



The Importance of Halal Product Guarantees in Fish Processing

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ABSTRACT

Ensuring the halal status of food products is a crucial requirement in the food industry. Products certified as halal must comply with strict food safety and hygiene standards while also providing benefits to consumers. Fish is one of the primary raw materials used in processed food products. In Tuban Regency, East Java Province, the fisheries sector is a leading contributor to regional economic growth, with the fish processing industry—dominated by micro, small, and medium enterprises (MSMEs)—serving as its backbone. This study aimed to analyze the supply chain of raw materials for fish processing units, classify fish processing enterprises, and evaluate the implementation of halal product guarantees and certification in Tuban Regency. An exploratory design approach was employed, utilizing primary data collected through surveys, questionnaires, and direct interviews with respondents. The results reveal that most fish processing businesses in Tuban have not yet implemented Halal Product Guarantee Standards and lack halal certification. The enterprises vary widely in product types, production volumes, income levels, investment capacity, marketing targets, and labor utilization. Improving technological standardization and product quality emerges as a key factor for enhancing efficiency. From an economic perspective, the adoption of advanced technology is essential to increase production output without additional inputs, thereby strengthening business competitiveness in the halal-certified fish processing sector.

INTRODUCTION

Guaranteeing halal products is a critical aspect of the food and beverage industry in today's rapidly developing and multicultural global environment (Alqudsi, 2014; Ambali & Bakar, 2014; Ali & Suleiman, 2018; Kohilavani *et al.*, 2021). The global Muslim population has grown significantly, increasing from 17% in 1950 to 26% in

2020, with Asia's Muslim population rising from 23 to 31% over the same period. This demographic shift has fueled a growing demand for halal-certified products (**Lever & Miele, 2012; Kurniawati & Cakravastia, 2023**). Businesses that comply with halal standards can access wider global markets (**Bakar *et al.*, 2014; Suryawan *et al.*, 2022**), and halal certification strengthens consumer trust, as products are perceived to undergo rigorous monitoring (**Mohtar *et al.*, 2014; Macready *et al.*, 2020; Nugraha *et al.*, 2022**). Importantly, halal certification also encompasses aspects of health and safety, benefiting not only Muslim consumers but also the wider population (**Mathew *et al.*, 2014; Neio *et al.*, 2016; Wibowo & Ahmad, 2016**). In response, many manufacturers are reformulating or developing products to meet halal standards, thereby creating innovative, high-quality goods (**Ngah *et al.*, 2014; Riaz & Riaz, 2016**).

Fish is widely recognized as an excellent source of animal protein, providing essential amino acids, omega-3 fatty acids, vitamins, and minerals important for human health (**Chalamaiah *et al.*, 2012; Blakistone *et al.*, 2015; Bisht *et al.*, 2022; Xie & Liu, 2023**). Processing fish into value-added products enhances its economic potential. With advancements in technology, the modern fish processing industry has expanded significantly, producing items such as canned fillets, fish sausages, fish chips, and other fish-based foods (**Alqudsi, 2014; Kohilavani *et al.*, 2021; Kurniawati & Cakravastia, 2023**). The sector generates employment, supports international trade, and contributes to global economic growth, while sustainable practices remain essential to safeguard future fish availability (**Lever & Miele, 2012; Suryawan *et al.*, 2022**).

Indonesia, one of the world's most biodiverse nations, has vast marine resources, including numerous fish species, coral reefs, mollusks, and other aquatic organisms (**Mathew *et al.*, 2014; Mohtar *et al.*, 2014; Neio *et al.*, 2016; Macready *et al.*, 2020; Nugraha *et al.*, 2022**). This biodiversity underpins the country's strong potential for fisheries production and processing (**Chalamaiah *et al.*, 2012; Ngah *et al.*, 2014; Riaz & Riaz, 2016; Wibowo & Ahmad, 2016**). Tuban Regency in East Java Province exemplifies this potential. With a 65km coastline and around 14,000 active fishers, Tuban's fisheries sector is a major contributor to local livelihoods and regional economic growth (**BPS, 2022a**). In 2022, the district recorded the highest economic growth in East Java at 8.88%, well above the provincial average of 5.34%. Much of this growth was driven by micro, small, and medium enterprises (MSMEs) engaged in marine fish processing (**BPS, 2022b**).

