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Research Article

A Model for Accelerating Self-Declare Halal Certification in a Local Bakery and Cookie Industry in Andonosari Village, Pasuruan Regency

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Abstract Consumers value local food more when halal aspects are assured. Halal certification verifies materials, equipment, and production processes; for small-scale industries, self-declared halal certification (SDHC) is an accessible option. A required procedure is halal traceability. This study analyzes the Halal Control Point (HCP) traceability model for bakery and cookie products produced by micro and small enterprises in Andonosari Village, Pasuruan Regency. Data were collected from eight products, including palm cheese, *nastar*, *kastengel*, cheese stick, banana cake, and *kue kerang*. HCPs were identified in ingredients and additives: flour (fortification vitamins); fats and oils (fermentation, fat sources, coloring, lecithin, glycerol, stabilizers, rennet, emulsifiers, bleaching agents); dairy (cheeses, full-cream and powdered milk); sweeteners (palm sugar, granulated/powdered sugar, ion-exchange resins, activated carbon); and food additives (ethanol, civetone compounds, cysteine, flavors, emulsifiers, colorings, coating agents, potassium tartrate salts). Noncompliant materials or equipment should be substituted. Implementing SDHC in local bakeries not only meets governmental halal certification requirements but also raises MSEs' awareness of the importance of halal assurance.

Keywords Accelerating, model, self-declared, halal, bakery

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INTRODUCTION

Micro, small, and medium enterprises (MSMEs) are a fundamental pillar of the Indonesian economy. Based on data from the Ministry of Cooperatives and SMEs, the number of MSEs is currently estimated at 64.2 million, contributing for 61.07% to Gross Domestic Product (GDP). Furthermore, MSEs absorb for 97% of the total workforce and account for 60.4% of total investment (Coordinator Ministry of Economic Affairs, 2021). Despite this substantial contribution, MSMEs face several critical challenges. One of the most pressing issues is halal certification. World Population Review (2026) states that Indonesia has approximately 242.7 million people, with Muslims comprising 87.54% of the population and about 12.7% of the global Muslim population, indicating strong demand for halal-certified products (Sucipto et al., 2021; Zzaman et al., 2013). The Government of Indonesia mandates that all products must be halal-certified (Law of the Republic of Indonesia No. 11 of 2020, Omnibus Law). Thus, fulfilling halal certification is not only a regulatory obligation but also a strategy to enhance product competitiveness, support halal food production, and accelerate the development of the halal industry.

In response to these challenges, various halal certification schemes have been developed. According to the Halal Product Assurance Organizing Body (*BPJPH*), 9.6 million products in Indonesia were halal-certified (BPJPH, 2025). Two certification schemes are currently implemented in Indonesia: the regular scheme and the self-declaration scheme (Indonesian Ministry of Religious Affairs, 2022; Musataklima, 2021). Initially, certification was conducted through a single, relatively expensive scheme, which posed a significant barrier for MSMEs. To address this issue, the self-declaration scheme was introduced to reduce financial constraints (Sukoso et al., 2020). The regular scheme is generally intended for large enterprises, whereas the self-declaration scheme is designed for MSMEs (Arifin, 2023; Puspita Ningrum, 2022). To further support MSMEs, the Ministry of Religious Affairs launched the Free Halal Certification Program (SEHATI) in 2021, aiming to issue 1.35 million certifications by 2026 (BPJPH, 2026; Kementerian Agama RI, 2021). This initiative offers MSMEs a valuable opportunity to obtain halal certification and improve their market position (Kementerian Agama RI, 2022).

However, practical challenges remain evident in the local area. In Andonosari Village, Pasuruan Regency, the bakery and cookie industry has emerged as an alternative economic activity following the decline in apple production due to climate change. Although MSMEs in this sector show strong interest in obtaining halal certification, most have not yet been certified. This condition limits their ability to improve product halalness, quality, production processes, and overall product value. Four MSMEs in the bakery and cookie industry have expressed their readiness to participate in the self-declaration scheme, underscoring both the potential and the urgency for targeted support.

The Halal Assurance System (HAS 23000) outlines 11 criteria required for certification, one of which is halal traceability. Halal traceability is crucial for identifying Halal Control Points (HCPs) within production processes. Previous studies on HCP traceability in the food sector have been conducted by several researchers (Kamaruddin et al., 2012; Lau et al., 2016; Prayudanti & Sucipto, 2021; Sucipto et al., 2021, 2022; and Zzaman et al., 2013). Nevertheless, these studies remain limited in integrating HCP identification with the current mandatory halal certification framework. This gap highlights the need for a more contextualized approach that aligns traceability practices with regulatory requirements, particularly for MSMEs.

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Therefore, this study makes a novel contribution by developing a halal traceability model specifically designed to accelerate self-declared halal certification (SDHC) among MSMEs in Andonosari Village, Pasuruan Regency. The novelty lies in integrating HCP identification with halal certification obligations within the MSME context. Accordingly, the objective of this research is to develop a halal traceability model and identify Halal Control Points (HCPs) in four bakery and cookie MSMEs to support and expedite the implementation of SDHC.

