Advanced International Journal of Business, Entrepreneurship and SME's
AIJBES
EISSN: 2682-8545
Volume: 8 Issue: 29 (September 2026) PP. 2231-2249



ADVANCED INTERNATIONAL JOURNAL OF BUSINESS, ENTREPRENEURSHIP AND SMES (AIJBES)
www.gaexcellence.com/aijbes

GLOBAL ACADEMIC EXCELLENCE

HALAL COMPLIANCE IN THE BOTTLED DRINKING WATER INDUSTRY: A CASE STUDY AT AL-KHALISS ENTERPRISE, KELANTAN

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Article Info:

Article history:
Received date: 30.07.2026
Revised date: 16.08.2026
Accepted date: 27.09.2026
Published date: 30.09.2026

Abstract:

This study aims to examine halal compliance practices at Al-Khaliss Enterprise, a JAKIM-certified bottled drinking water manufacturer in Kelantan, Malaysia, following its relocation from a manual production facility to a semi-automated factory. A qualitative case study approach was employed using semi-structured interviews with three key informants (the factory manager, assistant manager, and a part-time worker), supported by direct observations conducted during an internship and document analysis based on MS1500:2019 and related halal standards. The findings reveal that the company has implemented several commendable halal compliance practices, including systematic production workflows, 5S housekeeping, mandatory use of personal protective equipment (PPE), routine contamination monitoring, and proactive communication in addressing public misconceptions regarding its products. However, several challenges remain, including the absence of a formal Internal Halal Assurance System (IHAS), undocumented standard operating procedures (SOPs), inconsistent halal

Advanced International Journal of Business, Entrepreneurship and SME's
AIJBES
EISSN: 2682-8545
Volume: 8 Issue: 29 (September 2026) PP. 2231-2249

To cite this document:

Azmi, W. M. A. W., Ayob, H., Zahid, E. S. M., & Mat Daud, S. S. (2026). Halal Compliance in The Bottled Drinking Water Industry: A Case Study at Al-Khaliss Enterprise, Kelantan. *Advanced International Journal of Business Entrepreneurship and SMEs, 8*(29), 2231-2249.

DOI: 10.35631/AIJBES.829128

training, adaptation difficulties following factory relocation, and resource limitations that affect operational consistency. The study concludes that strengthening halal assurance requires the implementation of a structured IHAS, formal halal induction and refresher training, documented SOPs, the appointment of an internal halal coordinator, and improved logistical planning during operational transitions. These measures are expected to bridge the gap between halal certification and daily operational practice, thereby enhancing consumer confidence and supporting the long-term sustainability of halal compliance among small and medium-sized bottled drinking water manufacturers.

Keyword:

Bottled Drinking Water; Halal Assurance System (IHAS); Halal Compliance; JAKIM Certification; MS1500:2019.

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Introduction

Halal, meaning "permissible" in Arabic, is a fundamental Islamic principle governing not only food but also beverages, cosmetics, and pharmaceuticals. Rising global demand has made halal compliance essential across industries, with consumer trust often resting on visible certification logos such as JAKIM's (Noordin, Noor, & Samicho, 2014). However, maintaining consistent halal practices especially in small-scale enterprises depends heavily on staff understanding and behaviour, including temporary or part-time workers who may unintentionally compromise compliance due to limited training or supervision (Ramalingam et al., 2021).

Halal assurance in small enterprises faces both structural and human challenges. Even with formal policies in place, their success relies on how well staff apply them in daily tasks; temporary workers, often less exposed to training, may inadvertently breach halal practices due to low awareness or weak oversight (Hasnan et al., 2022; Halim & Abd Mutalib, 2024). Minor errors in material handling or cleanliness can cause serious compliance issues, particularly in the beverage industry where production lines must remain contamination-free. Therefore, effective halal assurance requires consistent behaviour, role clarity, and a shared organisational mindset rather than reliance solely on checklists or top-down audits (Hasnan et al., 2022; Halim & Abd Mutalib, 2024).

This study uses Al-Khaliss Enterprise a JAKIM-certified bottled drinking water company in Kelantan that follows MS1500:2019 as a case study to explore these gaps in a real production setting. Based on observations during the researcher's internship, the study investigates employee SOP compliance, hygiene practices, and human factors such as staff attitudes and

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EISSN: 2682-8545
Volume: 8 Issue: 29 (September 2026) PP. 2231-2249
communication. By identifying practical gaps between paper certification and floor operations, the findings aim to provide actionable recommendations for policymakers, halal auditors, and small-scale beverage manufacturers, ultimately emphasising that fostering a culture of halal integrity from documentation to daily practice is key to sustaining consumer trust in Malaysia's expanding halal beverage market.