The fisheries processing industry in Tuban is dominated by MSMEs, which act as the backbone of the local economy. However, sustaining this growth requires a clear understanding of the raw material supply chain. Raw material quality strongly influences the final product's quality and competitiveness (**Sampels, 2015; Ruiz-Capillas & Herrero, 2019; Glencross *et al.*, 2020; Nakazawa & Okazaki, 2020**). At the same time, the adoption of halal product assurance systems in Tuban's fish processing units holds

significant potential to increase household incomes, enhance product competitiveness, and build consumer confidence.

This study was therefore conducted to analyze the supply chain of raw materials for fish processing units, classify fish processing enterprises, and evaluate the implementation of halal product guarantees and certification in Tuban Regency, East Java Province. The findings are expected to support the acceleration of halal certification for processed fishery products, thereby strengthening both the economic performance and global competitiveness of the region's fisheries sector.

MATERIALS AND METHODS

Research design

This research employed an exploratory design as the primary methodological approach (Sukoso *et al.*, 2022; Tahira, 2022). Data collection combined primary and secondary sources. Primary data were obtained through surveys using structured questionnaires and direct interviews with respondents, while secondary data were sourced from the Fisheries Service of East Java Province and Tuban Regency. Enumerators conducted field surveys using the secondary data as a reference framework to guide and validate primary data collection.

The analysis was performed descriptively using the Spearman Rank correlation method to examine relationships among variables. The initial stage of the study involved collecting data from the East Java Provincial Fisheries Service, which was then synchronized with Tuban Regency data through direct field verification. Respondents consisted of household-scale fish processors as well as small and medium enterprises operating in the coastal area of Tuban Regency, East Java Province.

The study aimed to describe the characteristics of processed fishery products while also identifying key aspects of their transportation and distribution chains. The focus on processed fishery products was based on the inherent susceptibility of fish to spoilage, which underscores the importance of applying efficient and appropriate processing technologies tailored to each product type.

RESULTS AND DISCUSSION

Tuban Regency is divided into 14 sub-districts, five of which are capture fisheries producers, namely Palang, Tuban, Jenu, Tambakboyo, and Bancar sub-districts (Table 1). According to data from the Central Statistics Agency, during the period from 2018 to 2022, there were approximately 3,267 fishing households recorded, and marine capture fisheries production in 2022 reached around 30,394.44 tonnes (Table 2). The emergence of the Covid-19 pandemic in 2019 influenced PPKM policies and led to an increase in fuel prices. Business activities and marine fish catches in Tuban Regency are relatively stable and show an increasing trend (BPS, 2019; BPS, 2020; BPS, 2021a; BPS, 2023).

Table 1. Capture Marine Fisheries Data (Tons) for Tuban Regency, 2018-2022

No	Sub-district	2018	2019	2020	2021	2022
1	Palang	7,148,69	9,736.17	11,196.60	16,684.94	16,684.94
2	Tuban	290.30	394	437.34	594.78	594.78
3	Jenu	324,80	437.94	478.96	646.6	646.6
4	Tambakboyoy	1,395.92	1,858,93	2,137.77	2,992.88	2,992.88
5	Bancar	4,401.36	5,721.77	6,580.03	9,475.24	9,475.24
	Tuban Regency	13.236,27	18.148,81	20.830,7	30.394,44	30.394,44

Table 2. Number of fishing households in Tuban Regency, 2018-2022

No	Sub-district	2018	2019	2020	2021	2022
1	Palang	941	941	941	941	941
2	Tuban	420	420	420	420	420
3	Jenu	543	543	543	543	543
4	Tambakboyoy	766	766	766	766	766
5	Bancar	606	606	606	606	606
	Tuban Regency	3.276	3.276	3.276	3.276	3.276

Raw material supply chain for fish processing units

The implementation of a halal product guarantee system in Indonesia relies on the traceability method as the main approach (Suryawan *et al.*, 2022). The traceability concept is used to reveal information about the origin of raw materials and additional materials used in processed products (Ismoyowati, 2015). The tracking process begins when the main raw material, namely fish, is received, then managed, transported, processed with various additional ingredients, and finally packaged before being distributed to consumers. Fish must meet halal requirements in accordance with BPJPH Head Decree number 33 of 2022 because it is the main component in this process. The process of receiving fish raw materials usually occurs at the fish landing site and is handed over to the buyer after adding ice. Fresh fish is generally sold in traditional markets. Fish that are not sold will be processed into products that are more durable and have a higher selling value.

