

# Design of the compliance of halal assurance system criteria for smoked fish processing in Small and Medium Enterprises (SMEs) in Bangkalan Regency

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**Abstract.** Smoked fish is a fishery product that is widely produced by the community. Fishery products require halal certification. Implementing a halal assurance system can start by identifying critical points. Small and medium industries widely produce smoked fish. There are still not many SMEs that carry out halal certification. The aim is to design the implementation of a halal assurance system for fish-smoking SMEs in the Bangkalan district. The halal assurance system (HAS) preparation refers to the five halal pillars listed in HAS 23000. Based on the study results, the criteria for halal commitment and responsibility and monitoring and evaluation are not by the halal assurance system. The criteria for ingredients, halal product processes, and products as a whole are by the HAS. Recommendations given to SMEs are creating and socializing halal policies, forming a halal management team, conducting regular training involving all workers, creating a material matrix and compiling halal product documents, writing procedures for critical activities, creating traceability procedures that can trace the materials and facilities used, creating procedures for handling products that are not by the halal assurance system, name the product following the product criteria, and creating procedures for conducting internal meetings for halal assurance evaluation.

## 1 Introduction

Fish and fishery products are perishable foodstuffs that require speedy handling after capture [1]. Some types of fish processing products are fish drying, fish baking, fish roasting, fish freezing, fish oil, fish fermentation, fish canning, and so on. The rate of deterioration can be slowed down, and it is necessary to apply cold temperatures to withstand the quality decline, damage, or decay rate. The production process of fishery products also requires halal certification, including frozen fish, fishmeal, fish oil, and all processed fish products [2]. The initial step for halal certification is to identify the fulfillment of the halal assurance system criteria (SJH).

The number of companies that have received halal certification from the Halal Product Guarantee Agency (BPJPH) is 99 products, including seafood products, whole frozen fish, fillet fish, steak cut fish, loin fish, shrimp, crab, lobster, vacuum fish products, and presto fish products [3]. Halal certification is needed to expand the export market share. Some small and medium-scale fish processing industries have obtained halal certification. The fish processing sector is still far behind other sector business actors in halal-certified products [4]. The low number of halal-certified fishery products will affect the weak competitiveness of the

products produced. The fisheries industry is one of the five economic drivers in Indonesia today. Indonesia's marine economic potential is predicted to reach USD1,338 billion per year.

Bangkalan Regency has enormous potential for marine and land fisheries, reaching 26,622.42 tons in 2024. Bangkalan Regency's mainstay marine fisheries products are shrimp, squid, mackerel, snapper, and stingray. Meanwhile, inland fisheries that are produced are Carp, Mujaer, milkfish, Tawes, and Windu Shrimp. Processed fishery products in Bangkalan Regency reached 649,674 tons [5]. Processed fishery products include smoked fish, crackers, shrimp paste, petis, shredded tuna, fish drying, etc. One type of processed product that is widely produced is smoked fish. Smoked fish are widely produced in Gebang, West Klampis, Sepulu, Prancak, Banyusangkah, West Sukolilo, Jung Anyar Village, and many other areas [5]. The potential of fisheries must be supported by halal certification, ranging from capture to product distribution.

Smoked fish is one of the processed products produced by smoking techniques [6]. Smoked fish have a distinctive flavor and aroma. Smoked fish has many benefits, including improving flavor, preserving food, increasing vitamin D levels, as a source of high-quality protein, omega-3 fatty acids, antioxidants, long shelf life, and easy to process [7]. Making smoked fish

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combines salting, drying, and smoking [8-9]. Smoking fish in Bangkalan Regency is generally still carried out traditionally, using simple tools and paying less attention to sanitary and hygienic aspects, which can harm environmental health. Smoked fish is a fresh fish derivative product. The first step in obtaining halal certification can be identifying critical points of product halalness that refer to the halal assurance system guidelines. The critical halal point of the product production process is essential, considering that the production process is very likely to have the possibility of haram contamination and physical, chemical, and biological hazards [2],[10-11]. Critical factors in the fisheries processing industry are acquiring raw materials, processing, and storage, which can potentially be places for haram materials to enter the product. One of the processes that can be used as a reference to criticize the product can be seen from its compliance with the rules or provisions of the applicable Islamic law and the ingredients used. In addition, the materials used must not contain haram materials, such as pork and other materials [12–14].