MATERIALS AND METHODS

Experimental Design

This study adopted a descriptive research design to develop a model for accelerating self-declaration halal certification in the bakery and cookie industries. The research framework consisted of sequential stages:

1. Problem identification: a small number of halal-certified bakery and cookie SMEs in Andonosari Village.
2. Literature study: the topic covers "bakery", "cookies", and "self-declare halal certification."
3. Field data collection and process tracing: observation and interview.
4. Descriptive analysis: self-declare description, process flow diagram, critical activity written procedure, halal control point identification, and handling of non-criteria products.

The study focused on analyzing material flows and production processes to identify critical elements related to halal compliance, particularly Halal Control Points (HCPs). The overall research procedure is presented in Figure 1.

Data Collection

Data were obtained from both secondary and primary sources to ensure methodological robustness (Hamed & Mohammed, 2020). Secondary data were collected through a systematic literature review of peer-reviewed journals, conference proceedings, books, and relevant publications addressing bakery and cookie production processes, halal certification systems, and halal traceability.

Primary data were collected through field observations and semi-structured interviews with selected bakery and cookie MSMEs. The selection of respondents was based on their relevance to the study, particularly those involved in production and expressing interest in self-declaration halal certification. Observations were conducted to document raw materials, processing stages, equipment usage, and handling practices (BPJPH, 2021). Interviews were carried out using a predefined guideline to explore production practices, challenges, and readiness for halal certification.

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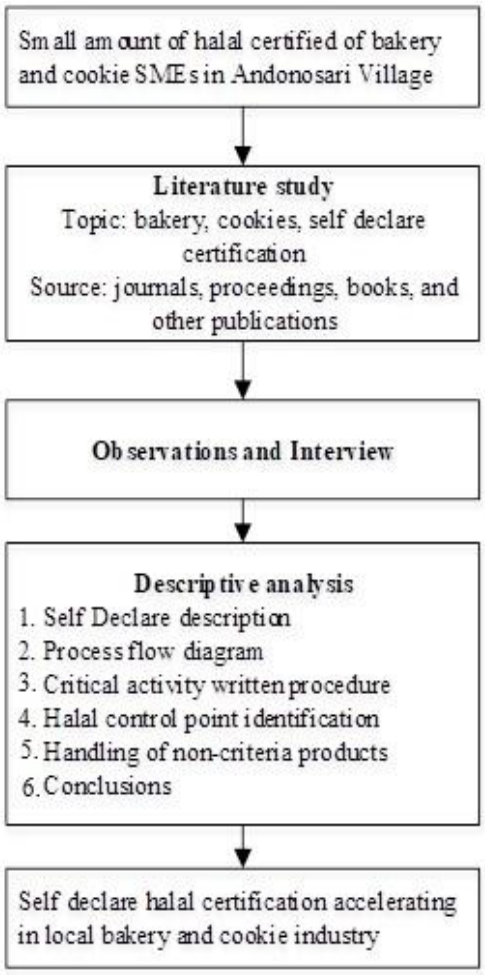


Figure 1. The study procedure

Methods

Data analysis was conducted using a descriptive approach combined with process mapping and traceability analysis (Sucipto et al., 2021, 2022, 2023). The production stage for bakery and cookies was systematically mapped to trace the flow of materials from inputs to the final products. Each stage was evaluated to identify potential Halal Control Points (HCPs) in accordance with halal assurance criteria.

The analysis involved (1) identification of raw material sources, (2) examination of processing steps, (3) assessment of potential contamination risks, and (4) alignment with halal certification requirements (BPJPH, 2021; Sucipto et al., 2021). Based on these analyses, a halal traceability model was developed to support the implementation of the SDHC in MSMEs.

Descriptive statistical analysis was applied to support data interpretation. Qualitative data from interviews were categorized and coded to identify recurring themes and patterns in halal certification practices and challenges. Observational data were summarized to highlight key characteristics of production processes and material usage. The results were presented in tabular and narrative forms to facilitate interpretation and to support the development and validation of the proposed halal traceability model.

RESULT AND DISCUSSION

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Self-declare Halal Certification (SDHC)

Self-declaration is a halal status statement for micro and small business products issued by business actors. It does not mean that business actors can declare their products halal, but a mechanism still regulates it. Some requirements should be complied with by MSEs. For example, the SDHC process must use materials that have been guaranteed to be halal, non-hazardous, and must use a simple technology process. They have separate locations, facilities, and equipment for processing halal products (PPH) from those for processing non-halal products, and have outlets and/or production facilities at most 1 (one) location (BPJPH, 2026; Indonesian Ministry of Religious Affairs, 2022). SDHC requires a strong commitment from entrepreneurs and halal product process assistance (*pendamping proses produk halal* or *P3H*) to properly prepare documents and implement a halal product assurance system (HPAS) during and after halal certification is obtained; Otherwise, SDHC will become merely administrative (Sucipto et al., 2026).

Local Bakery and Cookie Industries

Some of the MSEs in Andonosari Village produce bakery and cookies. Examples of bakery and cookies produced include banana cake (called *bolu pisang*), *kue kerang, nastar, kastengel,* palm cheese, and cheese stick. In general, bakery and cookie production are shown in Figure 2.