Literature Review

Halal certification in Malaysia is managed by JAKIM and state religious departments such as JAHEAIK, guided by the MS1500:2019 standard for food and beverages. Although bottled drinking water is naturally halal, certification remains necessary to ensure every production stage meets cleanliness, safety, and Shariah requirements. For small enterprises like Al-Khaliss Enterprise, compliance involves regular equipment maintenance, staff training, and strict hygiene procedures, which enhance consumer trust (Akbar et al., 2023; Halim & Salleh, 2024; Mohd Hatta et al., 2023). Certification is renewed every two years through the MyEHalal system and on-site audits, yet the challenge lies not in obtaining certification but in maintaining it daily (Yaacob et al., 2023).

The need for rigorous halal assurance becomes clearer when examining consumer behaviour. For Muslim consumers, choosing halal products is a lifestyle choice ensuring cleanliness, safety, and ethics, guided by the Qur'anic principle of halalan tayyiban (Akbar et al., 2023). Even though water is halal by default, many consumers are unaware of potential risks at processing and packaging stages, such as equipment cross-contamination or poor maintenance risks more serious in smaller factories with minimal automation (Halim & Salleh, 2024). Consequently, the visible halal logo significantly influences purchasing behaviour (Mohd Hatta et al., 2023). The halal logo functions as a symbolic and functional bridge between brands and consumers, building long-term relationships through a transparent system (Ellahi et al., 2025). Studies show that halal certification increases purchase intention and lowers perceived risk (Hidayati & Muhammad, 2024; Aneesh & Siddiq, 2024). However, during viral rumours, certification alone is insufficient companies must actively communicate their halal integrity to maintain consumer loyalty (Mustaqim & Fazriani, 2023; Muda et al., 2020).

Translating certification into daily halal assurance is particularly difficult for SMEs like Al-Khaliss. Observations revealed limited halal knowledge among new, part-time, and special needs workers, leading to inconsistent SOP compliance (Halim et al., 2024; Aziz & Hussin, 2024). The company's relocation from a manual plant to a semi-automated factory introduced operational learning curves, and the absence of written SOP references caused inconsistencies in sanitisation procedures (Al-Shami & Abdullah, 2023). Resource constraints mean halal processes depend heavily on human diligence rather than automation (Ellahi et al., 2025).

These struggles reflect broader implementation complexities facing Malaysian SMEs. Small businesses struggle to translate guidelines into daily practice due to inadequate staff training, low automation, and the absence of dedicated halal officers (Halim et al., 2024; Shah et al., 2025). While Al-Khaliss meets basic requirements like UV sterilisation and halal logos, more complex requirements like document traceability and cross-contamination protocols are harder to maintain without systematic training (Ahmad et al., 2018). SMEs must rely on manual documentation, which becomes challenging during operational changes (Jasman & Ariffin, 2021; Al-Shami & Abdullah, 2023).

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EISSN: 2682-8545
Volume: 8 Issue: 29 (September 2026) PP. 2231-2249

Underlying these challenges is internal communication and stakeholder awareness. Successful halal systems depend on systematic internal communication to ensure consistency in SOP and hygiene practices (Ahmad et al., 2024). At Al-Khaliss, structured communication regarding halal SOPs was often inadequate, especially for new or special needs workers. When the company relocated, not all staff were properly oriented on how new machinery affects halal compliance. During viral disinformation incidents such as the false rumour that white-capped bottled water came from sewage proactive communication proved essential to clarify that water is sourced from AKSB and follows JAKIM standards (Ahmad et al., 2024).

The consequences of weak halal assurance extend to operational performance. Non-compliance can lead to product rejection, certification suspension, and reduced productivity, damaging consumer confidence (Ahmad et al., 2018). Lack of automation results in slower production, higher contamination risk, and more human error (Hasnan et al., 2022; Noor Najah Nazri et al., 2024). Halal mismanagement can also disrupt supply chains during viral rumours (Wahyuni et al., 2024). Conversely, companies investing in continuous improvement see smoother operations, demonstrating that halal integrity is deeply intertwined with operational efficiency.