The halal assurance system is contained in HAS 23000 (Halal Assurance System 23000). HAS 23000 is a halal certification requirement set by LPPOM MUI for halal certification of a product. The reference in determining the halalness of the product is described in the halal assurance system, including 11 halal criteria, namely halal policy, halal management team, training, materials, production facilities, products, written procedures critical activities, traceability, handling products that do not meet the criteria, internal audits, and management reviews [12],[15–18]. BPJPH released a document for the halal product guarantee system (SJPH) criteria through the decision of the Head of BPJPH Number 57 of 2021 regarding halal criteria called the 5 pillars of halal. The five pillars of halal include commitment and responsibility, ingredients, halal product process, product; and monitoring and evaluation. This study aims to analyze halal assurance system criteria fulfillment in the smoked fish production process in Small and Medium Enterprises (SMEs) in Dakiring Village, Socah District, Bangkalan Regency, to obtain halal certification.

## 2 Methods

The research was conducted at UMKM X fish smoking in Dakiring Village, Socah District, Bangkalan Regency. The data collection method was carried out using primary data and secondary data. Primary data is

Table *I*. Appropriateness of commitment and responsibility implementation.

No	Indicators	Conformance		Information	Conformance Percentage
		Yes	Not		
	<b>Halal Policy</b>				
1	Availability of halal policy		√	There is no document on halal policy	0
2	Socialization of halal policies in companies		√		0
3	Availability of written evidence of halal policy		√		0
	<b>Halal Management Team</b>				
4	Establishment of a halal management team		√	There is no stipulation of a halal management team	0
5	The team covers all parts on critical activities?		√		0

collected by observing the fish-smoking production process and interviewing related parties. In contrast, secondary data is in the form of literature on halal assurance systems, critical points of product halalness, and the fish-smoking production process.

The method used in this research is a descriptive method using a checklist form. The checklist form contains 5 pillars of halal, including commitment and responsibility, ingredients, halal product processes, products, and monitoring and evaluation. Each criterion is analyzed for halalness, and the percentage of conformity with the halal assurance system is calculated to determine the percentage level of conformity with the halal assurance system.

## 3 Result and discussion

### 3.1. Halal assurance system

The halal standardization process as an effort to carry out the halal certification process refers to the implementation of the Halal Product Guarantee System [19]–[23]. The Halal Assurance System, according to LPPOM MUI, 2005, is a system that is compiled, implemented, and maintained by companies holding halal certificates to maintain the continuity of the halal production process so that the products produced can be guaranteed halal. The halal assurance system is part of a company policy compiled in a written document. HAS 23000 is a document that contains the requirements for LPPOM MUI halal certification. Here are 5 criteria for halal assurance: commitment and responsibility; ingredients; halal product processes; products; amonitoring and evaluation.

#### 3.1.1 First criterion: commitment and responsibility

The commitment and responsibility are in the form of a written statement from the head of the company's commitment to be consistent in producing halal products, including consistency in the use and procurement of raw materials, additives, and auxiliary materials and consistency in the halal production process [24]. In addition, commitments and responsibilities include forming a halal management team and organizing socialization and training activities for all parties involved. The suitability of the application of commitments and responsibilities can be seen in

6	The team has the appropriate duties, responsibilities and authorities		√		0
<b>Training and Socialization</b>					
7	Training procedures written in the SJPH Manual		√	No training and socialization	0
8	Evidence of the implementation of HAS 23000 socialization		√		0
9	The implementation of external training has been attended by the team leader/member at least once every two years		√		0
10	The implementation of internal training is carried out at least once a year		√		0
11	The implementation of internal training involves all employees related to critical activities, including new employees		√		0
12	Internal training materials have included HAS 23000		√		0
13	Is there evidence of the implementation of the evaluation of the results of internal training?		√		0
Total Conformance Percentage					0

The fish-smoking industry is a small industry that does not commit to carrying out halal certification activities even though business owners know the importance of halal certification for their products. The fish-smoking industry must commit to implementing and maintaining quality standards, food safety, and production processes to produce halal products. One activity that can be done is to conduct socialization in the form of banners in several production sections. The banner aims to remind workers and fish suppliers to consider halal aspects at every stage of the smoked fish production process.