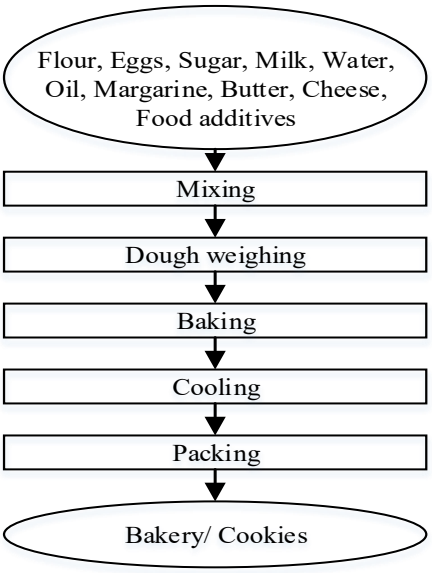


Figure 2. Bakery /cookie production

1. Materials
   Raw and supplementary materials used in bakery and cookie production are flour, eggs, sugar, milk, water, palm oil, margarine, butter, cheese, and food additives. Some materials used are positive lists, such as eggs, pineapple, banana, garlic, cinnamon, pandan leaves, and water. The other materials should comply with the self-declaration requirement and be halal-certified. The materials used should be guaranteed as halal and listed in the material matrix.
2. Mixing

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Materials are mixed based on the product type. All the ingredients are combined and mixed with a mixer. The producer should guarantee that no cross-contamination occurs from *najis, subhat*, or haram material during this process.

3. Dough weighing
   Dough weighing aims to divide the dough according to the required size. In this step, the producer also shapes the dough as required and adds the filling or topping, if needed. The producer should guarantee that there is no cross-contamination with *najis*, *subhat*, and haram substances.
4. Baking
   Bakery and cookie baking use an oven. The primary factors of baking in the bakery and cookie industries are time, temperature, heating rate, and oven air relative humidity (Panirani et al., 2023). The temperature should vary depending on the product type and the material's composition.
5. Cooling
   After baking, the product should be cooled before packing. The cooling aims to reduce the moisture gradient in the dough. A hairline crack in the cookie may appear if the moisture gradient is too high (Davidson, 2019). In this process, the producer should also ensure that there is no cross-contamination with *najis*, *subhat*, and haram substances.
6. Packing
   Bakery and cookies are packed differently. Bakery products, such as banana cake and *kue kerang*, are packed in plastic film, while cookie products, such as nastar, kastengel, palm cheese, and cheese sticks, are packed in plastic jars. The packaging type is adjusted to the product's properties. Cookies contain less water than bakery products, so the cookie structure is drier and harder. A plastic jar is used for cookie packaging because it is strong and helps protect the cookies from shaking. The packaging material should be halal to comply with self-declaration requirements.

Critical Activity Written Procedure

Critical activity written procedures comprise defined processes that encompass crucial activities that may affect the product's halal status; these procedures are integrated with the ISO 9001 and 22000 systems. The procedures refer to Halal Assurance System (HAS) 23301 for the processing industry. The following critical activities include material purchasing, new material inspection, storage and handling, new material selection, production, cleaning production equipment and facilities, development of new menus, and transportation (LPPOM MUI, 2014b). Figure 3 demonstrates the identified products' critical activities and HCP positions.

