



THE INTEGRATION OF HACCP AND HAS 23000 IN THE MEAT INDUSTRY TO ENHANCE AUDIT MANAGEMENT EFFECTIVENESS AND EFFICIENCY

Dhea Ana Mishanty¹, Melfa Yola^{2*}, Anwardi³, Harpito⁴, Muhammad Ihsan hamdy⁵, Mohammad Ikbar Abdul Wahab⁶

^{1,2*,3,4,5}Universitas Islam Negeri Sultan Syarif Kasim, Pekanbaru, Riau, Indonesia

⁶Universiti Kuala Lumpur - Malaysian Institute of Industrial Technology, Johor Bahru, Johor, Malaysia

Correspondence: melfa.yola@uin-suska.ac.id

Abstract

Research aims: This study aims to design and validate an integration model between the Hazard Analysis Critical Control Point (HACCP) system and the Halal Assurance System (HAS) 23000 to enhance the effectiveness of internal audits at slaughterhouses while ensuring food safety and halal compliance.

Design/Methodology/Approach: The research used a qualitative approach with the Expert Judgment method involving three experts (halal industry practitioners, industrial engineering academics, and halal quality management). The stages include: (1) mapping HACCP and HAS 23000 criteria, (2) designing an integration model based on the similarity of document functions and processes, (3) validation through a questionnaire with a scale of 1-9, and (4) feasibility analysis based on the percentage of scores.

Research findings: The validation results indicate that the HACCP–HAS 23000 integration model falls into the Highly Suitable category (average 80.4%). This model aligns HACCP Critical Control Points (CCPs) and HAS 23000 critical activities within a unified audit framework, potentially enhancing efficiency, consistency in oversight, and the integrity of the halal supply chain.

Theoretical Contribution/Originality: This study offers two innovations: (1) the first integration model specifically designed for NKV III slaughterhouses, (2) the application of Expert Judgment to align the scientific perspectives of HACCP and HAS 23000 sharia standards.

Practitioners/Policy Implications: For RPH, this model has the potential to simplify internal audits and reduce document duplication. For BPJPH, it can be adopted as technical guidelines for halal certification for small-scale RPH. Globally, it offers a solution for countries with fragmented halal certification.

Research Limitations/Implications: The study was limited to three expert respondents and focused on one slaughterhouse case. Future research should validate the model across multiple facilities and expand the expert panel. Long-term implementation studies are needed to assess practical effectiveness.

Keywords: Expert Judgment, Food Safety, Integration of HACCP-HAS 23000, Integrated Internal Audit, Slaughterhouse Management

Introduction

The global halal industry is currently experiencing rapid growth, with a market value reaching USD 2.3 trillion, primarily due to increasing consumer



awareness of safe, halal, and thayyib products (Nor et al., 2023; Yulastri & Huda 2024). In Indonesia itself, the demand for halal meat continues to rise, driven by the majority Muslim population and the growing demand for healthy and sharia-compliant food consumption. However, there are still significant challenges in this sector, particularly because approximately 85% of slaughterhouses (RPH) are not yet halal-certified (Hardi et al., 2024). Allah SWT states in Q.S Al-Baqarah verse 168, which reads:

يَا أَيُّهَا النَّاسُ كُلُوا مِمَّا فِي الْأَرْضِ حَلَالًا طَيِّبًا وَلَا تَتَّبِعُوا خُطُوَاتِ الشَّيْطَانِ إِنَّهُ لَكُمْ عَدُوٌّ مُبِينٌ ﴿١٦٨﴾

“O mankind, eat from whatever is on earth that is lawful and good, and do not follow the footsteps of Satan. Indeed, he is to you a clear enemy.” This verse emphasizes the importance of consuming food that is not only halal but also good (thayyib), encompassing aspects of food safety and hygiene (Febrian & Hadi, 2023).

The government has established regulations through Law No. 33 of 2014 on Halal Product Assurance, updated by Law No. 11 of 2020 and Government Regulation No. 39 of 2021, as a form of strengthening halal policy. Research indicates that halal certification can enhance consumer trust and confidence in products, thereby serving as a key differentiator in competitive markets, particularly in the food and beverage sector (Tini et al., 2025; Habibie, 2023). Halal certification refers to the Halal Assurance System (HAS) 23000, which regulates halal policies, ingredient control, and risk management (Anggarkasih & Resma, 2022; Amirullah et al., 2024). On the other hand, food safety in slaughterhouses must also be ensured through the implementation of Hazard Analysis Critical Control Point (HACCP), which serves to prevent contamination and ensure that meat remains safe for consumption (Farahita & Junianto, 2024; Lestari et al., 2024).

An example of good halal governance practices can be seen in Malaysia through the Malaysian Islamic Development Department (JAKIM), which acts as the main halal authority. JAKIM not only regulates the halal certification process, but also develops the Halal Assurance System (HAS) to ensure integrity and transparency in the halal product supply chain (Suriyah et al., 2023). Additionally, JAKIM actively participates in international cooperation for the harmonization of global halal standards, which is increasingly important given the high demand for halal products worldwide (Abdallah et al., 2021; Sauzan Hasanah et al., 2025; Putri & Amri, 2025).



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The integration of HACCP and GMP standards into the halal regulatory system has proven to offer various benefits. HACCP enhances food safety assurance and consumer confidence in halal products while GMP ensures that production processes adhere to principles of cleanliness and ethics, aligning with halal values (Priyanto et al., 2022). Studies in the food processing industry show that the simultaneous application of both improves operational efficiency and product integrity (Rifai et al., 2023).