Given these interconnected challenges, maintaining halal assurance requires strategic countermeasures. A systematic Halal Assurance System (HAS) with formal documentation and clear SOPs based on MS1500:2019 is essential (Ahmad et al., 2018; Halim & Salleh, 2024). Comprehensive staff training should focus on behaviour change, not just compliance (Hasnan et al., 2022; Halim et al., 2024). Simple technology solutions such as barcode tracking or mobile apps can improve halal control where full automation is unaffordable (Al-Shami & Abdullah, 2023). Transparency and community outreach help counter viral rumours and restore trust (Koh et al., 2024; Putri et al., 2023; Yaacob et al., 2023).

In conclusion, halal compliance is an issue of quality, hygiene, and trust. For SMEs like Al-Khaliss, challenges in standard application, employee understanding, and operational uniformity highlight the need for strong internal halal assurance systems, stakeholder communication, and daily operational discipline to uphold halal integrity beyond the certification logo (Sorna Umme Saima et al., 2024)

Research Methodology

This study employs a qualitative case study approach to explore halal compliance implementation at Al-Khaliss Enterprise, a small-scale bottled water producer in Kelantan, focusing on two production sites (a fully manual plant in Kubang Kerian and a semi-automated facility in Jelawat) to observe how different levels of automation affect halal assurance practices. Both primary and secondary data were collected, with primary data obtained through semi-structured interviews with three respondents directly involved in daily operations (factory manager, assistant manager, and part-time production staff) using an open-ended interview guide, with face-to-face sessions lasting 30 to 45 minutes at both factory locations, while secondary data were gathered from literature reviews and official documents including the MS1500:2019 Halal Certification Standard, JAKIM documents, journal articles, and industry reports to develop the literature framework and validate thematic findings. The semi-structured interview served as the main instrument allowing probing questions, with three participants selected to ensure diverse feedback, ethical considerations including informed consent and data secrecy maintained, and audio recordings and notes later transcribed and analysed thematically

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to identify patterns and recurring concerns within Al-Khaliss Enterprise's halal assurance system.

Demographic Profile

Three respondents belonging to Al-Khaliss Enterprise participated in the study, selected based on their involvement in production and halal-related issues. Two informants were female and one was male. Informant 1, the factory manager, is a female aged between 25 and 30 years and has worked for the company for more than five years. Informant 2, the assistant manager, is a female aged between 40 and 45 years and has worked for three years in bottled water operations. Informant 3 is an 18 to 22-year-old part-time production worker who has been working for approximately less than one year. This variation in demographic backgrounds enables the study to capture various levels of experience and responsibility, contributing to improved coverage of halal assurance practices at the firm.

Table 1: Demographic Profile of Respondents

Characteristics	Informant 1	Informant 2	Informant 3
Gender	Female	Female	Male
Age	25-30	40-45	18-22
Position	Factory Manager	Assistant Manager	Part-time Worker
Years of Experience	>5 years	3 years	<1 year

Result and Discussion

Background of Al-Khaliss Enterprise, Kelantan

Koperasi Warga Universiti Sains Malaysia Kelantan Berhad (COOPUSMA) is an institutional cooperative affiliated with Universiti Sains Malaysia (USM). The cooperative's official profile states that it was registered on 12 June 2000 and is headquartered at Lot 8014, Tingkat 1, Bandar Satelit Islam Pasir Tumboh, 16150 Kota Bharu, Kelantan (COOPUSMA, n.d.-a). In organizational terms, COOPUSMA presents itself as a multi-service cooperative serving the USM community through a diversified portfolio that includes retail, food services, childcare, health-related support, financial services, accommodation, and related community-oriented operations (COOPUSMA, n.d.-b; COOPUSMA, n.d.-c).

Within this broader institutional structure, COOPUSMA's official website identifies several operating units, including Coop Mart, Kopitiam Lestari, Unit Rakan Bayi (URB), Kompleks Auliya Genius, personal financing, Kilang Air Minuman Al-Khaliss, Hotel Budget Lestari, ambulance services, Pusat Dialisis Lestari, and Klinik Lestari (COOPUSMA, n.d.-b; COOPUSMA, n.d.-c). This service profile suggests that the cooperative functions not only as an economic enterprise, but also as a provider of essential community services for the university environment. The official profile further reports a substantial membership base

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drawn from USM staff, reinforcing COOPUSMA's role as a staff-based institutional cooperative rather than a purely commercial operator (COOPUSMA, n.d.-a).