Fishing results generally depend on the "pengambe," namely someone who finances all fishing operational costs and is tied up in the form of debt (Herlambang *et al.*, 2017). Based on their agreement, the ship's crew will hand over all the fish caught to the fisherman. This collector will determine the price and market the fish at the Fish Landing Place, then distribute it to the fish auction or market to be sold or entrusted to the collector in accordance with the sale and purchase agreement (Fig. 1). At this stage, a sorting process is carried out based on the type of fish, which is usually divided into fish

that can be consumed and by-products from fishing. Larger and medium-sized collecting companies often process fish into various processed products. On the other hand, micro, small, and medium enterprises will collect raw fish to be processed into food or feed that is modified and adjusted according to needs.

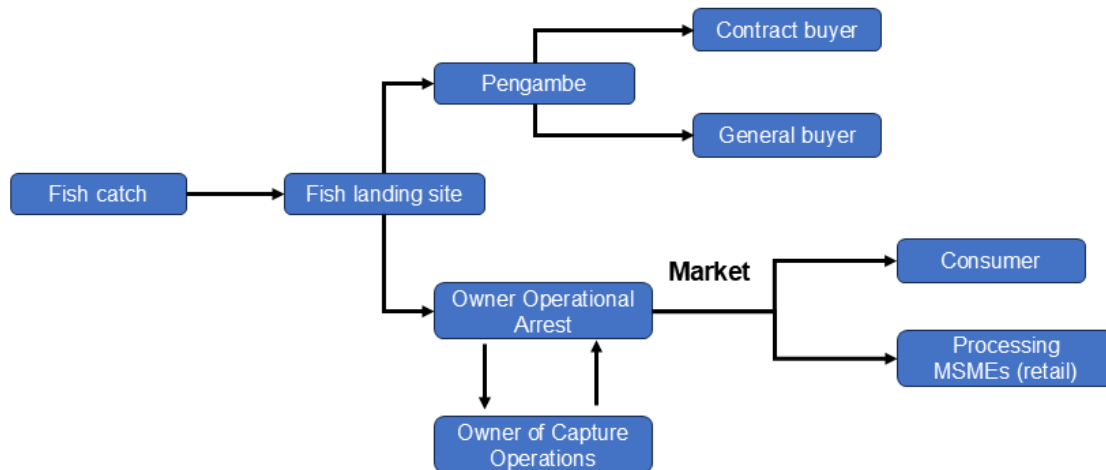


Fig. 1. Raw material supply chain mechanism for fish processing units in Tuban regency

Fish catches can be traded to parties that process fishery products. This fish, which is sold in small quantities, is intended for buyers falling into the categories of micro, small, and medium enterprises, as well as individuals who process fish at home. Findings from field research show that most individuals or businesses involved in fish processing need a better understanding of the importance of implementing Halal Product Guarantee Standards (SJPH) and obtaining halal certification. This can be seen in the small number of fish processing business actors who possess halal certificates. In 2022, out of the 637 halal certificates issued in Tuban Regency, only 27 were granted to fishing businesses through the Fisheries Service.

Classification of fish processing units

The grouping of fish processing businesses is carried out based on the amount of turnover obtained, namely: (1) Fish processing businesses that have a medium turnover, generating more than IDR 6 billion annually; (2) Fish processing businesses that have a small turnover, with a turnover ranging from IDR 600 million to IDR 6 billion per year; (3) Micro-scale fish processing businesses that have legal entity status and have a turnover of less than IDR 600 million per year; and (4) Micro-scale fish processing businesses without legal entities (households) with a turnover of less than IDR 600 million per year. There are six medium-scale fish processing businesses that generate more than IDR 6 billion in turnover annually. One of them is located in Jenu District, while the other five are located in Palang District. Five of these companies have legal

entities as trading units (Table 3). All listed companies have different products, production amounts, turnover, investment, marketing targets, and numbers of workers.