Several studies indicate that the implementation of HACCP not only enhances consumer confidence but also helps meet export standards (Hasan et al., 2022; Widodo et al., 2022). Unfortunately, challenges also arise in duplicate documentation due to a lack of integration between systems (Lestari, 2023), while consistent internal audits are one of the keys to quality control (Nur & Istikomah, 2021).

In the European Union, food safety is regulated through the FSSC 22000 standard, but the halal certification system remains fragmented among member states, leading to inconsistent standards and confusion at the industry and consumer levels (Abdallah, 2021; Bacelo et al., 2024). This situation contrasts with the centralized approach in Malaysia, which is managed by JAKIM. Globally, the challenge of integrating halal systems with food safety standards like HACCP remains high, particularly in countries that do not require halal certification, such as the United States (Al-Mahmood & Fraser, 2023). Conversely, Turkey has demonstrated success through a strong, export-oriented national halal system (Yusoff et al., 2022), although generally, differences in approaches between countries still hinder the harmonization of global halal standards (Karim et al., 2022).

A comparison between Malaysia and the European Union shows that centralized halal governance tends to be more effective in maintaining integrity and enhancing product competitiveness. Malaysia's approach through MS 1500:2019 and JAKIM oversight strengthens the position of the halal export market, while regulatory fragmentation in Europe risks reducing consumer confidence (Alrobaish et al., 2021). This underscores the need to develop adaptive and relevant integration models across systems and regions.

The integration of food safety systems and halal certification is a key focus in strengthening the quality of the food industry. Elizabeth et al., (2021) demonstrated that the integration of ISO 22000:2018 and HAS 23000 can enhance the effectiveness of audits in the meat industry. Similar findings were reported by Afifah & Irianto, (2021) through the integration of halal standards with Good Manufacturing Practices (GMP) in the pharmaceutical sector. The HACCP system plays an important role not only



in maintaining product quality but also in promoting process efficiency (Hasibuan et al., 2020). Its integration with HAS 23000 is considered capable of providing more comprehensive assurance regarding the safety and halal status of food products (Purwanto & Rofiq, 2020). Additionally, management policies that apply the ASUH principles also determine the effectiveness of implementing this system in slaughterhouses (Anggraini et al., 2021).

However, most studies remain limited to specific product types such as cattle and poultry. Highlight the lack of attention to other ruminant species, necessitating a more inclusive approach. Usman et al., (2023) also emphasize the importance of comprehensive halal risk analysis, including aspects of impurity and errors in slaughtering. In general, the challenges of integrating HACCP and HAS 23000 include limited product coverage and suboptimal sharia-based risk analysis. Therefore, the development of an adaptive and comprehensive model is necessary to ensure the system can be implemented synergistically in daily industrial practices.

To date, no specific research has examined the integration of HACCP and HAS 23000 in the operations of ruminant slaughterhouses (RPH), particularly the NKV III category, which has limited resources. Previous studies generally discussed the two systems separately and have not produced an integrated internal audit model that is applicable. The lack of technical guidelines, weak documentation, and the absence of a dedicated internal audit team reinforce the urgency of developing an adaptive integration model to enhance the effectiveness of oversight and compliance with halal standards and food safety.

The integration of HACCP and HAS 23000 is considered crucial for creating more efficient and accountable production processes at RPH Ruminansia X. Several studies indicate that such integration can improve performance, efficiency, and regulatory compliance (Fahira & Yasin, 2022; Riwayati et al., 2020; Sagita et al., 2025; Sagita et al., 2024; Sulastri et al., 2023). Based on observations and interviews, it was found that the quality monitoring system at RPH X is not yet operating optimally. Quality inspections are reactive, training is not conducted regularly, and shift work procedures are not standardized, which could potentially affect product quality and halal compliance.

This gap indicates a research opportunity to develop an internal audit model that integrates HACCP critical control points (CCPs) and HAS 23000 simultaneously, so that food safety and sharia compliance aspects can be monitored in a single system. Given the complexity of integrating these two systems and the limitations of previous research, the expert judgment



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approach was chosen to explore comprehensive perspectives from experts. Expert judgment is effective in addressing multidimensional challenges, as it can gather and synthesize expert opinions for strategic decision-making (Yu & Kuncel, 2020). In the context of integrated systems, this method has been widely used, as demonstrated by to evaluate and formulate management strategies in complex environments. Its advantage lies in its ability to mediate various information sources to produce data-driven decisions, as demonstrated in the application of Total Quality Management (TQM) relevant to RPH. Additionally, expert judgment can integrate documents and systems more efficiently, bridge knowledge gaps, and strengthen entrepreneurial orientation and competitiveness (Dewanti, 2022)

This study developed an integrated internal audit model based on HACCP and HAS 23000 that is applicable and adaptable for ruminant slaughterhouses, with the unique feature of integrating critical control points (CCPs) from both systems HACCP for food safety and HAS 23000 for sharia compliance so that both aspects can be monitored simultaneously within a single audit framework. The model was developed using the expert judgment method, involving experts in food safety, halal audit, and the RPH industry to ensure scientific validity and alignment with field practices. It is expected to enhance the effectiveness of oversight, simplify internal audit processes, and strengthen the quality and competitiveness of the halal industry, particularly in the animal slaughtering sector, through an integrated approach that efficiently meets food safety standards and halal certification requirements.

This research provides practical contributions to slaughterhouses, regulators, and training institutions through an efficient, risk-based internal audit model that integrates halal and food safety systems. Academically, this study presents an innovative adaptive integration model of HACCP and HAS 23000, with the main challenges being limited resources, differences in scientific and sharia approaches, and the absence of standard technical guidelines in the field.