A management team is needed to commit to the halal certification process. Like other business owners, fish-smoking SMEs need to form a halal management team chaired by the business owner [25]–[27]. While membership comes from production workers, each worker's duties differ. Team members must understand the critical point of the product's forbiddenness in terms of raw materials and the overall production process. The halal management team is given full authority to take the necessary actions in implementing the Halal Assurance System, including corrective action against errors to stop production or rejection of raw materials, by the rules applied by LPPOM MUI. A management team is needed to commit to the halal certification process. Like other business owners, fish-smoking SMEs need to form a halal management team chaired by the business owner

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Training is an activity to increase knowledge, skills, and attitudes to achieve the desired ability level. Efforts that these SMEs can make include writing the procedures for implementing training. Training is carried out by bringing in competent presenters to plan, implement, evaluate, and improve the halal assurance system following halal certification requirements. Internal training is carried out at least once a year, while external training is carried out at least once every 2 years. The training aims to increase employees' understanding of the meaning of halal haram, the importance of the halalness of a product, critical points of materials and production processes, and the halal assurance system. Training can be carried out in collaboration with related agencies, such as the Health Office, to provide direction regarding the better product. If items are unsuitable, they are prohibited from being used because of their effect on the products produced [28],[29].

**Table 2.** Appropriateness of commitment and responsibility implementation.

No	Indicators	Conformance		Information	Conformance Percentage
		Yes	Not		
<b>Halal Policy</b>					
1	Availability of halal policy		√	There is no document on halal policy	0
2	Socialization of halal policies in companies		√		0
3	Availability of written evidence of halal policy		√		0
<b>Halal Management Team</b>					
4	Establishment of a halal management team		√	There is no stipulation of a halal management team	0
5	The team covers all parts on critical activities?		√		0
6	The team has the appropriate duties, responsibilities and authorities		√		0
<b>Training and Socialization</b>					
7	Training procedures written in the SJPH Manual		√		0

8	Evidence of the implementation of HAS 23000 socialization		√	No training and socialization	0
9	The implementation of external training has been attended by the team leader/member at least once every two years		√		0
10	The implementation of internal training is carried out at least once a year		√		0
11	The implementation of internal training involves all employees related to critical activities, including new employees		√		0
12	Internal training materials have included HAS 23000		√		0
13	Is there evidence of the implementation of the evaluation of the results of internal training?		√		0
Total Conformance Percentage					0

**3.1.2 Second criterion: materials**

Materials include raw materials; additives; auxiliary materials; packaging, lubricants/greases used for machinery and may be in direct contact with materials and products; sanitizers and cleaning agents for sanitizing facilities/equipment that contact materials and products; and validation media from washing facilities that are in direct contact with products [24].

The critical point of halalness is the possibility of a product becoming haram at a stage of food production. Things that determine the halalness of a food ingredient include not containing alcohol or intoxicating components, not wild animals, fangs, long hooves, and pigs. Foodstuffs derived from plants and fish are guaranteed to be halal. The forbidden's critical point is the tools and materials added during processing and packaging. As for foodstuffs derived from animals that are legalized for consumption, the critical point is the method of slaughter, tools and materials used or added

**Table 3.**

The fish-smoking process uses raw materials in the form of fresh fish. The types of fish used are gulamah, dukang, otek, and fish and remang. Fish is obtained directly from fishermen. The fishermen directly deposit the caught fish to the smoked fish business owner daily. The smoked fish production process only uses coconut shells for the smoking process. The distinctive aroma and color of smoked fish are obtained from the chemical reaction between the smoking process and the fish

**Table 3.** Appropriateness of application of material criteria.

No	Ingredient name	Brands and manufacturers	Material criteria		Certificate number	Exp period
			Positive list	Critical		
1	Fresh fish	Fisherman	√		-	-
2	Coconut shell	Market	√		-	-
3	Water	-	√		-	-

**3.1.3 Third criterion: halal product process**

The Halal Product Process is a series of activities to ensure the halalness of products, including the provision of ingredients, processing, storage, packaging, distribution, sales, and presentation of products [24]. The halal status of the product is determined not only by Table 4

during processing, and packaging [30],[31]. The ingredients used in making smoked fish are found in

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The types of materials used to make smoked fish are included in the positive list criteria. Positive list criteria is a list of non-critical materials from the aspect of halalness that are generally used in the processing industry. The criteria for halal assurance system products can categorize the use of materials in this process.

