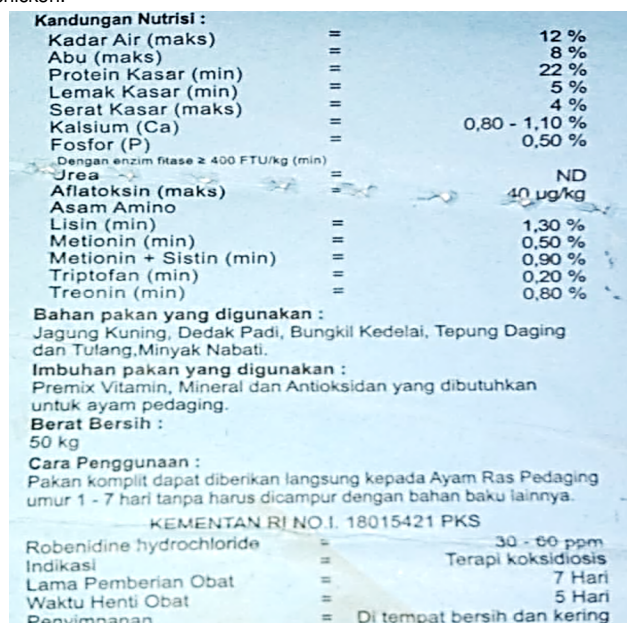


Figure 9: Feed label C of chicken

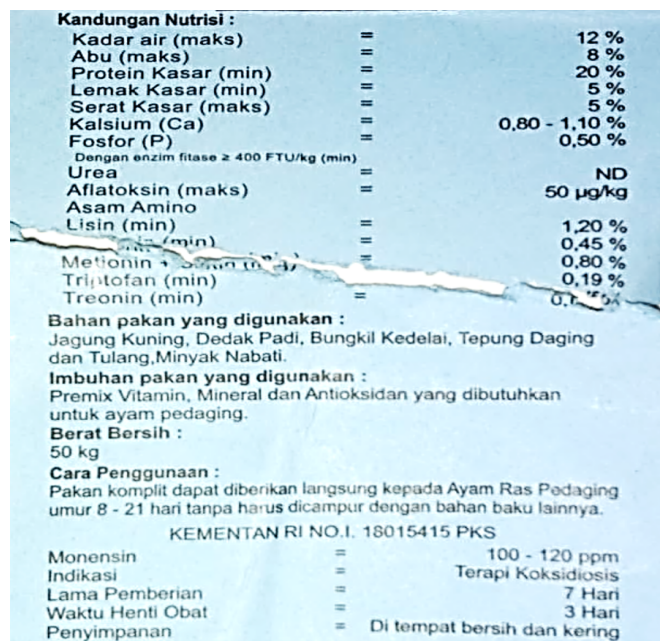


Figure 10: Feed label D of chicken

There are no rules or standards that regulate the application of Al-istibra' or Istihalah for chickens for chicken farming, leading to farmers not implementing Al-istibra' or Istihalah.