Literature Review

Hazard Analysis Critical Control Point (HACCP)

HACCP is a quality assurance system that focuses on controlling hazards at critical points in the food production process (Lestari et al., 2024). This system aims to prevent and minimize risks from biological, chemical, physical, environmental, and ergonomic hazards in a systematic manner (Mafaza & Kumalasari 2022). According to Suratmono et al., (2016), HACCP consists of 12 steps, from team formation to documentation. At the



slaughterhouse, critical control points include animal inspection (Alba et al., 2023), slaughtering process, equipment sanitation, carcass processing, and storage and distribution (Ortêncio et al., 2020). Each CCP must have critical limits that are monitored, accompanied by correction, verification, and recording procedures. HACCP is a quality assurance system that emphasizes controlling hazards at critical points during the food production process (Lestari et al., 2024).

HAS 23000

In Indonesia, the Halal Assurance System (SJH) refers to the HAS 23000 standard published by LPPOM MUI, covering HAS 23000:1 (criteria) and HAS 23000:2 (procedures) (Alfiana & Wicaksono, 2020). HAS 23000 ensures the sustainability of the halal process during the certification period (Nabilah et al., 2024), starting with the preparation of the SJH Manual by business operators. This standard includes 11 criteria, such as: halal policy, halal management team, human resource training, use of halal ingredients, production facilities, traceability, critical activity procedures, internal audits, and management reviews (Fauzi et al., 2023; Pratiwi et al., 2025).

International Studies and System Integration Practices

Several countries have implemented integration between halal and food safety systems. Malaysia is a successful example through the MS 1500:2019 standard, which combines HACCP and GMP principles under the supervision of JAKIM (Suriyah et al., 2023). The United Arab Emirates uses the UAE.S 2055 framework, which integrates OIC/SMIIC halal standards with ISO 22000 for global exports (Karim et al., 2022). Meanwhile, European countries rely on FSSC 22000, but face challenges of halal certification fragmentation due to the absence of a central authority (Aulia et al., 2025; Bacelo et al., 2024).

A study by Elizabeth et al. (2021) shows that system integration can improve audit effectiveness, but it is still limited to large industries. This underscores the need for an adaptive integration model for RPHs with limited resources.

Table 1
Comparison of Food Safety and Halal Integration Systems in Several Countries

Country	Standard	Advantage	Weaknesses
Malaysia	MS 1500:2019 + HACCP + GMP	Integrated, supervised by JAKIM (Suriyah et al., 2023).	Need strong audit resources
EU	Halal (SMICC) + ISO 22000		Less flexible for SMEs



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		Suitable for global export (Karim et al., 2022).	
European Union	FSCC 22000 + Private Halal	Strong food safety system (Bacelo et al., 2024).	Halal standards are not uniform
Indonesia	HAS 23000 + ISO 22000	Improve audit & process efficiency	Limited to large industries

Source: Suriyah et al., 2023; Karim et al., 2022; Bacelo et al., 2024; Elizabeth et al. 2021

Research Methodology

This study used a descriptive qualitative approach with the Expert Judgment to design and validate the HACCP-HAS 23000 integration model in slaughterhouses. Expert Judgment technique was chosen to gradually obtain expert consensus to ensure strong integration between food safety and halal assurance systems.

Data Collection

Primary data was obtained through direct observation of facilities, workflows, and operational procedures at the Pekanbaru City Slaughterhouse, as well as semi-structured interviews with managers, operational staff, and meat inspectors. Meanwhile, secondary data was obtained through literature studies on HACCP standards, HAS 23000, government regulations, and analysis of internal documents from the slaughterhouse.

Characteristics and Selection of Expert Judgment Panel:

1. Three expert panelists were involved in the expert judgment, consisting of academics, halal industry practitioners, and quality management system experts. The experts were selected purposively based on the following criteria:
2. At least 5 years of experience in implementing HACCP or HAS 23000 systems,
3. Active involvement in halal or food safety certification,
4. Contribution to the development of related policies or training,
5. Preferably with experience in international collaboration (particularly in the context of standard harmonization).