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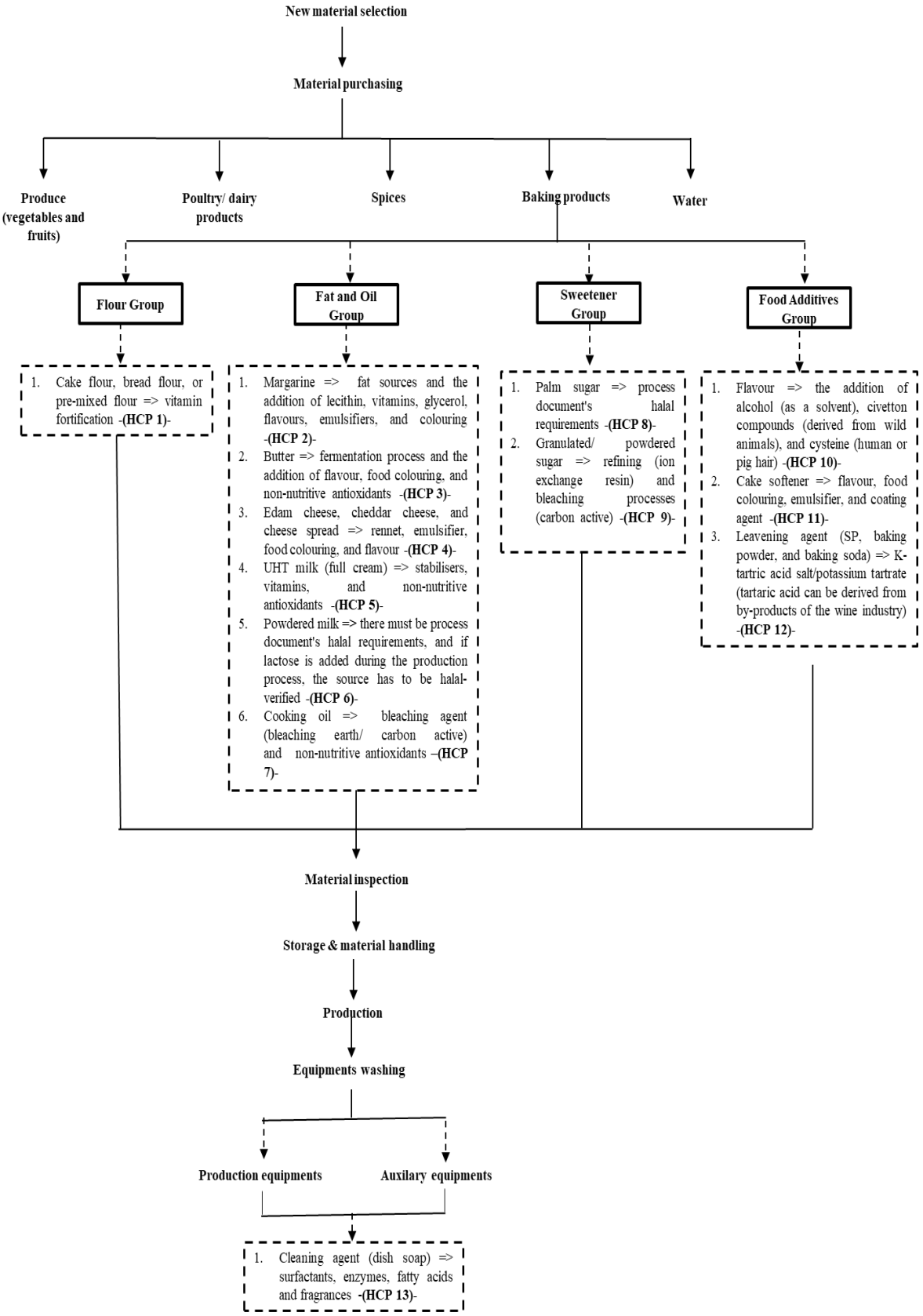


Figure 3. The written procedures for critical activities and HCP positions of bakery and cookie products

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An in-depth description of the HCP identification procedure is provided below:

1. Material Purchasing

An enterprise must establish a centralized management system that can be traced effectively from the purchase of raw materials to the shipment of finished products. Material procurement is a critical component of HCP traceability in bakery MSEs. The majority of the materials were purchased randomly at the local market. If the origin of the materials is unclear, the halal tracing process can become more complex. Material purchasing procedures should comply with the list of materials already "halal certified" (LPPOM MUI, 2014b, 2015). Self-declared halal certification (SDHC) is suitable for products that use low-risk materials and can be guaranteed to be halal (Arifin, 2023). When purchasing materials, producers or MSEs should prefer halal-certified materials or products; documents for material purchases must also be appropriately recorded.

2. Material Inspection

The raw and supplementary materials for the four MSEs were examined and classified into five categories: produce (vegetables and fruits), poultry/dairy products, spices, baking products, and water. The identified materials are presented in **Table 1**. Fresh material was added to the halal-positive list, and the halal label on the packaging of processed products was checked. According to LPPOM MUI decree SK07/Dir/LPPOM MUI/1/13 (LPPOM MUI, 2014; *Surat Keputusan LPPOM MUI tentang Daftar Bahan Tidak Kritis* (Halal Positive List of Materials), 2013), fresh materials such as fruits, vegetables, and spices constitute halal-positive list materials. Animal products such as fresh milk, eggs, pure honey, fish, and other fresh fisheries are also included in the halal-positive list. On the other hand, halal-certified slaughter must be proven for other animal materials, such as beef, chicken meat, goat meat, and other halal animals. Additional materials, usually processed food products, are permitted through halal certification or halal product process (HPP), which halal auditors verify.

3. Storage and Handling of Material

Storage handling is designed to ensure the value of stored commodities by preventing, limiting, or removing depreciating influences (Afriyie et al., 2022; Banoub & Martin, 2020). Storage helps protect the material from various forms of damage or other risks that could affect its quality. The storage and handling of materials is prone to contamination with subhat (halal status unknown) and haram substances. As a result, halal materials need to be stored separately from doubtful (*subhat*) and haram materials.

Bakery products include cookies, cakes, pastries, and bread; however, this study focused on cookies and cakes. Bakery products are made from complex materials, grouped into five categories in this study: produce (vegetables and fruits), poultry/ dairy products, spices, baking products, and water. Produce comprises fresh fruits and vegetables; the identified materials for this group are pineapples, garlic, and bananas. Watkins & Nock (2012) state that vegetables and fruits require appropriate storage conditions due to commodity characteristics. Banana is a climacteric fruit that requires forced-air cooling storage at 13–15°C, with 90–95% humidity, and a storage life of 7–28 days. Garlic is a crop product with a long shelf life and low perishability that is best stored in room-cooling storage with an optimal temperature of 0°C, humidity of 65-70%, and a storage life of 180–210 days. Pineapple is a

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non-climacteric fruit that may be stored in room-cooling storage with an optimal temperature of 7–13°C, humidity of 85–90%, and a storage life of 14–28 weeks. To avoid contamination with haram and subhat substances, it would be desirable to separate produce storage from household storage. Poultry/dairy products are fresh animal products; the identified material for this group is an egg. The ideal storage condition for eggs is room temperature, with a storage life of 2 weeks (room temperature) or up to 8 weeks (refrigerated) (Feddern et al., 2017). Spices consist of fresh or dried materials; the identified materials for this group are cinnamon and pandan leaves. Bunning et al. (2014) state that spices are best stored in cold, dry conditions. Storing in well-sealed, transparent, rigid containers is recommended to improve quality and avoid contamination.