Table 3. Medium scale fish processing business turnover > 6 billion idr per year in Tuban Regency, East Java Province, in 2022

No	Company Name	Product Type	Production (Tons/year)	Turnover (IDR/year)	Investment Value (IDR)	Marketing Objective	Number of Employment (people)
1.	UD. Subakhi	Shrimp paste	480	16,500,000,00 0	9,750,000,00 0	Gresik, Pasuruan, Tuban, Surabaya	27
2.	UD. Sumber Laut	Shrimp paste	240	7,200,000,000	9,200,000,00 0	Jakarta, Central Java, Tuban	25
3.	H. Kasuwi	Shrimp paste	144	6,720,000,000	7,700,000,00 0	Surabaya, Central Java, Jakarta, Semarang, Japan, China	19
4.	UD. Dadi Jaya	Fresh fish	450	8,100,000,000	1,300,000,00 0	Tuban, Lamongan	10
5.	UD. Barokah	Peeled crab	55	16,500,000,00 0	975,000,000	Gresik, Pasuruan, Tuban, Surabaya	18
6.	UD. Empat Bersaudara	Anchovy Rice (dried fish)	120	12,000,000.00 0	150,000,000	Jakarta, Semarang, Japan, China	38

In Table (3), the products produced include fresh fish, shrimp paste, peeled crab, and anchovies (dried fish). This business uses raw materials from a group of small pelagic fish, namely fish that live in surface to mid-depth waters. This type of product shows that, even though it operates on a medium scale, its production still relies on technology. The majority of products are semi-finished products that require further processing before they can be consumed or are not ready for direct consumption. Therefore, processing, packaging, and marketing products still require technology (Nagarajaro, 2016; Rowan, 2023; Kurniawan *et al.*, 2025). The equipment owned by most businesses is limited to refrigeration machines and simple technology.

There are 20 small fish processing businesses with annual turnovers ranging from IDR 600 million to IDR 6 billion. Of this number, 10 of them are located in Palang District. Within this category of companies, seven of them are legally valid trading units (Table 4). All listed companies have different types of products, varying production, varied turnovers, diverse investments, distinct marketing targets, and varying numbers of employees as well.

The products produced (Table 4) include dried fish, shrimp paste, peeled crab, pindang, smoked nuggets, crackers, and fish skin chips. The types of fish used as the main raw materials include Lebar, Tembang, Lemuru, Layang, and Lisong fish. This product diversity reflects that, even though the industry is a small business, the industry adopts technology in its production process. Some products are ready for consumption,

while others require processing, packaging, and marketing stages that use technology (Nagarajaro, 2016; Rowan, 2023; Al Zamzami *et al.*, 2025).

Table 4. Small-scale fish processing businesses in Tuban Regency, East Java Province, with an annual turnover of 600 million IDR to 6 billion IDR

No	Company Name	Product Type	Production (Tons/year)	Turnover (IDR/year)	Investment Value (IDR)	Marketing Objective	Number of Employment (people)
1	UD Harun	Shrimp paste	84	2.940.000.000	1.900.000.000	Central Java	15
2	UKM Markamah	Shrimp paste	36	1.080.000.000	200.000.000	Tuban, Central Java	6
3	TOKO ASIH	Shrimp paste, crackers, dried fish, etc	300	600.000.000	150.000.000	Surabaya, Malang, Semarang, Tuban	8
4	UD. Putra Galuh	Peeled crab	10	2.756.100.000	400.000.000	Gresik	15
5	Rudi	Peeled crab	9,5	1.852.000.000	250.000.000	Gresik	7
6	Dani	Peeled crab	9	1.834.000.000	200.000.000	Gresik	7
7	UD. Wali Songo	Crab processing	7,5	2.192.400.000	200.000.000	Gresik	28
8	H. Pandi	Crab processing	14,9	4.340.000.000	200.000.000	Gresik	7
9	Basar	Crab processing	5,4	1.461.400.000	200.000.000	Gresik	2
10	CV. Mutiara Laut	Dried fish	36	900.000.000	3.800.000.000	Jakarta, Lampung	25
11	UD. Subur Jaya	Dried fish	144	1.728.000.000	700.000.000	Central Java, West Java, East Java	10
12	UD. WB. Perdana	Dried fish	170	1.700.000.000	1.500.000.000	Jakarta, Bandung, Solo	10
13	UD. SJ TUBAN	Dried fish (layang, teri, kalapan, kembung)	120	3.650.000.000	600.000.000	Batam	5
14	UD. Teri Putih	Dried Teri	120	6.000.000.000	1.300.000.000	West Java, Central Java, Tuban	30
15	UKM HJ Sholekah	Pindang processing	30	600.000.000	50.000.000	Babat	2
16	UKM Jati	Pindang processing	120,0	2.160.000.000	350.000.000	Babat	9
17	UKM Sulastri	Smoked fish	48,0	1.680.000.000	100.000.000	Tuban, Lamongan	2
18	UKM Sumarno	Smoked fish	45,0	1.350.000.000	60.000.000	Tuban	1
19	UKM Dua Putra	Fish skin chips	60	600.000.000	100.000.000	Jakarta, Batam, Bali, Surabaya	7
20	UKM Pantura	Nuggets	15,0	600.000.000	30.000.000	Bojonegoro, Tuban	6