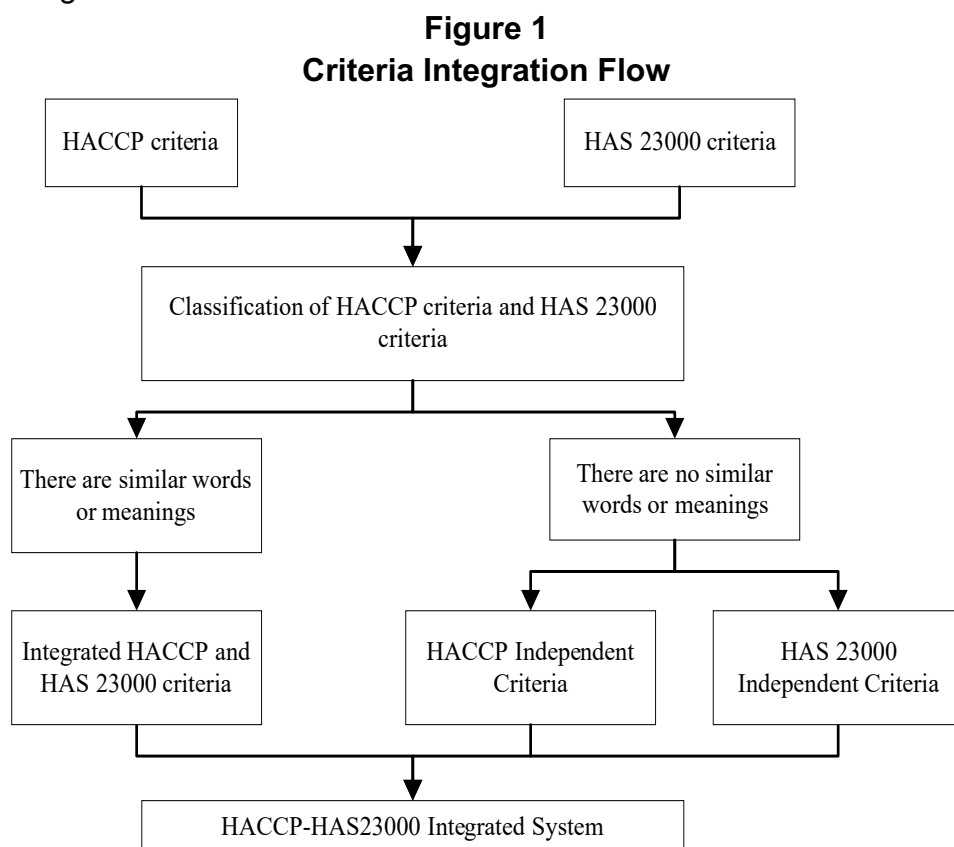
Model Design Procedure

The integration process is carried out in three main stages:

1. Criteria Review: Review the elements in HACCP and HAS 23000 to understand the structure and scope of each system.
2. Design a model that integrates both criteria.



The second stage focused on designing an integration model based on the results of the criteria mapping of the two systems. The integration process is carried out by combining elements that have functional linkages, so as to form an audit system structure that is integrated, efficient, and in accordance with the operational needs of the abattoir. In the design, a semantic approach is used, namely by examining the meaning and equivalence of terms between criteria to determine the possibility of substantial integration between HACCP and HAS 23000 elements. the integration process can be seen in Figure 1 below:



Source: Processed research data (2025)

3. Verification and Validation

conducted through expert judgment to ensure the feasibility and effectiveness of this integrated audit model.

Conversion of Literature to Expert Judgment Items

The indicators were developed from the HACCP-HAS 23000 literature and enriched through expert discussions, resulting in expert judgment questionnaire attributes covering audit, documentation, CCP, sharia compliance, and integration effectiveness—validated for application in ruminant slaughterhouses.



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Data analysis in this study was conducted using a descriptive approach. Based on Meishanti & Ardiansyah, (2021), the average score from media experts and subject matter experts can be calculated using the following formula:

$$\text{Validation Results} = \frac{\text{Score obtained}}{\text{Maximum score}} \times 100\%$$

These values are used as a reference in assessing whether the model is suitable for use or needs further improvement.

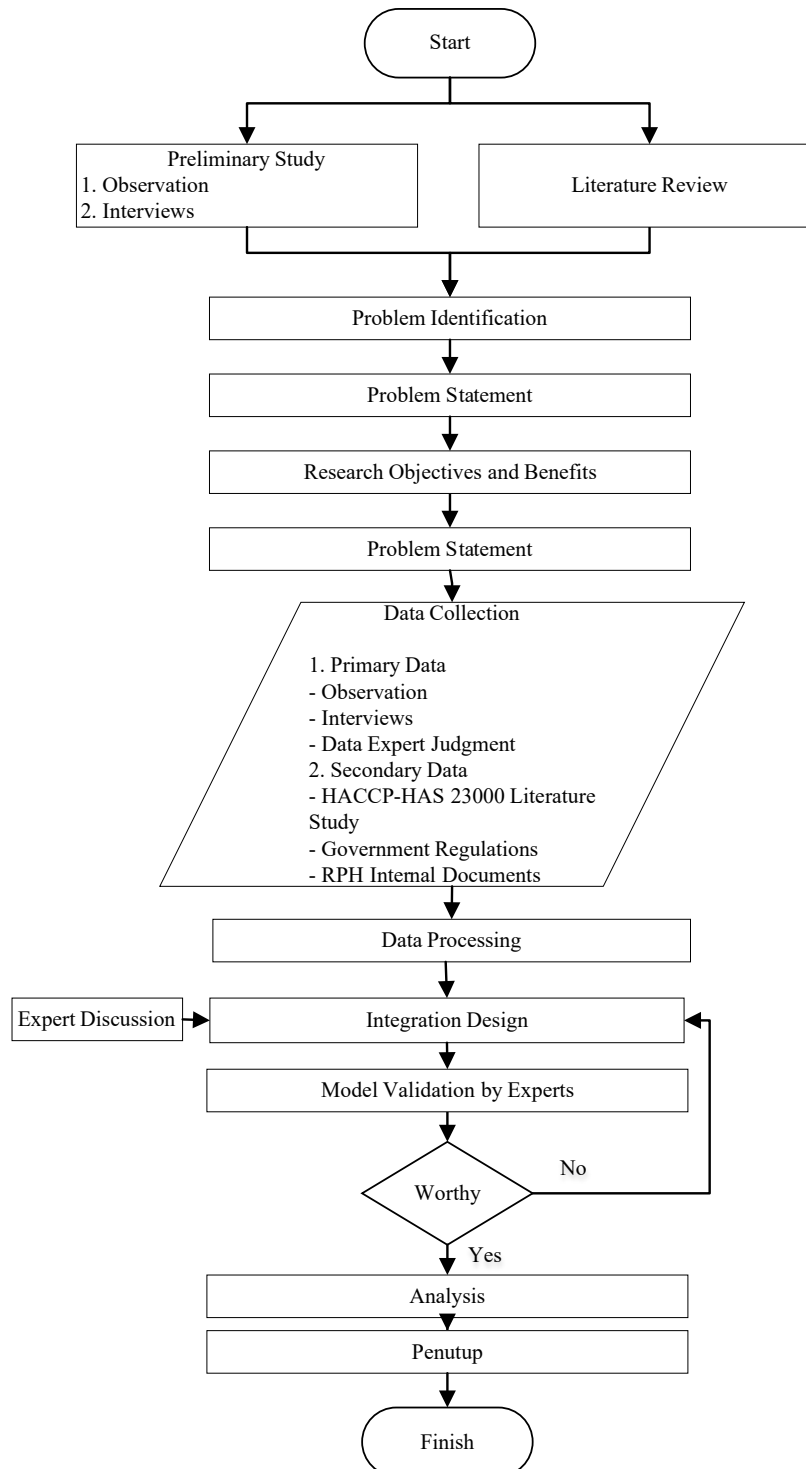
Table 2
Qualification Level

Percentage (%)	Feasibility Level
81-100	Highly Feasible
61-80	Feasible
41-60	Moderately Feasible
21-40	Not Feasible
0-20	Highly Not Feasible