Baking products are made from the basic ingredients commonly used in baking. This material group is quite complex and is dominated by identified HCP products. Baking products are categorized into four groups: flour, fats and oils, sweeteners, and food additives. Flour refers to processed dry materials in the form of flour or powder, such as cake flour, bread flour, and premixed flour. Premix flour (wheat flour, corn starch, or tapioca flour) mixed with additional ingredients such as powdered milk, sugar, raising agents, and flavors. The ideal storage condition for flour products is at a low temperature (-20˚C) in an airtight container to prevent contact with oxygen and moisture absorption (Lancelot et al., 2021).

Table 1. The list of identified material

MSE	Product	The identified material				
		Produce	**Poultry/ dairy products**	**Spices**	**Baking products**	**Water**
A	*Nastar*	Pineapple	Egg and egg yolk	-	Cake flour/premixed flour, margarine, cheddar cheese, salt, granulated sugar, milk flavor, cake softener, vanilla flavor, powdered milk, UHT milk,	Water
	Kastengel	-	Egg and egg yolk	-	Cake flour/premixed flour, margarine, cheddar cheese, salt, granulated sugar, vanilla flavor, corn flour, and tapioca flour	-
	Cheese stick	Garlic	Egg and egg yolk	-	Cake flour/premixed flour, margarine, cheddar cheese, salt, cake softener, granulated sugar, vanilla flavor, and corn flour	-
B	Palm cheese	-	Egg	-	Cake flour/premixed flour, margarine, butter, cheese spread, powdered milk, palm sugar, cheddar cheese	-

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MSE	Product	The identified material				
		Produce	Poultry/ dairy products	Spices	Baking products	Water
	Nastar	Pineapple	Egg and egg yolk	Cinnamon	Cake flour/premixed flour, margarine, butter, cheese spread, cheddar cheese, powdered sugar, and powdered milk	Water
	Kastengel	-	Egg	-	Cake flour/premixed flour, margarine, butter, cheese spread, cheddar cheese, powdered sugar, powdered milk, and edam cheese	-
C	Banana cake	Banana	Egg	-	Cooking oil, UHT milk (full cream), salt, granulated sugar, baking soda, cake flour, and powdered milk.	-
D	*Kue kerang*	-	Egg	Pandan leaves	Granulated sugar, cake flour, bread flour, baking powder, Super Polymer (SP), and margarine	-

The fat and oil group includes processed food products derived from fat (particularly dairy) and oil in liquid, dry, or semi-solid form, such as butter, margarine, any cheese (cheddar cheese, cheese spread, and edam cheese), full-cream milk (UHT), powdered milk, and cooking oil. For butter and margarine, ideal storage conditions at 10°C and the use of foil packaging can better retain product quality (Krause et al., 2008). In contrast, for cheese, ideal storage conditions are 4 to 10°C in airtight containers or packaging (Sasmazer et al., 2022). Powdered milk can be stored in a tin container for one year at 4°C and 20°C (Dahle, 1924). Full-cream milk (UHT) has the longest shelf life, 34–36 weeks, when stored at 4 and 20°C (Karlsson et al., 2019).

Sweeteners are processed products that serve as natural sweeteners and can be in dry or liquid form. The identified materials in the sweetener group are palm sugar, granulated sugar, and powdered sugar. In general, storage at 16–24°C with a shelf life of 2 years is favorable for group sweeteners (Michigan Sugar Company, 2019). Cooking oil stored at 4–8°C for 12 months showed better oxidation resistance than oil stored at room temperature. Food additives are processed products in dry (powder), liquid, or semi-solid form used as leavening agents, flavors, and food coloring. The identified materials for the food additives group are flavor, cake softener, and leavening agents (baking powder, baking soda, and SP).

Food additives should be stored at room temperature, in low-humidity conditions, to prevent excess moisture and degradation of product quality. Furthermore, maintaining an adequate temperature range is the most important aspect of the secure and effective storage of baking ingredients. To avoid contamination with haram and *subhaat* substances, bakery and cookie production facilities should be separate from household food storage.

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4. New Material Selection

The selection of new materials replaces those materials whose halal status is doubtful. The HCP identification detected 12 products with a doubtful halal status. These materials should be replaced with new substitute materials. The following HCP products were identified as non-criteria products: cake flour/ bread flour/premixed flour, margarine, butter, cheese (cheddar cheese, cheese spread, and edam cheese), full-cream milk (UHT), powdered milk, cooking oil, palm sugar, granulated sugar/ powdered sugar, flavor, cake softener, and leavening agent (baking powder, baking soda, and SP). To improve halal production, bakery and cookie MSEs should consider using halal suppliers or purchasing halal products directly. The most important aspect is the use of halal materials, with the selection of new halal materials a key component of food processing (Razak et al., 2014; Zailani et al., 2020).