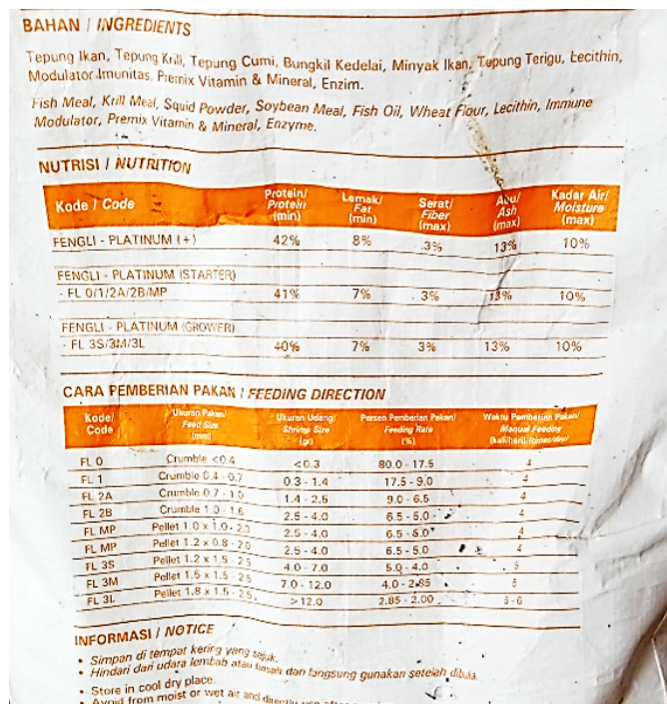


Figure 11: Feed packaging E of fish



Figure 12: Condition of feed from slaughterhouse waste

Quality standards for aquatic animal feed are regulated directly by the Directorate of Fish Feed and Medicine, under the Directorate General of Aquaculture, Ministry of Maritime Affairs and Fisheries, Republic of Indonesia. An example of the standard is SNI 01-4087:2006 (BSN 2006) (Artificial Feed for Catfish (*Clarias gariepinus*)). Catfish feed ingredients typically include raw materials of animal origin, such as fish meal, krill meal, squid meal, soybean meal, fish oil, wheat flour, lecithin, immunity modulators, premix vitamins and minerals, and enzymes. In addition, feed from other brands contains fish meal, soybean meal, wheat shreds, rice bran, vitamins (A, C, D3, E, K, B2, B6, B12), niacin, calcium D-pantothenate, choline, chloride terrace minerals, and antioxidants as shown in Figure 11. Other compositions may include fish meal, poultry meal, wheat flour, soybean meal, soybean oil, MPC, lysine, methionine, vitamins, and minerals. According to Palanggi *et al.* (2013), the quality of feed produced from blood meal treatment with added crude extracts of protease enzymes and Flavo cyanophage microbes is comparable to feed containing 100% fish meal. The use of fish-based ingredients, namely fish meal and squid

meal, alongside animal-derived feed such as poultry meal, is common. The practice of providing unclean feed was reported in catfish farming units that used waste from chicken slaughterhouses.

There are no rules or standards that regulate the application of Al-istibra' or Istihalah for catfish cultivation units, leading farmers to avoid procedural implementation. While a quarantine period is in place for catfish prior to shipment, it cannot be reliably used to determine whether catfish has fully completed the process. The study conducted using real-time PCR examined catfish skin gelatin fed with pork-contaminated feed (Figure 12-14). The results showed pig contaminant DNA in feed (Faruqi 2019).



Figure 13: Condition of fish that have passed the quarantine period Take a break Al-Istibra'



Figure 14: Quarantine pool of fish

4 Discussion

Blood from slaughtered livestock and poultry is considered a waste with high economic value and is often used in various industries. However, it is considered a major source of pollution through spillage. Blood is collected by specialized officers using storage drums with a size of ± 20 liters. This waste is further processed as a mixture of animal feed (fish, ducks, etc.) (Padmono 2005). There needs to be clarity regarding the rules governing the release and use of blood by certain parties. Inconsistent practices have been observed, as some blood is processed only at WWTPs, while portions are repurposed for uses such as pomfret and catfish feed, maggot feed, feather waste processing, and even for rituals.

In cattle and poultry farms, no prohibited substances were detected in relation to blood use (HTCCP4). However, in fish farming units using poultry slaughterhouse waste, prohibited substances such as blood, were observed. The packaging label did not contain the word "blood" (HTCCP5). Similarly, the feed label only provides nutritional information on products (HTCCP6). This is because blood or its derivatives are not applied in animal feed (HTCCP7). Beef cattle farming has been regulated implicitly in an effort to prevent the livestock from being classified under Al-Jallah, in accordance with the Decree of the Minister of Agriculture Number 471/Kpts/OT.210/5/2002 (Kementan 2002). Therefore, the poultry feed label should include the phrase "PROHIBITED FOR USE FOR RUMINANT ANIMAL FEEDING (COWS, BUFFALO, GOATS, AND SHEEP) written entirely in capital letters and colored red. In fish-farming units, preventive measures to ensure fish are not included in Al-Jallah have not been implemented. In 2006, fish farmers in Malaysia used animal by-products such as pig intestines. It is important to acknowledge that catfish farming practices in Indonesia continue to include the use of impure feed.