The final model was developed through systematic expert judgment evaluation, incorporating only the highest-validated components to ensure an efficient internal audit system tailored to ruminant slaughterhouse (RPH) operational characteristics. The complete flow of this research methodology is summarized in Figure 2 below:



Figure 2
Research Methodology



Source: Processed research data (2025)





Results and Discussions

Integrated HACCP and HAS 23000 Criteria

Several HACCP criteria align with HAS 23000 in process control, documentation, and traceability, allowing for integration.

The criteria mapping is shown in Table 3.

Table 3
Relationship between HACCP and HAS 23000 Criteria

HACCP Criteria	HACCP Document	HAS 23000 Criteria	HAS 23000 document	Keywords.	Integration
Assembling the HACCP Team	1. HACCP Team Worksheet 2. HACCP Team Job Description Worksheet	Halal Management Team	1. Written evidence of the establishment of a halal management team 2. Team tasks and responsibilities document	Team, supervision, coordination	Both teams are responsible for process control, monitoring critical points, and ensuring products are safe and halal. In abattoirs, it can be combined into one Joint HACCP-Halal Team. An Integrated Management Team document that includes: HACCP document: 1. HACCP Team Worksheet 2. HACCP Team Job Description Worksheet HAS 23000 document: 1. Written evidence of the establishment of a halal management team 2. Team tasks and responsibilities document Integrated HACCP-HAS23000 Document: 1. Joint HACCP-Halal Team Worksheet



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					2. Joint Team Job Description Worksheet 3. Joint Team Decree 4. Joint Team Organizational Structure
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Source: Processed research data (2025)

HACCP Criteria	HACCP Document	HAS 23000 Criteria	HAS 23000 document	Keywords	Integration
Product Description	Product Description Worksheet	Products	1. Enforcement Document 2. Inclusion of Halal Label 3. Product List Halal Logo	Composition, characteristics, certification	Both systems demand product specifications, ranging from its composition, characteristics, and safety. HAS adds the following aspects Halal materials and processes. Integrated Product Description Working Document that includes: HACCP document: Product Description Worksheet HAS 23000 document: 1. Halal Labeling Enforcement Document 2. Product List 3. Halal Logo Integrated HACCP-HAS23000 Document: 1. Integrated Product Description Worksheet (includes safety and halal aspects)



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					2. List of Products with Halal Status
Identifying the Purpose of Product Use	Product Usage Form				HACCP emphasizes aspects of food safety based on the use of the product by consumers. Independent HACCP Documents

Source: Processed research data (2025)

HACCP Criteria	HACCP Document	HAS 23000 Criteria	HAS 23000 document	Keywords	Integration
Developing a Flow Chart	Process Flow Chart Worksheet Document				Flow charts in HACCP are used to analyze critical points in the production process. Independent HACCP Documents
Flowchart Verification	Verification Flowchart Document				Flow chart verification is part of the hazard analysis in HACCP. Independent HACCP Document
Hazard Analysis	Hazard Analysis Worksheet				HACCP identifies physical, chemical and biological hazards in food products. Independent HACCP Document
Determine CCP (<i>Critical Control Points</i>) or Critical Control Points	Critical Control Point Identification Worksheet	Written Procedures for Critical Activities	SOP for Beginning to End of Slaughter	Risk, contamination, prevention	Critical points in HACCP = points that must be monitored to prevent food hazards. In HAS, critical activities are points that risk compromising halalness. Both need strong SOPs. Integrated Monitoring and Control document that includes: HACCP document:



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					<p>Critical Control Point Identification Worksheet</p> <p>HAS 23000 document: SOP for Beginning to End of Slaughter</p> <p>Integrated HACCP-HAS 23000 Document:</p>
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Source: Processed research data (2025)

HACCP Criteria	HACCP Document	HAS 23000 Criteria	HAS 23000 document	Keywords	Integration
					<p>1. Integrated Critical Control Point Identification Worksheet</p> <p>2. Integrated monitoring form for each combined critical point</p>
Determining Critical Limits for Each CCP	Critical limit setting worksheet for each CCP				<p>HACCP determines critical limits based on food hazards, which are not necessarily related to halal.</p> <p>Independent HACCP Documents</p>
Monitoring Each CCP	TKK Process Flow Chart Worksheet	Handling of Products Not Meeting Criteria	Product Recall SOP	Supervision, inspection, corrective action	<p>CCP monitoring and control of problem products both aim to detect deviations and take corrective action. Integrated Monitoring and Control documents that include:</p> <p>HACCP document: TKK Process Flow Chart Worksheet</p> <p>HAS 23000 document: Product Recall SOP</p> <p>Integrated HACCP-HAS 23000 Document:</p>



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					Integrated Monitoring and Control Form
Determine Remedial Measures	TKK Control Determination Worksheet				Improvement efforts in HACCP focus on controlling food hazards. Independent HACCP Document

Source: Processed research data (2025)