5. Production Process

Bakery products in Andonosari Village are produced mainly by the home industry (household kitchen). The cooking process is categorized into heating and non-heating (Sucipto et al., 2021). The heating process includes baking, cooking jam, and melting margarine or butter. The non-heating processes include washing, peeling, cutting, blending (to produce pineapple puree), mixing cookie/cake batter, kneading, dough weighing, cookie shaping, pouring the dough into cake molds, egg yolk coating, cooling, and packing. Heating and non-heating processes do not affect HCP; nevertheless, facilities and equipment contaminated with haram or najs (Islamic filthy) substances directly affect the product's halal status (LPPOM MUI, 2014a). Documentary evidence validates these production processes.

6. Cleaning Production Equipment and Facilities

Equipment and facilities that previously came into contact with *najis* must be cleaned according to Sharia so that they can be used again. Water is the most preferred cleaning agent because it is affordable and convenient; however, dirt, oils, and chemicals may need chemical cleaning solutions for greater sanitation (Ahmad & Shariff, 2016; LPPOM MUI, 2014b). Cleaning agents should be used if merely soil and water are insufficient to remove the *najis*. Cleaning agents should not be produced from or contain haram or *najis* substances. Cleaning agents include detergents (both commercial and clay detergents), acids (HCl and HNO_3), and bases (NaOH) (Hutami, 2014). The clean equipment and facilities can only be used to produce halal products, not haram or *subhaat* products.

Dish soap is frequently used as a cleaning agent for production and auxiliary equipment. Dish soap contains complex ingredients, indicating an HCP risk. The Indonesian Ulema Council's Assessment Institute for Foods, Drugs, and Cosmetics (LPPOM MUI) (2019) states that detergent additives include surfactants, enzymes, fatty acids, soap bases, perfumes, solubilizers, and colors. The detergent additives contain HCP: the surfactant can be derived from oil or fat derivatives, enzymes derived from the source can be generated by bacteria, animals, or plants, fatty acids for soap basis materials can be derived from oil or fat derivatives, and fragrances can be composed of complex materials whose source must be verified/ halal certified. Solubilizers are often derived from fatty acids, obtained from fatty

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oils. Solubilizers, soap bases, enzymes, fatty acids, surfactants, and fragrances must all be evaluated for halal compliance. If the oil or fat derives from a halal animal, it must be confirmed that the animal was slaughtered in compliance with the principles of sharia. If it derives from bacteria, it must be confirmed that the growth medium is free of pork or haram substances.

7. Transportation Procedure

Transporting raw materials and end products requires a *najs*-free carrier or medium. Therefore, it is particularly important to use a transportation option that ensures the product's halal status. LPPOM MUI (2014b) states that carriers are used exclusively to transport halal materials and products to avoid *najis*/ haram contamination. It is acceptable to transport halal products with non-certified products, but they must be free of haram (pork and its derivatives) and najis materials. Standard operating procedures for halal transportation must be followed, and transportation records must be maintained.

8. New Product Formulation and Development

The new product formulation and reformulation should incorporate halal-positive lists and halal-certified materials. These materials comprise raw and supplementary materials, as specified in the new material selection section (3.3.4). The standard formula could be adopted as a production guide. The following factors describe the concept of new halal food development: new materials, new technologies and machinery, and advanced production standards (Norizah Mohamad & Backhouse, 2014). The following factors are necessary for sustaining halal, sharia-compliant food production: If the identified bakery product recipe is reformulated, confirm that the new materials are halal, and document the reformulation and production process.

Halal Control Point (HCP) Identification

The HCP identification results can be summarized as follows: 20 materials, including raw and supplementary materials, from brands "A" to "D," were identified. The identification discovered 12 HCPs as doubtful materials in **Table 2**.

Table 2. HCP Identification

MSE	Materials	HCP
A: *Nastar*, *kastengel*, and cheese stick	Cake flour/premixed flour, corn starch, tapioca flour, margarine, cheddar cheese, salt, granulated sugar, milk flavor, vanilla flavor, cake softener, vanilla flavor, water, powdered milk, UHT milk, pineapple, garlic, and egg.	1. Cake flour/ bread flour/premixed flour: vitamin fortification. 2. Margarine: fat sources, lecithin, vitamins, glycerol, flavors, emulsifiers, and coloring. 3. Butter: fermentation process and the addition of flavor, food coloring, and non-nutritive antioxidants. 4. Cheese (cheddar cheese, cheese spread, and edam
B: palm cheese, *nastar*, and *kastengel*	Cake flour/premix flour, margarine, butter, cheese spread, powdered milk, edam cheese, cheddar cheese, palm sugar, powdered sugar, powdered milk, egg,	