One of COOPUSMA's best-known business activities is its bottled-water operation, Air Minuman Al Khaliss. The official product page states that the product is 100% bumiputera-owned, clean and halal, and recognized by MESTI (COOPUSMA, n.d.-d). On the basis of the sources retrieved in this session, the strongest defensible description is that Al-Khaliss is positioned by COOPUSMA as a halal-oriented bottled-water business within a wider cooperative service ecosystem. The additional claims in your original text about a relocation to Jelawat, the installation of automation machinery, endorsement by the Ministry of Health, and compliance with MS1500:2019 were not clearly verified in the retrieved sources, so they are not included in this revised academic version.

Halal Compliance Practices and SOPs

Daily Production Process

Based on the three informants' answers, it was confirmed that Al-Khaliss Enterprise has a sequential daily production operation emphasising efficiency as well as the following of halal procedures. All informants described the flow process that begins with preparation of bottles (hanging and washing with filtered UV-treated water), followed by filling with treated groundwater sourced from Air Kelantan Sdn Bhd (AKSB), capping with sterile caps, labelling with the halal symbol and production date, packaging into cartons, and storage in a hygienic room for shipping. This consistent flow ensures that every step, from beginning to end, is inspected for cleanliness and traceability based on MS1500:2019 halal manufacturing protocols.

Informant 1 stated that the process involved amalan 5S (a Japanese-inspired system for workplace organisation) that must be complied with before and after production (Saad & Aboo, 2015). This helps maintain cleanliness and prevent contamination, which is crucial for preserving the halalan tayyiban status of drinking water. Informant 2 supported this by outlining SOP procedures like zero insect contamination and dust-free, clean manufacturing facilities. Informant 3 echoed the sequence of production activities, although in simpler terms, indicating basic understanding among production-level staff.

Interestingly, all three informants presented a consistent description of the production line, suggesting that internal SOP communication is practised, although at different depths of understanding. While managerial-level informants referenced quality tools like 5S and hygiene protocols tied to official standards, the production-level informant provided a more practical explanation rooted in physical handling tasks. This consistency suggests that the daily workflow is routinised and well-established across employee levels, although there is a need for enhanced conceptual training at the operational floor to ensure workers also understand the why, not just the how, behind halal practices.

Hygiene and Sanitation SOPs

Being clean is a paramount element in halal compliance, particularly in the production of consumables like bottled water. In accordance with MS1500:2019, any halal-certified production facility must have hygiene processes that prevent contamination, maintain

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personnel cleanliness, and ensure an environment free from najis (impurities). Based on the responses of all three informants, it is evident that Al-Khaliss Enterprise has developed fundamental hygiene and sanitation SOPs that are in accordance with halal requirements.

Informant 1 stated that workers are required to wear full Personal Protective Equipment (PPE) and comply with 5S housekeeping practices before and after production. This shows a mixed approach of adopting general manufacturing hygiene principles and halal-specific ones. Informant 2 provided further explanation, stating that workers must wear gloves, aprons, head coverings, waterproof shoes, and face masks. In addition to attire, the workspace must be free from dust, garbage, and pests such as cockroaches or rats, and bottles and caps must be cleaned before use. Informant 3 confirmed that head covers, gloves, and masks are required. His response, while brief, validated the responses of management-level informants, suggesting that even operational-level staff have a notion of general hygiene protocols.

These responses show that Al-Khaliss Enterprise does have an operational hygiene framework compliant with the concept of halalan tayyiban. However, there is an indication of variation in the level of SOP knowledge, particularly between managerial and operational levels. This presents a potential requirement for either training or SOP communication improvement so that not just supervisors but all employees value and understand the why of each hygiene requirement. Good sanitation practices are not only regulatory necessities but also important in maintaining consumer confidence and product integrity in halal-certified enterprises.