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HACCP Criteria	HACCP Document	HAS 23000 Criteria	HAS 23000 document	Keywords	Integration
Develop Verification Procedure	a Verification Program Worksheet	Internal Audit	SJPH Manual Document (Halal Product Assurance System) along with attachments	Inspection, validation, compliance	<p>Verification in HACCP and internal audit in HAS have identical functions: evaluating the effectiveness of the system in place. An Integrated Monitoring and Control document that includes:</p> <p>HACCP document: Verification Program Worksheet</p> <p>HAS 23000 document: SJPH Manual Document (Halal Product Assurance System) along with attachments</p> <p>Integrated HACCP-HAS 23000 Document:</p> <ol style="list-style-type: none"> 1. Integrated Verification Program Worksheet 2. HACCP-Halal Internal Audit SOP 3. Integrated Internal Audit Form <p>SJPH Document with HACCP Aspect</p>
Establish Documentation & Recording System	a 1. HACCP plan and supporting materials	<i>Traceability</i>	Documented Procedures for Traceability	Records, tracking, product history	Both systems require documentation that can trace products from the beginning to the end of the production chain (<i>supply to consumer</i>).

Source: Processed research data (2025)



HACCP Criteria	HACCP Document	HAS 23000 Criteria	HAS 23000 document	Keywords	Integration
	2. Monitoring Document 3. Corrective Action Document Verification Document		Product (<i>Traceability</i> Document)		Integrated Monitoring and Control Document that includes: HACCP document: 1. HACCP plan and all supporting materials 2. Monitoring Document 3. Corrective Action Document 4. Verification Document HAS 23000 document: Documented Procedures for Product <i>Traceability</i> (<i>Traceability</i> Document) Integrated HACCP-HAS 23000 Document: 1. HACCP-Halal Integrated Documentation System 2. Document Distribution List Worksheet 3. Integrated Traceability SOP Product Tracking Form (<i>Traceability Record</i>)
		Halal Policy	1. Written statement on halal policy		Halal policy is a specific requirement in HAS 23000 that is not addressed in HACCP. Independent HAS 23000 document

Source: Processed research data (2025)



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HACCP Criteria	HACCP Document	HAS 23000 Criteria	HAS 23000 document	Keywords	Integration
			2. Document of commitment to the use of halal ingredients		
			3. Production process documents according to halal principles		
		Training and Education	1. Training Procedure Document 2. Halal Supervisor Training Certificate		HAS 23000 requires halal training, while HACCP emphasizes food safety training. Independent HAS 23000 document
		Material	1. Halal Certificate 2. Material List Form 3. Material Inspection Form 4. Material Inspection Form 5. <i>Production Process Flow Chart</i> 6. <i>Certificate Of Analysis (CoA)</i> 7. Halal Declaration Letter		HACCP focuses more on food hazards, while HAS 23000 ensures the ingredients used are in accordance with halal standards. Independent HAS 23000 document

Source: Processed research data (2025)



HACCP Criteria	HACCP Document	HAS 23000 Criteria	HAS 23000 document	Keywords	Integration
			8. Laboratory Result Report 9. <i>Material Safety Data Sheet</i> (MSDS)		
		Production	1. Production Equipment Specification Document 2. Equipment Cleaning SOP		HAS 23000 regulates the cleanliness and halalness of facilities, while HACCP emphasizes more on controlling hazards at every point of production. Independent HAS 23000 document
		Management Review	SJPH Implementation Evaluation Document		The management review in HAS 23000 focuses more on the halal policy aspect compared to HACCP which is based on food risk analysis. Independent HAS 23000 document

Source: Processed research data (2025)

Description:

	HACCP-HAS 23000 Integration System
	HACCP Independent Criteria
	HAS 23000 Independent Criteria





Table 3 shows the integration between HACCP and HAS 23000 criteria based on similarities in meaning and existing documents. This integration is the basis for developing an integrated model in abattoirs to ensure product safety and halalness.

Expert Validation Instrument Development

The validation instrument was developed through a rigorous process of theoretical synthesis and expert engagement. Drawing from established frameworks in HACCP and HAS 23000 standards, the instrument was carefully designed to assess key aspects of system integration. As presented in Table 4, the questionnaire captures critical dimensions including process harmonization, sharia compliance, and operational feasibility.

Table 4
HACCP and HAS 23000 Integration Criteria

Integration of HACCP Team and Halal Management Team	
Code	Statement
A1	The HACCP Team and Halal Management Team have similar oversight functions in identifying and controlling risks.
A2	Merging the teams will increase efficiency without reducing the effectiveness of food safety and halal supervision.
A3	The HACCP Team Worksheet and Halal Management Team document can be integrated into one combined team document.
A4	The integrated organizational structure should clearly indicate the division of responsibilities for food safety and halal aspects.
A5	The Joint Team Decree must clearly state the team's responsibilities for both aspects (safety and halal).
Integration of Product and Product Description	
Code	Statement
B1	The HACCP Product Description Worksheet and Halal Labeling Document can be integrated without losing important information.
B2	Integrated product descriptions must include safety and halal aspects in a balanced manner.
B3	The components of product characteristics in HACCP and halal status in HAS 23000 can be combined in one document.
B4	Listing products with halal status provides better transparency to consumers than separate documents
B5	Integration of product descriptions will facilitate the process of tracing the origin of ingredients and halal products.
Integration of Critical Control Points and Critical Activities	
Code	Statement
C1	Critical Control Points in HACCP and Critical Activities in HAS 23000 can be identified and integrated in one document.
C2	Combining food safety and halal control points will facilitate the overall supervision process.
C3	Integrated monitoring forms will improve the efficiency of critical point surveillance
C4	Combining critical control points and critical activities can potentially