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MSE	Materials	HCP
	pineapple, cinnamon, and water,	cheese): rennet, emulsifier, food coloring, and flavor. 5. Full-cream milk (UHT): stabilizers, vitamins, and non-nutritive antioxidants. 6. Powdered milk: there must be a process document with halal requirements, and the addition of lactose must be halal-verified. 7. Cooking oil: bleaching agent (bleaching earth/ carbon active) and non-nutritive antioxidants. 8. Palm sugar: process document's halal requirements. 9. Granulated sugar/ powdered sugar: refining (ion exchange resin) and bleaching processes (carbon active). 10. Flavor: the addition of alcohol (as a solvent), Civetton compounds (wild animals), and cysteine (human or pig hair). 11. Cake softener: flavor, food coloring, emulsifier, and coating agent. 12. Leavening agent (baking powder, baking soda, and SP): K-tartaric acid salt/potassium tartrate (byproducts of the wine industry).
C: banana cake	Egg, banana, cooking oil, UHT milk (full cream), salt, granulated sugar, baking soda, cake flour, and powdered milk.	
D: *kue kerang*	Egg, pandan leaves, granulated sugar, cake flour, bread flour, baking powder, Super Polymer (SP), and margarine.	

HCP identification was further explored by categorizing HCP into four groups: flour, fat and oil, sweetener, and food additives. The comprehensive overview is described below:

1. Flour group

The flour group consists of cake flour, bread flour, and premixed flour. The HCP is in the vitamin fortification. Cake flour and bread flour are considered wheat flour; wheat flour is generally enhanced with iron, Zn, vitamin B1 (thiamine), vitamin B2 (riboflavin), vitamin A, and folic acid. The critical point is the addition of vitamins; for example, vitamin A is fat-soluble and easily damaged, so a coating agent must also be added. This ingredient could be derived from sources like gelatin that are not entirely halal. Gelatin is derived from animal bones or skin, including pig bones or skin, so it is not halal. Other halal animal sources include fish and cattle, and cattle slaughtered should comply with Sharia (LPPOM MUI, 2012; Roswiem, 2015).

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2. Fat and oil group

The fat and oil group consists of butter, margarine, any cheese (cheddar cheese, cheese spread, and edam cheese), full-cream milk (UHT), powdered milk, and cooking oil. The HCP of butter is produced during fermentation; therefore, it contains microbial products, with the critical factor being the source of the fermentation media. Aside from that, food coloring, non-nutritive antioxidants, and flavors are also added during butter production. Beta-carotene is a common food coloring agent. The addition of stabilizers in coloring raises the possibility of non-halal sources. The HCP of margarine is in the sources of fat (risk comes from pork fat), lecithin (can be sourced from the brains of farm animals; it is haram if it comes from pigs), glycerin (can be sourced from animals and enzymes; it is haram if it comes from pigs), vitamin A (could be derived from sources such as gelatin, which are not entirely halal), and flavors (alcohol added, Civetton compounds, and cysteine) (LPPOM MUI, 2012; Roswiem, 2015).

The HCP of cheese is found in rennet, emulsifiers, food coloring, preservation agents, and flavor. Rennet is extracted from the gastrointestinal tract of a calf or goat. HCP is based on the Sharia-compliant slaughter of the animal. Furthermore, rennet can be derived from microbial products; therefore, the halal status of the fermentation substrate must be investigated. The HCP of full-cream milk is found in stabilizers, vitamins, and non-nutritive antioxidants. Critical points are stabilizers in oil and fat derivatives, vitamins in the use of gelatin as a coating agent, and non-nutritive antioxidants in synthetic antioxidants. These risk materials could be from animals that are not halal. The HCP of powdered milk includes lactose, which must be halal-verified; a process document's halal requirements are also necessary for this product. Bleaching agents and non-nutritive antioxidants detected the HCP in cooking oil. Bleaching agents generally originate from bleaching earth or activated carbon, the source of which might involve haram materials like pig bones or human hair. Non-nutritive antioxidant HCP is identified in synthetic antioxidant sources that may not be halal (LPPOM MUI, 2012; Roswiem, 2015).

3. Sweetener group

The sweetener group includes palm sugar, granulated sugar, and powdered sugar. Granulated sugar or powdered sugar, the HCP is discovered during the refining and bleaching processes. LPPOM MUI (2012) states that granulated sugar is a natural sweetener derived from sugarcane or sugar beets. The HCP risk arises from the refining process using an ion-exchange resin. Process flowcharts, technical specifications, or halal certifications all qualify as material documents.

Furthermore, it typically includes a bleaching process that provides for activated carbon. Activated carbon can be obtained from plants, coal, or animal sources (e.g., bone); sharia-compliant slaughter must be verified for animal sources. The supporting documentation for palm sugar includes a process flowchart and technical requirements.