According to Imam An-Nawawi in al-Majmu' Syarh al-Muhadzdzab IX/30, the Sya'fi'iyah colleagues define Al-Jallah as an animal that

consumes dirt and other unclean substances. This category includes camels, cows, goats, and chicken. Some argue that an animal whose diet primarily consists of unclean items is classified as Al-Jallalah. In contrast, an animal with a predominantly clean diet is not considered Al-Jallalah. The prevailing scholarly opinion holds that the classification is based not on the quantity of unclean food but on the presence of a foul odor. An animal is classified as Al-Jallalah when its hair, nape, or other parts emit an unclean smell. The absence of such an odor means it is not Al-Jallalah. Camel meat that changes in aroma is deemed makruh (disliked) to consume, with no disagreement among scholars. In another Hadith, the Prophet Muhammad SAW said:

"Ibn Umar reported that Rasulullah SAW prohibited riding or drinking the milk of Al-Jallalah animals whose primary diet consists of unclean substances" (HR Abu Dawud).

Scholars have varying opinions on the level of impurity required for an animal to be considered Al-Jallalah and the corresponding rulings (1) First Opinion*: An animal that consumes more unclean things than clean food is classified as Al-Jallalah. This view, held by the Al-Hanabilah, Al-Hanafiah, and Ash-Shafi'iyah schools, suggests that such an animal's meat becomes similar to rotten food, making it forbidden to eat. The Al-Hanabilah school also prohibits buying and selling these animals, (2) Second Opinion: An animal that consumes a significant amount of unclean matter is considered Al-Jallalah. Minimal consumption does not render it Al-Jallalah. This perspective, held by the Al-Hanabilah school, differentiates between 'more' and 'a lot,' though the precise threshold is undefined, (3) Third Opinion: Classification as Al-Jallalah is based on the presence of an unclean odor rather than the quantity of unclean food. An animal with a foul odor in its sweat or other smells is Al-Jallalah. The absence of such an odor means it is not classified as Al-Jallalah. This is the predominant view in the Ash-Shafi'iyah school.

Istihalah is the transformation process from unclean ('ain najasah) into pure, either naturally or through intermediaries (Hehsan 2015). According to Sarwat (2019), it was defined as "the change of an object's character and nature or the absence of any determination." This means that an object transitions from its original form to become a different entity with distinct substances and properties. Istihalah includes physical modifications, content alterations, or both. In Islamic law, Istihalah is governed by specific rules outlined in the Al-Qur'an, Hadith, Al-Ijma, and Al-Qiyas, and is supported by various fiqh principles. It is reinforced by Al-Qiyas, the fourth source of Islamic law. For Istihalah, the Hadith of the Prophet Muhammad SAW can be applied outside the context of Al-Jallalah. The foundational rule in fiqh states: "Everything is permissible (halal) unless there is a proof that specifically states otherwise. Istihalah comprises 3 basic elements, namely the original material, the agent of transformation, and the new material (Jamaluddin *et al.* 2012). In fiqh discussions, several terms related to Istihalah are considered, including Al-Istihlak, Al-Intiqal, Al-Tabi'iyat, and Al-Istibra. Among these terms, Al-Istibra is most relevant to Al-Jallalah. It refers to quarantining an original material for a specific period and purpose, such as purification. In the context of Al-Jallalah, Al-Istibra includes isolating an animal to remove its unclean nature, usually by providing clean feed. Scholars differ on the duration required for an animal to be considered pure, taking into account the potential impact on the meat's taste, smell, and color.