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	result in a more comprehensive control system
C5	Integration of the Initial Slaughter SOP in HAS 23000 with critical point control in HACCP will improve process control.
Integration of CCP Monitoring and Handling of Non-Criteria Products	
Code	Statement
D1	The TTK Process Flow Diagram in HACCP and the Product Recall SOP in HAS 23000 can be combined effectively
D2	Integrated monitoring form will improve response to product nonconformities
D3	Integrated product withdrawal procedures must include withdrawal criteria based on safety and halal aspects.
D4	Integration of non-conforming product monitoring and handling will speed up the decision-making process
D5	The incorporation of product monitoring and recall procedures will minimize the risk of mishandling non-conforming products.
Integration of Verification and Internal Audit Procedures	
Code	Statement
E1	HACCP verification procedures and HAS 23000 internal audits can be effectively integrated
E2	The HACCP-Halal Internal Audit SOP will simplify the system evaluation process.
E3	An integrated internal audit form will make it easier to identify nonconformities in both aspects
E4	Integrated internal audit will save time and resources compared to separate audits
E5	The SJPH document with HACCP aspects will provide more comprehensive guidance for system evaluation.
Integration of Documentation & Recording Systems and <i>Traceability</i>	
Code	Statement
F1	HACCP documentation and HAS 23000 traceability documentation can be effectively integrated
F2	Integrated Traceability SOP will improve product traceability from upstream to downstream.
F3	Integrated product tracking form will facilitate investigation in case of problems
F4	Merging documentation systems will minimize the risk of non-uniformity of information
F5	Integrated documentation system will facilitate the certification process and external audits

Source: Processed research data (2025)

Table 4 shows the statements resulting from the *literature review* and the results of discussions with experts. The table contains statements on the integration of HACCP and HAS 23000. This statement will be used as a statement in the Expert Judgment questionnaire distributed and assessed by 3 respondents who understand food safety and halalness.

Expert Validation Results



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The expert validation was conducted to evaluate the feasibility, relevance, and effectiveness of the proposed integration model of HACCP and HAS 23000 in the context of ruminant slaughterhouses (RPH). Three experts were selected based on their professional backgrounds and experience: a halal industry practitioner, an academic in industrial engineering, and a quality management professional specializing in halal assurance systems. The results of the expert judgment questionnaire can be seen in Table 5.

Table 5
Summary of Expert Validation Comparison Results

Code \ Respondents	R ₁	R ₂	R ₃
A1	8	7	8
A2	9	7	8
A3	8	6	8
A4	9	7	9
A5	8	7	9
B1	9	7	8
B2	9	7	9
B3	8	6	8
B4	9	7	8
B5	8	6	8
C1	8	7	7
C2	9	9	8
C3	9	7	8
C4	8	7	8
C5	8	6	8
D1	6	6	4
D2	6	5	4
D3	6	5	4
D4	5	6	4
D5	7	7	5
E1	8	7	8
E2	9	7	8
E3	8	7	8
E4	9	7	8
E5	9	9	8
F1	6	5	4
F2	8	7	6
F3	8	7	6
F4	8	7	6
F5	8	8	6

Source: Processed research data (2025)

Table 4 shows that most of the statements received high scores, indicating a tendency towards positive consensus from the experts. These



results indicate that the majority of the elements proposed in the integration design are considered relevant and acceptable, so that they can be used as the basis for finalizing the integration model of the halal assurance system and food safety in slaughterhouses. The summary of validation comparison results can be seen in Table 5 below.

Table 5
Summary of Validation Comparison Results

Expert Category	Score Obtained	Maximum Score	Percentage	Evaluation Category
Halal Industry Personnel	23	27	88	Highly Feasible
Industrial Engineering Academics	203	270	75	Feasible
Halal <i>Quality Management</i>	211	270	78	Feasible
Overall Average	217.3	270	80.4	Highly Feasible

Source: Processed research data (2025)

Table 5 shows the presents the results of the validation comparison from the three experts. Based on the validation results, the distribution of assessments from the three experts shows that the majority of assessments are in the high category, although there are variations between expertise backgrounds.

In the "Highly Feasible" category ($\geq 80\%$), the assessment from the Halal Industry Personnel expert yielded a percentage of 88%. This indicates that the integration model is considered highly relevant and ready for practical application in the halal industry, particularly in RPH. Meanwhile, the other two experts were in the "Feasible" category (61–80%), namely Halal *Quality Management* with a score of 78% and Industrial Engineering Academics with a score of 75%. This assessment indicates that the model has met the minimum eligibility standards, but there is still room for improvement, particularly in technical and documentation aspects.

Expert Assessment Based on Criteria

To assess the practical and theoretical acceptability of the integration model, validation was conducted by three experts with varying backgrounds. They assessed various aspects of the model based on their respective expertise, including team structure, product description, critical control points, handling of non-conforming products, internal audits, and documentation and traceability systems. The Expert Assesment Based on Criteria can be seen in Table 6 below.