4. Food additives group

The materials identified for the food additives include flavor, cake softener, and leavening agents (baking powder, baking soda, and SP). The HCP in flavor discovers that both natural and synthetic flavors are present at the source of the material. Furthermore, because most food flavors are insoluble in water, manufacturers use alcohol (ethanol) as a solvent. Fruity-

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flavored products are very expensive when made with real fruit. Still, manufacturers substitute this with additional chemicals derived from the Civetton compound of the Civet (wild cat), which is classified as a wild animal. This is clearly haram. Aside from that, the cysteine compound is used, which can be extracted from the hydrolysis of proteins from sheep wools, duck feathers, chicken feathers, bristles, and human hair. Human hair and bristles are haram; for sheep, ducks, and chickens, the key element is sharia-compliant slaughter (Roswiem, 2015). Cake softener HCP is included in the flavor, food coloring, emulsifier, and coating agent. Beta-carotene is a widely used food coloring additive. The use of stabilizers in coloring increases the risk of non-halal sources—Emulsifier with a critical point in oil and fat derivatives. The oil or fat source could be from non-halal animals. The HCP in leavening agents (baking powder, baking soda, and SP) was identified in K-tartaric acid salt/potassium tartrate (byproducts of the wine industry). The halal status of tartaric acid depends on its source, which can be the result of a chemical reaction (dl-tartaric acid) or "tartar" (wine industry byproducts). Using dl-tartaric acid is permissible; however, using "tartar" or K-tartaric acid as a leavening agent is haram (LPPOM MUI, 2012; Roswiem, 2015).

Handling of Non-Criteria Products

Products derived from resources and production facilities that do not meet the criteria are separated and removed from the production area to prevent contamination in the manufacturing process before distribution to consumers. If a product fails to comply with the requirements, it must be removed from the market (Sucipto et al., 2021, 2022). The materials do not meet the criteria, and alternate materials are provided. The following materials should be replaced with halal-certified products: cake flour/bread flour/premixed flour, margarine, butter, cheese (cheddar cheese, cheese spread, and edam cheese), full-cream milk (UHT), powdered milk, cooking oil, granulated sugar, powdered sugar, palm sugar, flavor, cake softener, and leavening agent (baking powder, baking soda, and SP).

Several factors must be considered while substituting alternative materials (Sucipto et al., 2021).

1. Determine the properties and composition of substitute materials and alternative reserves, focusing on their similarities to previous materials.
2. The price of substitute materials is comparable to that of the components they replace, allowing halal products to remain market-competitive.

Substitute materials are widely available and easy to obtain. The producer's dedication is necessary to reformulate the menu with halal materials. The awareness and commitment to building halal menus that meet consumer needs and comply with new halal regulations.

Internal Audit

The internal audit addresses 11 criteria and verification of implementation: halal policy, halal management team, training and education, materials, products, manufacturing facilities, written procedures for critical activities, traceability, handling products that do not meet the criteria, internal audits, and management reviews. Internal audits are executed regularly, ideally every six months (Susihono & Fabianti, 2018). A halal internal audit is required to evaluate the business's implementation of the Halal Assurance System. This internal audit is intended to eliminate potential problems. After finalizing all preceding steps, internal audits may uncover halal-compliant practices and monitor products and processes that do not comply with HAS guidelines

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(Sucipto et al., 2021). Internal audits are conducted in this study following the completion of the self-declaration halal certification application.

CONCLUSIONS

The bakery and cookie industry is one of the micro and small enterprises (MSEs) in Andonosari Village, Pasuruan Regency. Bakery and cookie products also require an HCP compatible with HAS. The HCP (haram risk) was identified on 4 MSEs: cake flour/bread flour/premixed flour, margarine, butter, cheese (cheddar cheese, cheese spread, and edam cheese), full-cream milk (UHT), powdered milk, cooking oil, granulated sugar, powdered sugar, palm sugar, flavor, cake softener, and leavening agent (baking powder, baking soda, and SP). The HCP risk of cake flour/bread flour/premixed flour is in the vitamin fortification. HCP in margarine is a fat source, lecithin, vitamins, glycerol, flavors, emulsifiers, and coloring; butter in the fermentation process; and the addition of flavor, food coloring, and non-nutritive antioxidants. The HCP risk in cheese products (cheddar cheese, cheese spread, and edam cheese) is associated with rennet, emulsifiers, food coloring, and flavor. HCPs in full-cream milk (UHT) are stabilizers, vitamins, and non-nutritive antioxidants; in powdered milk, there must be a process document outlining halal requirements, and the addition of lactose must be halal-verified. The HCP is covered in bleaching agents (bleaching earth or activated carbon) and non-nutritive antioxidants for cooking oil. Palm sugar should comply with the process document's halal requirements. HCP of granulated sugar or powdered sugar occurs in refining (ion exchange resin) and bleaching processes (activated carbon).

The HCP in flavor: the addition of alcohol (as a solvent), Civetton compounds (from wild animals), and cysteine (from human or pig hair) for cake softener was identified as a flavor, food coloring, emulsifier, and coating agent. HCP of the leavening agent (baking powder, baking soda, and SP) is in the K-tartaric acid salt/potassium tartrate (byproducts of the wine industry). The HCP materials and equipment do not meet halal standards and should be replaced with halal material and equipment alternatives. Applying for self-declare halal certification is an option to guarantee a halal certificate for MSEs. Halal traceability (HCP identification) is one of the steps that must be fulfilled. An overview of HCP identification in bakery and cookie products provides in-depth explanations and education on halal and haram materials. This may broaden awareness among researchers and practitioners, primarily bakery MSEs, of the urgency of accelerating halal certification to strengthen the halal industry and support the mandatory regulation requiring halal certification obligations on October 17-18, 2026.

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