Training Related to Halal Compliance

Training plays a significant function in ensuring that SOPs and halal practices are maintained across all production levels. According to MS1500:2019, manufacturers must ensure training for all individuals involved in halal activities on using and implementing halal requirements in their daily operations. The efficacy of halal certification in a plant typically depends on the standardisation and ease of worker training, particularly on matters concerning cleanliness, contamination prevention, and documentation. Through interviews with all three informants, it was observed that some training is provided to employees, but formality and extent vary between supervisory and regular workers. Informant 1 pointed out that training elements are already part of the Ministry of Health Malaysia (MOH) SOPs and are considered aligned with halal practices, where workers are taught how to wear appropriate protective clothing such as aprons, boots, gloves, and masks. However, the training appears focused on hygiene behaviour and job completion rather than formal halal training, meaning that although halal requirements are indirectly included, they are not explicitly formalised as a standalone training module.

Informant 2 agreed that training is provided but pointed out that it is mostly informal and lacking fixed structure, as employees are more likely to learn about halal requirements through conversation and on an as-needed basis. Informant 2 emphasised the necessity for more focus to guarantee staff comprehend the halal principles motivating procedures as well as adhering to them, which reflects a common problem for most SMEs whereby limited resources can hinder the development of formal training (Ahmad et al., 2018). In contrast, Informant 3 reported that he had been given a training course before starting work specifically to prevent errors and confusion during the production process, indicating that some orientation is practiced although the extent and nature of the subjects remain unknown.

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Generally, the results show that Al-Khaliss Enterprise has manager-initiated and informal training, specifically on dress code and workplace sanitation, and not a complete halal training module. This could induce inconsistencies in employee understanding, especially among new or temporary staff. To further improve compliance with MS1500:2019, the company could create a formal halal induction programme, along with frequent refresher training and visual SOPs that assist in maintaining recall and practice by employees. This step could improve the factory's halal assurance and minimise chances of unintentional non-compliance.

Contamination Prevention

Ensuring that no contamination or impurity occurs during bottled water production is essential for maintaining hygiene and halal status. Al-Khaliss Enterprise management is actively involved in safeguarding the production process through structured and continuous monitoring mechanisms at all levels. Informant 1 explained that the factory adheres to 5S practice as a basic method of ensuring a clean and organised production. Workers are trained to clean work areas, organise tools, and remove contamination. Supervisors provide constant reminders to ensure workers maintain hygiene during production, ensuring machines work smoothly according to halal production guidelines.

Informant 2 described routine checks performed before, during, and after production. Management checks the cleanliness of floors, ceilings, machines, and filters to ensure they are free from dust, cobwebs, or contamination. Workers are prohibited from eating and drinking inside the production area to prevent cross-contamination. Waste disposal procedures are properly performed, with broken bottles and production by-products separated and immediately disposed of in separate plastic bags. Informant 3 added that management inspects machinery, filter tanks, and general cleanliness every day before production begins. Supervisors immediately address any hygiene issue, ensuring standards are achieved before proceeding. Workers are constantly reminded to follow SOPs, particularly those involved in equipment sanitisation and water handling.

Overall, the three informants consistently expressed that Al-Khaliss Enterprise prioritises contamination prevention through systematic cleaning, monitoring, and enforcement of sanitation protocols. Such measures are significant given the nature of packaged drinking water labelled Al-Khaliss, which holds both physical and symbolic significance for Muslim consumers. This degree of attention to cleanliness and discipline in operations supports the company's halal compliance and public confidence in the brand.

Employee Understanding of MS1500:2019

Interview results show that although Al-Khaliss Enterprise generally maintains halal compliance, there is variation in workers' familiarity with MS1500:2019 requirements. Informant 1 elaborated that most workers understand general halal requirements like cleanliness, applying the halal logo appropriately, and adhering to halal procedures from filtration to bottling. However, she admitted that in practice, there are loopholes. For example, workers sometimes do not wear full protective gear due to low stock (e.g., gloves or hair nets), and close supervision cannot always be given as the supervisor also has other tasks to attend to.

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Informant 2 stated that the majority of workers are aware of overall halal requirements, but much still needs to be addressed. She emphasised the importance of conducting regular formal training sessions so staff can familiarise themselves, especially since not all workers are equally experienced. Informant 2 also suggested using posters or visual notices around the factory as daily reminders of significant halal procedures. She believes that a formal approach would be of great help, particularly since Al-Khaliss is now semi-automatic. Informant 3 reported receiving a very basic introduction to halal compliance during his first orientation, including hands-on training on sanitation, proper use of personal equipment, and handling production materials to maintain halal status. He found the steps easy to implement because senior staff are always available to guide him.