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Table 6
Expert Assessment Based on Criteria

Code	Expert	Expert 2	Expert	Total Score	Maximum Score	%	% Total	Criteria
A1	8	7	8	23	27	85	87	Highly Feasible
A2	9	7	8	24	27	89		
A3	8	6	8	22	27	81		
A4	9	7	9	25	27	93		
A5	8	7	9	24	27	89		
B1	9	7	8	24	27	89	87	Highly Feasible
B2	9	7	9	25	27	93		
B3	8	6	8	22	27	81		
B4	9	7	8	24	27	89		
B5	8	6	8	22	27	81		
C1	8	7	7	22	27	81	87	Highly Feasible
C2	9	9	8	26	27	96		
C3	9	7	8	24	27	89		
C4	8	7	8	23	27	85		
C5	8	6	8	22	27	81		
D1	6	6	4	16	27	59	59	Moderatel y Feasible
D2	6	5	4	15	27	56		
D3	6	5	4	15	27	56		
D4	5	6	4	15	27	56		
D5	7	7	5	19	27	70		
E1	8	7	8	23	27	85	89	Highly Feasible
E2	9	7	8	24	27	89		
E3	8	7	8	23	27	85		
E4	9	7	8	24	27	89		
E5	9	9	8	26	27	96		
F1	6	5	4	15	27	56	74	Highly Feasible
F2	8	7	6	21	27	78		
F3	8	7	6	21	27	78		
F4	8	7	6	21	27	78		
F5	8	8	6	22	27	81		



Table 6 presents the results of expert assessments of each statement in the HACCP and HAS 23000 integration model. The assessments were provided by three experts based on a scale of 1–9, then converted into percentages of the maximum score. This table illustrates the level of suitability of each item, grouped into six main aspects, ranging from team structure (A), product description (B), critical control points (C), handling of nonconforming products (D), internal audit (E), to documentation and traceability (F).

Aspect A, integrated organizational structure, received a score of 85–93%, with sub-aspect A4 (clear organizational structure) being the highest. This finding is in line with Fajri (2020), who emphasized the importance of a clear team structure, as well as Kusyuniadi & Buchori, (2020) who highlighted management support and implementation coordination as keys to successful integration.

The aspect of harmonization of product safety and halal (B) achieved the highest score in B2 (93%), indicating high appreciation for the harmonization of these two approaches. This supports the findings of Ali et al., (2022) on the importance of halal supply chain integrity to maintain quality and prevent contamination.

The aspect of integrating safety and halal control points (C) achieved the highest score at C2 (96%), indicating widespread acceptance of integrating critical safety and halal control points. This reinforces the findings of Al-Beltagi et al., (2025) and Kohilavani et al., (2020) regarding the importance of a multidisciplinary approach and balanced control to enhance consumer trust.

The D aspect of product monitoring and handling integration is the weakest, with an average score of 59% (*Fair*). This is mainly due to potential conflicts between HACCP and HAS 23000 standards. Recommended solutions include *cross-training* and the use of technologies such as AI and blockchain, in line with the study by Lin & Hertig, (2023) on pharmaceutical product *recalls*.

Aspect E, internal audit, received the highest acceptance from industry practitioners (up to 89%). It was rated as highly acceptable, with strong support from the halal industry (up to 100%), in line with the views of Faradillah et al., (2021) and Supangat & Delastri, (2023) that audit integration can improve efficiency and reduce risks.

Finally, the documentation integration aspect (F) showed significant disparities. Sub-aspect F1 received the lowest score (56%) due to difficulties in integrating HACCP and HAS 23000 documents, while F5 (Certification Ease) received the highest score (82% – *Very Acceptable*).



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The implementation of *blockchain* technology (Sarkar, 2023; Dasaklis et al., 2022) is proposed to enhance *traceability* and transparency, which are critical for the halal food industry.

From an Islamic religious perspective, the integration of the HACCP and HAS 23000 management systems holds significant importance as it ensures compliance with the principles of *halalan thayyiban*. Criteria such as integrated product description (B2) and halal product list (B4) ensure clarity of halal status, as mandated in QS. Al-Baqarah: 168. Oversight by an integrated team (A4, A5) ensures that production processes remain compliant with Sharia law. Additionally, integrated internal audits (E1–E5) reduce the risk of contamination with prohibited or questionable ingredients, maintaining the purity and halal status of products throughout the entire process.

When compared to the approach in Malaysia, which integrates HACCP and MS 1500:2019 standards under the authority of JAKIM (Suriyah et al., 2023), this model has advantages in terms of flexibility, especially for small-scale slaughterhouses. Meanwhile, studies in Europe highlight significant challenges due to the fragmentation of halal certification (Bacelo et al., 2024), underscoring the urgency of such operational integration models.

Since this model has not yet been directly implemented, further research is needed to test its effectiveness across various types of RPHs. Sensitivity analysis of operational, management, and production capacity variations is crucial for assessing the model's adaptability. Cross-location validation will help expand the adoption of the model at the national and international levels. With initial validation through Expert Judgment, this model has already demonstrated its suitability for field needs according to experts. However, actual implementation remains an important next step to test the model's resilience to real operational complexities.

Conclusion

A comparison of the validation results from the three experts shows varying perceptions regarding the feasibility of the HACCP and HAS 23000 integration model. Experts from the halal industry gave the highest score of 88%, categorized as "Highly Feasible." This assessment reflects that the model is considered very suitable for implementation needs in the field. Meanwhile, experts from industrial engineering academics gave a score of 75% and experts from halal quality management gave a score of 78%, both in the "Feasible" category. The overall average of these three assessments was 80.4%, which is included in the "Highly Feasible" category. These



results indicate that in general, the integration model has been well received by the experts, although improvements are still needed in several technical aspects to be more applicable in various operational contexts.

This study developed an integrated audit model between HACCP and HAS 23000, specifically designed for ruminant slaughterhouses with limited resources. Validated through the Expert Judgment, the model enhances audit efficiency, reduces documentation overlap, and ensures compliance with both food safety and halal standards.

However, the study is limited in scope, focusing on a single location with a small expert panel. Future research should involve multi-site validation and international testing to assess adaptability. The model also offers potential for e-audit system development.

Policy-wise, this model can inform technical guidelines for BPJPH and certification bodies, and serve as a framework for global adaptation in countries with fragmented systems. Despite its benefits, key challenges remain—such as methodological alignment, limited dual-competency auditors, and the need for practical guidance. Cross-sector collaboration is essential for sustainable implementation.

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