Total production, number of employees, investment value, and turnover vary, even for similar products. For example, nugget products have low investment but generate high turnover. This shows the need to improve standards and regulations for fish

processing products (Thilsted *et al.*, 2016; Suryawan *et al.*, 2022; Anggayasti *et al.*, 2025). The market level carried out still covers cross-regional and cross-provincial areas, but cross-country expansion is necessary. This is important to improve product quality and to reach a wider market. The importance of assistance is such that all small fish processing businesses can meet sanitation standards and obtain halal certification (Noordin *et al.*, 2014; Kobayashi *et al.*, 2015).

There are three legally valid microeconomic institutions with revenues of less than 600 million per year (Table 5). Two of them are located in Tambakboyo District. All listed companies have various types of products, production levels, income, investments, marketing targets, and various workforce numbers. The products produced include crispy anchovies, fish nuggets, fish crackers, and fish chips. This shows that, even though it is on a micro scale, the products are technology-based. Most of the products are finished goods that can be consumed directly without the need for additional processing.

Table 5. Legalized micro-scale fish processing business Turnover < 600 million IDR per year in Tuban Regency, East Java Province in 2022

No	Company Name	Product Type	Production (Tons/year)	Turnover (IDR/year)	Investment Value (IDR)	Marketing Objective	Number of Employment (people)
1	A & R SEA FOOD	Various fish chips	3	300.000.000	250.000.000	Surabaya, Gresik, Tuban, Jakarta, Bandung	3
2	UD. RISTA	Fish chips	8	120.000.000	74.000.000	Jepara, Jatirogo, Bancar, Tuban	3
3	UKM KS	Fish Nuggets and Crispy anchovies	4	144.000.000	25.000.000	Tuban	3

Production, the number of workers, investment value, and income have different levels (Table 5). Fish nuggets and crispy anchovies have the lowest investment but generate relatively high income. Apart from that, many fish processing businesses have not implemented halal product guarantee standards (SJPH) and still do not have halal certificates.

There are approximately 955 micro-scale fishing households operating with an annual turnover of less than IDR 600 million per year. (Table 6). This business produces various types of fish products, namely: fresh fish, salted fish, pindang fish, smoked fish, fermented fish, and others. The total production of these fishery households reaches 43.635 kg per year, with a turnover of IDR 1.297.270.535.460. This type of product highlights the importance of technology in the fish processing process, as most products are still in a semi-finished form and require further processing before they can be consumed directly. Therefore, the processing, packaging, and marketing of these products heavily rely on technology. Most micro-scale household fish processing businesses have

not implemented Halal Product Guarantee Standards and do not possess halal certification.