Table 3: Opinions of ulama regarding al-istibra' or the period of animal purification

Cleric	Animal purification period (days)			
	Camel	Cow	Goat	Chicken
Hanabilah	40	40	7	3
Al-Shafi'yah*	40	30	7	3
Hanafiyah	10	10	4	3
Imam Ahmad	40	40	7	3

*) There is no specific time limit for determining the duration, the benchmark is the time known by habit or high suspicion that the unclean smell has disappeared

Based on Table 1, validation should be conducted in accordance with field data related to Standard Operating Procedures for Handling Al-Jallalah in livestock. This includes evaluating the al-istibra mechanism in terms of location, duration, feed intake during al-istibra, and the verification process that confirms the animal has undergone al-istibra. The objective is to ensure the animals intended for consumption are halal and appropriate, particularly for Muslims, and to eliminate any doubts. At present, the application of the Istihalah concept is restricted to preventive measures as specified by state regulations and standards. For instance, Malaysia's National Fatwa Council and the JAKIM Halal Certification Procedures Manual classify animal feed as a non-certifiable product. Additionally, the Federation of Malaysia's standard MS 1500:2009 on Halal Food—General Guidelines for Production, Preparation, Handling, and Storage (Second Revision), addresses feeding practices in 2 relevant clauses (Malaysian Standard 2009). Clause 3.5.1.1.1.h asserts that livestock intentionally and continuously fed with unclean substances, such as excrement, are not considered Halal for consumption. Similarly, Clause 3.5.1.1.2 specifies that aquatic animals exposed to or fed with unclean substances are also not Halal (MS1500:2009). Indonesia, the country with the highest Muslim population, has established regulations and standards for animal feed

mixtures. Since 2006, the Minister of Agriculture has enforced Regulation Number 482/Kpts/PD.620/8/2006 (Kementan 2006), which prohibits the importation of certain ruminant products, including blood meal, due to concerns about BSE disease agents. Additionally, the Indonesian Ulama Council (MUI) issued Fatwa Number 52 of 2012 (MUI 2012), which addresses the permissibility of livestock fed with unclean items. This fatwa outlines that (1) Livestock fed with minimal amounts of unclean items or elements, remains halal for consumption, including meat and milk; (2) When the feed contains engineered elements from haram products that do not alter the smell, taste, or safety of the animal's products, the livestock is still considered halal. However, if the feed affects the smell or taste or poses a danger to consumers, it is deemed harmful; and (3) Animal feed products mixed with pork or its derivatives, or other unclean animals, are deemed harmful and cannot be sold. Therefore, to standardize Al-istibra' or Istihalah procedures, it is necessary to have complete rules and standards that explicitly regulate the implementation of Al-istibra' or Istihalah in an effort to quarantine animals included in Al-Jallalah through the authentication procedure of quarantine periodization (Istihalah-Al-Istibra).

5 Conclusion

In conclusion, the suitability of slaughterhouses for Cattle, Pig, and Chicken was good, with 5 of 7 facilities receiving appropriate marks. However, some facilities failed to meet technical standards, leading to poor hygiene, sanitation, and environmental contamination risks. The WWTPs were ineffective, and no facilities had replacement land, despite a lack of compliance with location requirements. While blood waste was mostly processed through WWTPs, it was occasionally used as raw materials for animal feed, religious rituals, or other purposes, which raised concerns. In livestock and aquaculture units, cattle, chicken, and catfish farms were mostly compliant, with only one facility receiving a lower rating. However, unclean feed was used in some fish and indirectly in poultry farms, with no operational guidelines for Al-istibra' or Istihalah being established. Prohibited substances (blood) were not detected in cattle and chicken farms, but catfish farms did use chicken slaughterhouse waste. Regional governments needed to enforce technical requirements to ensure the production of safe, healthy, and halal meat. Clear regulations on blood usage, WWTPs functions, and operational procedures for Al-istibra' or Istihalah were urgently needed to maintain halal integrity. This was particularly important in relation to quarantine periods, which have been scientifically validated, and studies on the duration required for animals fed unclean food, a topic that continues to develop.

Conflict of Interest

The authors declare no conflict of interest.

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