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the ingredients but also by the conditions of the production process. SJPH provides rigorous details regarding the fulfillment of these criteria, starting from the location, place, tools, halal product process equipment and devices, and procedures. Identification of critical points of forbidden ingredients and production processes can be seen in

**Table 4.** Identification of critical points of forbidden materials and production processes.

Description		Risk Points of Haram	Status	Precautions
<b>Main Ingredients</b>				
1	Fresh fish	Fish received in rotten conditions, using formalin	Critical	The selection of fish ensures that the fish used are in fresh condition
<b>Auxiliary materials</b>				
1	Water	-	Non Critical	-
2	Coconut shell	-	Non Critical	-
<b>Process Stages</b>				
1	Reception of fresh fish	Fish received in a rotten condition, or formalin	Critical	Conducting a thorough inspection of the fish received from fishermen
2	Weighing	Scales mixed with unclean	Non Critical	Washing process is carried out periodically
3	Cleaning	Fecal cleaning tools	Non Critical	The appliance is washed regularly
4	Fish splitting	The knife used is mixed with feces and rust	Non Critical	Knives are sharpened regularly and cleaned
5	Laundering	The water used is mixed with feces	Non Critical	Water clarity and cleanliness check
6	Clamped with bamboo	Bamboo used mixed with feces	Non Critical	Separating bamboo from items mixed with impurities
7	Fogging	The equipment used is mixed with feces,	Non Critical	Periodic washing of production equipment
8	Cooling	Containers and products mixed with feces	Non Critical	Periodic washing of production equipment
9	Packaging	Packaging mixed with impurities	Non Critical	-
10	Distribution	The distribution process is mixed with non-halal goods	Non Critical	-

Table 4 shows that the critical point of the halalness of smoked fish products lies in the raw material (fish) and the process of receiving raw materials. These two points determine the halalness of a product. To anticipate that the product remains halal, closely monitoring the quality of fish receiving raw materials must be carried out. Workers who are in the process of receiving raw materials must be workers who are competent in the characteristics of fresh fish. Production facilities are used to produce products, including buildings, rooms, machinery, leading equipment, and auxiliary equipment. The status of production facilities in smoked fish processing SMEs can be identified in Table 5.

**Table 5.** Appropriateness of production facility criteria.

No	Name	Contaminati on (yes/no)	Critical (yes/no)	% Confor mance
1	Washbasin	No	No	100
2	Cool box	No	No	100
3	Scales	No	No	100
4	Knife	No	No	100
5	Para – para	No	No	100
6	Chopping board	No	No	
7	Fish clamp	No	No	100
8	Tray	No	No	100
9	Production room	No	No	100

10	Storage space	No	No	100
Total conformance percentage				100

Table 5 shows that the facilities used in the smoked fish production process are not contaminated with unclean. The washing process of production facilities such as basins, cool boxes, knives, cutting boards, and trays is carried out regularly. The production and product storage rooms are cleaned daily before the production process begins. Based on this, it can be said that 100% of production facilities have met the criteria for a halal assurance system.

Products that do not meet the criteria are halal-certified products that are already made from materials that are not approved by LPPOM MUI or produced in facilities that are not free from prohibited materials. The company must have a written procedure for handling products that do not meet the criteria, so that products that do not meet the criteria can be guaranteed not to be reprocessed (downgrade) and must be destroyed or not sold to consumers who need halal products. Withdrawals must be made on products that have already been sold [24]. In fish-smoking SMEs they never sell products that do not meet the criteria or are contaminated with unclean things. The company has also never withdrawn products that do not meet the criteria. Smoked fish that is ready to sell will be directly marketed in the nearest market.

Traceability is the ability to trace certified products, which includes the origin of ingredients that meet the criteria (approved by LPPOM MUI) and are produced in production facilities that meet the criteria (free from pork derivatives) [24]. All smoked fish products can be traced to the origin of the ingredients and the production facilities used, so the traceability indicator is 100%. The traceability results at fish smoking MSMEs show that the materials used during production are a halal positive list of materials approved for use by LPPOM MUI. The materials used are fresh fish, water, and coconut shells. This process does not use other additives, so this business has traceability that meets the criteria for a halal assurance system.

### 3.1.4 Fourth criterion: product

The fourth criterion is the product. In addition to ingredients and processes, the final product is a unique criterion whose requirements must be met by business owners to be certified halal. Products that have been registered do not have a tendency to smell or taste, leading to haram products. The product's shape, product name, form of packaging, and labels used also do not depict erotic and vulgar or pornographic properties [24].