Table 6. Micro-scale Household fish processing business turnover <600 Million IDR in Tuban Regency, East Java Province, 2022

No	Type of product	Total RTP	Production (Kg/year)	Omset (IDR/Year)
1	Pindang	261	3.327	90.708.038.491
2	Asin	180	7.869	207.116.100.000
3	Asap	323	3.702	87.593.425.846
	Fresh			
4	Products	54	25.336	787.152.218.182
5	Fermentation	87	3.132	84.057.352.941
6	Etc	50	269	40.643.400.000
	Total	955	43.635	1.297.270.535.460

In this supply chain, more fresh fish has been processed, where the fish is initially received in fresh condition from the fish landing site and then distributed to consumers through the market using a cooling process with ice. However, the newer fisheries business sector, consisting of 54 fishing households, experienced a decline due to policies aimed at controlling the spread of the Covid-19 virus. These policies included restrictions on community activities and procedures related to fish catching and selling operations. The increase in fuel prices and activity restrictions during the Covid-19 pandemic also had a negative impact on the availability and volume of raw materials for processed fishery products (Chanrachkij *et al.*, 2020; Campbell *et al.*, 2021; Monirul *et al.*, 2022; Amaralal *et al.*, 2023). As a result, unsold fish are processed into products such as dried fish, salted fish, pindang fish, and smoked fish. The remaining fish, in large quantities, are processed into dried and salted fish, while a small portion is processed into boiled fish and smoked fish.

Micro, small, and medium enterprises that have legal status generally possess business permits such as trading permits, home industry permits, and business registration numbers. The number of workers in legally incorporated micro, small, and medium enterprises varies, and their organizational structures differ, with clear distinctions between workers and business owners. Household micro-enterprises that do not have legal status require permits such as food production numbers, business registration numbers, and halal certificates (Staff, 2019; Kurniawan *et al.*, 2024a). Production depends on market or consumer demand, and the activities carried out tend to be informal. Even though the number of workers in household micro-enterprises varies, the organizational structure is more organized, with business owners also serving as workers.

However, household micro-enterprises tend to involve more workers than MSMEs with legal status. This demonstrates that household micro-enterprises are more flexible than other types of businesses but need to ensure the consistent quality of the products produced within the same product group (Carlucci *et al.*, 2015; Caldera *et al.*, 2019). The research conducted also indicates that fishery product processing activities are concentrated in Palang District, Tuban Regency, because the location is easily accessible for obtaining raw materials from fish landing sites. Additionally, this sub-district shares a border with Lamongan Regency, which has the potential to supply raw materials (BPS, 2021b).

The implementation of the Halal Product Guarantee System (SJPH) is essential

The role of the marine fishing industry is crucial in providing a source of animal protein, especially for people living in coastal areas. Products produced in the marine fisheries sector can be considered in accordance with halal principles by implementing an SJPH system that complies with the standards and requirements set by the Indonesian Ulema Council (MUI), the authorized authority to assess the halalness of products in Indonesia.

The Tuban Regency Government demonstrates a strong commitment to supporting the welfare of fishing households. The Tuban Food Security, Agriculture, and Fisheries Department has launched several initiatives to improve the welfare of fishing households, including:

- a. Fisherman Identity Legality Program: The Tuban Food Security, Agriculture, and Fisheries Service encourage fishermen to obtain legal identity, including personal identification and boat registration, enabling them to access all the empowerment programs provided.
- b. Free Insurance Program: The Tuban Food Security, Agriculture, and Fisheries Department covers insurance premiums for fishermen, providing protection when they face risks at sea, such as injury or death. The insurance amount for fishermen who pass away reaches IDR 50 million. This program annually provides free insurance to 1,500 fishermen. In 2022, this benefit will be extended to 1,500 fishermen in Bancar, Tambakboyo, Jenu, Tuban, and Palang Districts. Tuban Regency is one of four districts in East Java that offers free insurance to fishermen.
- c. Free Land Certification Program: This program aims to provide land certification to fishermen, allowing them to use the land as collateral to obtain capital from financial institutions. In 2022, Tuban Regency will successfully certify 200 plots of land owned by fishermen for free, specifically 100 plots in Sukolilo Village, Bancar District, and 100 plots in Pabean Village, Tambakboyo District.
- d. Cash Assistance for Fuel: In 2022, the Amendment to the Regional Revenue and Expenditure Budget II provides cash assistance of IDR 450,000 to fishermen for the

purchase of fuel oil (BBM). This assistance will be distributed through the Tuban Post Office.