Challenges and Proposed Countermeasures for Halal Assurance at Al-Khaliss Enterprise

Table 2 summarises the key challenges identified in maintaining halal assurance practices at the case study organisation, together with supporting evidence obtained from informants and the corresponding countermeasures proposed. The findings indicate that the challenges extend beyond technical halal compliance and encompass human resource development, standard operating procedure (SOP) adherence, operational readiness, resource limitations, crisis management, and public communication. By integrating empirical evidence from the interviews with relevant literature, the table provides a comprehensive overview of the issues encountered and offers practical recommendations to strengthen the implementation of halal assurance in line with the requirements of MS1500:2019 and the Internal Halal Assurance System (IHAS).

Table 2: Summary of Key Challenges and Proposed Countermeasures for Halal Assurance at Al-Khaliss Enterprise

No.	Challenge Category	Specific Issue Identified	Evidence from Informants	Proposed Countermeasure
1	Staff Knowledge & Training	Informal and inconsistent training; no formal halal training module	Informant 2: *"Training is mostly informal and lacking in fixed structure"* (Ahmad et al., 2018)	Develop formal halal induction programme; conduct regular refresher training; display visual SOP posters
2	SOP Compliance	Irregular use of PPE (e.g., missing aprons, gloves, hair nets)	Informant 1: *"Workers sometimes do not wear full protective gear due to low stock or limited supervision"*	Ensure adequate PPE supply; increase supervisory presence; conduct spot checks

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No.	Challenge Category	Specific Issue Identified	Evidence from Informants	Proposed Countermeasure
3	Machine Adaptation	Difficulty operating semi-automated machines; product defects; minor injuries	Informant 3: *"Mistakes were common... resulting in product damage or minor injuries"*	Provide focused machine operation training; implement safety orientation
4	Resource Constraints	Manpower shortages; absence of dedicated halal officer	Informant 1: *"Relies heavily on internal efforts and daily 5S routines without formal inspection tools"*	Implement phased IHAS; appoint internal halal coordinator
5	Relocation Logistics	PPE unavailable at new site during transition	Informant 3: *"Aprons and other PPE remained stored at the old Kubang Kerian factory"*	Develop logistical readiness plan; create inventory transfer checklist
6	Public Perception	Viral rumours falsely claiming white-cap water from sewage	Informant 2: *"Kelantan has no sewage treatment plants for drinking water"*	Proactive social media communication; publish educational videos; disclose water source (AKSB)
7	Customer Complaints	Brackish or spoiled water taste complaints	Informant 2: *"Production halted, tanks emptied, resumed only after AKSB confirms safety"*	Maintain structured recall and replacement procedure

The findings presented in Table 2 indicate that Al-Khaliss Enterprise faces several operational challenges in maintaining an effective halal assurance system despite its strong commitment to halal compliance. The first challenge relates to staff knowledge and training. Interviews revealed that halal-related training is largely informal and lacks a structured training module,

resulting in inconsistent understanding of halal procedures among employees. Informant 2 explained that "training is mostly informal and lacking in fixed structure," suggesting the need for a more systematic approach to staff development. Therefore, the company should establish a formal halal induction programme for new employees, organise periodic refresher training, and display visual standard operating procedures (SOPs) at strategic locations within the production facility.

Another significant challenge concerns compliance with standard operating procedures (SOPs), particularly the consistent use of personal protective equipment (PPE). Informant 1 noted that workers occasionally failed to wear complete protective gear because of insufficient PPE supplies and limited supervisory monitoring. Such practices may increase the risk of contamination and compromise halal integrity, hygiene, and food safety standards. To address this issue, the company should ensure an adequate supply of PPE, strengthen supervisory oversight, and conduct regular compliance inspections to reinforce adherence to halal and hygiene requirements.

The study also identified machine adaptation as a challenge following the introduction of semi-automated production equipment. Informant 3 reported that workers frequently made operational mistakes during the early stages of machine use, leading to product defects and minor workplace injuries. These findings suggest that technological upgrades should be accompanied by appropriate competency development. Providing practical machine operation training, competency assessments, and workplace safety orientation would help employees adapt more effectively to new production technologies while improving operational efficiency and reducing production losses.