**Table 6.** Appropriateness of application of product criteria.

No	Indicators	Conformance		Conformance percentage
		Yes	Not	
1	The shape and name of the product, the form of packaging and the labels used do not depict the erotic, vulgar nature of pornography	√		100
2	The product does not have a tendency to smell or taste that leads to haram products	√		100
Total conformance percentage				100

Based on the results of the smoked fish produced, this product has no indications of products that do not comply with sharia (both shape, packaging, label, odor, and taste). The weakness of this product is that it does not have a brand or product name. Efforts that must be made to meet the criteria for a halal assurance system are to give a product name so that this product can be traced to its halalness.

### 3.1.5 Fifth criterion: monitoring and evaluation

Monitoring and evaluation criteria are carried out to ensure that the halal product assurance system is carried

out consistently, not just fulfilling certification requirements. Mechanisms to maintain consistency include internal audits and management reviews [24].

The halal management team conducts an internal audit, a requirement of MUI halal certification, to assess the suitability of implementing the halal assurance system in the company. Companies must have written internal audit procedures to implement the Halal Assurance System. Internal audits must be carried out at least once a year. If weaknesses (non-fulfillment of criteria) are found in the internal audit, the company must identify the root cause and make improvements. Improvements must be made with a precise time target, and weaknesses must be resolved to prevent recurrence in the future [24].

Management review is a study conducted to assess the effectiveness of implementing the Halal Assurance System and formulating continuous improvement by top management or its representatives. The evaluation results must be submitted to the party responsible for each activity to improve the implementation of the halal assurance system [24]. The suitability of monitoring and evaluation criteria in the smoked fish production process is shown in Table 7.

**Table 7.** Appropriateness of implementation of monitoring and evaluation criteria.

No	Indicators	Conformance		Conformance percentage
		Yes	No	
1	Internal meetings were held to discuss the evaluation of business development	√		100
2	Implementation of internal meetings; for the evaluation of the business halal assurance system		√	0
Total conformance percentage				50

Smoked fish business owners always conduct internal meetings to discuss business development. Discussions reviewed at internal meetings include the amount of production, procurement of raw materials and supporting materials, production process constraints, and sales trends from time to time. At this time, these SMEs have never held an evaluation meeting for the implementation of the halal assurance system. However, when this business is committed to halal certification, the business owner will carry out all the criteria listed in the five pillars of halal.

### 3.2. Halal assurance system implementation design

The design of the halal assurance system implementation based on the HAS 23000 standard criteria can be seen in

**Table 8.**

**Table 8.** Design of halal assurance system implementation.

No	Criterion	Available systems	Gap		Recomendation
			Exist	Not	
1	Commitment and responsibility	There is no halal policy yet	√		Creating and socializing halal policies
		There is no halal management team yet	√		Forming a halal management team
		There is no training and socialization	√		Conduct regular training involving all workers
2	Material	There is a list of ingredients but it is not in accordance with the criteria of the halal assurance system		√	Create a material matrix and compile halal product documents
3	Halal Product Process	There are no facilities mixed with uncleanness		√	-
		There are no written procedures for critical activities yet	√		Written procedures for critical activities
		There is no traceability system yet	√		Create traceability procedures that are able to trace the materials and facilities used
		There is no procedure for handling products that are not in accordance with the halal assurance system	√		Creating procedures for handling products that are not in accordance with the halal assurance system
4	Product	The shape, packaging, smell and taste of the product are in accordance with the criteria of the halal assurance system This product has no name yet	√		Name the product in accordance with the product criteria
5	Monitoring and Evaluation	There is an internal meeting to discuss the evaluation of business development		√	
		There has been no internal meeting; for the evaluation of the business halal assurance system	√		Creating procedures for conducting internal meetings for halal assurance evaluation

## 4 Conclusion

The conclusions that can be drawn in implementing a halal assurance system based on the criteria of the HAS 23000 standard in fish smoking SMEs in Bangkalan Regency are: Criteria that have been appropriately implemented are halal ingredients, products, and product processes. Criteria that have not been implemented are commitment, responsibility, monitoring, and evaluation. Recommendations provided to small and medium-sized enterprises (SMEs) include the following: establishing and promoting halal policies, establishing a dedicated halal management team, conducting regular training involving all employees, creating a material matrix and compiling documentation for halal products, developing procedures for critical activities, implementing traceability procedures to track materials and facilities used, establishing procedures for handling products not covered by the halal assurance system, naming products according to specified criteria, and establishing procedures for conducting internal meetings to evaluate halal assurance.

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