- e. Business Infrastructure Assistance: The Tuban Food Security, Agriculture, and Fisheries Department provides infrastructure assistance according to the needs and capacity of fishermen's businesses.
- f. Implementation of SJPH and Free Halal Certification (SEHATI): Out of the six programs aimed at improving the welfare of RTP in Tuban Regency, five of them have been successful. However, the SJPH and SEHATI implementation programs have not achieved the expected results. Many fishing households have not utilized them properly because they do not fully understand the importance of implementing SJPH and obtaining halal certification in increasing sales.

The Tuban Regency Government continues to encourage micro, small, and medium enterprises to use SJPH by providing incentives to those who comply and applying sanctions to those who do not follow SJPH (Nawang Sari *et al.*, 2021; Mas'ud *et al.*, 2025). The Regent of Tuban also appealed to all micro, small, and medium enterprises in the area to obtain halal certificates by 2024. A halal certificate is not only a guarantee of product quality and increase in its attractiveness in the market but will also make it easier for business actors to obtain capital assistance. In 2022, the free halal certificate program (SEHATI) succeeded in issuing 637 halal certificates in Tuban Regency, with 589 certificates issued by the Halal Task Force of the Ministry of Religion, 27 certificates by the Fisheries Service, and 21 certificates by the Ministry of Manpower and Industry (Nasori *et al.*, 2022; Kurniawan *et al.*, 2024b; Ismail *et al.*, 2025).

In 2023, the Indonesian Halal Product Guarantee Agency (BPJPH) was expected to provide 1,000,000 free halal certificates throughout Indonesia, including a quota of 52,000 for East Java (Sholeh & Mursidi, 2023; Sharef *et al.*, 2025). It is hoped that this opportunity can be utilized by all MSMEs in Tuban Regency to obtain halal certificates. The 2024 Mandatory Halal Certification campaign has also been introduced nationwide in 1,000 locations across 38 provinces. Tuban Regency is one of the places where this campaign is being implemented, specifically in front of the Tuban Great Mosque and GOR. The Tuban Regency Halal Certificate Task Force has actively campaigned for MSMEs every Sunday during Car Free Day, with the support of 137 halal assistants and Islamic Religious Counselors, providing information and assisting in direct registration.

The research results show that the majority of micro, small, and medium enterprises in Tuban Regency still have not implemented SJPH and have not obtained halal certificates. Therefore, better understanding and awareness are needed among MSME players regarding the importance of SJPH and halal certification (Henderson, 2016; Khan & Haleem, 2016). The business being run must comply with quality standards such as sanitation, hygienic standards, the use of appropriate additives, SJPH

requirements, and administrative requirements needed to apply for halal certification. The halal certification process follows the principle of traceability, which means that the product to be certified must be traceable from the origin of the raw materials to the finished product, including additional materials used, the production environment, and equipment used to ensure that the product meets the principles of halal and thoyyiban (Noordin *et al.*, 2014; Al Zamzami *et al.*, 2023).

CONCLUSION

Tuban Regency has great potential to become a center for developing Halal Industrial Areas in the fish processing business sector. This region has a variety of abundant supplies of fish raw materials. Fish processing businesses in Tuban have variations in product type, production volume, income, investment, marketing objectives, and labor usage. These businesses can be grouped into four categories, namely: Medium-scale fish processing businesses with a turnover of more than IDR 6 billion. Small-scale fish processing businesses with a turnover ranging between IDR 600 million and IDR 6 billion.

Micro-scale legal entity fish processing businesses with a turnover of less than IDR 600 million. Micro-scale household fish processing businesses with a turnover of less than IDR 600 million. Most of them are micro-scale household fish processing businesses with a turnover of less than IDR 600 million, which includes 955 fishing households. They produce 43,635 kg per year and have a total turnover of IDR 1,297,270,535,460. Production, the number of workers, investment value, and turnover vary. This underscores the importance of standardizing technology and product quality to increase business efficiency. In the economic world, business efficiency is strengthened by the adoption of better technology, which can increase production output using the same inputs. Apart from that, many products have not implemented SJPH and do not possess a halal certificate. Business actors need to learn and understand the importance of implementing SJPH and obtaining a halal certificate to improve product quality, selling prices, sales volume, and turnover. Intensive and holistic support is needed to ensure that all fishery processing products comply with SJPH and obtain halal certificates.

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Conflicts of interest

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