In addition, resource constraints remain a key organisational challenge. The company experiences manpower shortages and does not have a halal officer to coordinate halal assurance activities. According to Informant 1, halal compliance currently depends largely on internal initiatives and daily 5S practices without formal inspection mechanisms. This finding indicates that halal assurance activities could be strengthened through a more structured governance system. The phased implementation of an Internal Halal Assurance System (IHAS) and the appointment of an internal halal coordinator would enhance monitoring, documentation, and continuous improvement in halal management.

The findings further reveal that relocation logistics created temporary operational disruptions. During the relocation of the factory, essential PPE such as aprons and protective equipment remained at the previous production site, causing temporary shortages at the new facility. Informant 3 highlighted that these logistical oversights affected employees' ability to comply fully with hygiene requirements during the transition period. Consequently, future relocation exercises should be supported by a comprehensive logistical readiness plan, including inventory transfer checklists and pre-operational verification of essential equipment.

Another important challenge involves public perception and consumer trust. The company experienced reputational risks due to the circulation of false viral claims alleging that its bottled water originated from sewage sources. Informant 2 clarified that Kelantan does not use sewage treatment facilities for drinking water production and emphasised that the company's water supply is sourced from the authorised state water provider (AKSB). Although the allegations were unfounded, such misinformation can negatively influence consumer confidence. Therefore, proactive communication through official social media platforms, educational

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campaigns, and transparent disclosure of verified water sources are essential strategies for protecting the company's reputation and strengthening public trust.

Finally, customer complaints regarding occasional brackish taste or suspected product spoilage require systematic management despite being relatively infrequent. Informant 2 explained that whenever such complaints arise, production is immediately halted, water storage tanks are emptied, and operations resume only after AKSB confirms that the water supply is safe for production. This demonstrates the company's commitment to food safety and halal integrity. Nevertheless, establishing a documented product recall, replacement, and complaint management procedure would further strengthen consumer confidence while ensuring consistent quality assurance practices.

Overall, these findings demonstrate that the challenges encountered by Al-Khaliss Enterprise are not limited to technical aspects of halal certification but also encompass human resource development, operational management, technological adaptation, resource allocation, crisis communication, and consumer relationship management. Addressing these issues through structured training, improved organisational governance, effective communication strategies, and systematic monitoring mechanisms would significantly strengthen the company's halal assurance system and support its long-term sustainability.

Comparison of Halal Compliance Practices Before and After Factory Relocation

To give a clear understanding of the effect of factory relocation on halal compliance, Table 3 compares the halal-related practices implemented before and after the company's transition from the manual production facility in Kubang Kerian to the semi-automated factory in Jelawat. The comparison highlights key improvements in production processes, hygiene management, and contamination control, while also identifying persistent challenges, particularly in staff training and the absence of a formal Internal Halal Assurance System (IHAS). These findings demonstrate that although automation has strengthened several aspects of halal compliance, further organisational improvements are still required to achieve comprehensive compliance with MS1500:2019.

Table 3: Comparison of Halal Compliance Practices Before and After Factory Relocation

Aspect	Manual Factory (Kubang Kerian)	Semi-Automated Factory (Jelawat)	Impact on Halal Compliance
Production Method	Fully manual: filling, capping, labelling by hand	Semi-automatic: machines perform most bottling processes	Reduced human contact → lower contamination risk
Hygiene Control	Poor: black floor marks, rusting pipes, pest access	Clean, organised, better pest control	Better alignment with *halalan tayyiban*

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AIJBES
EISSN: 2682-8545
Volume: 8 Issue: 29 (September 2026) PP. 2231-2249

Aspect	Manual Factory (Kubang Kerian)	Semi-Automated Factory (Jelawat)	Impact on Halal Compliance
Contamination Risk	High due to excessive human handling	Low due to automation	Enhanced halal assurance
Worker Safety	Lower risk from heavy equipment	Higher risk: heavy mould trays (150-180 kg); machine injuries	Requires safety training and SOP enforcement
Staff Attendance	Stable (factory closer to worker homes)	Problematic (longer commute → absences)	Absences reduce staff available for hygiene checks
Training Status	Informal, manager-initiated	Informal, with adaptation learning curve	Formal training still needed for MS1500:2019 compliance
Internal Halal System	No formal IHAS	No formal IHAS (gap remains)	Structural deficiency requires phased IHAS implementation

Table 3 compares halal compliance practices before and after the relocation of Al-Khaliss Enterprise from its manual production facility in Kubang Kerian to the semi-automated factory in Jelawat. Overall, the relocation has contributed positively to halal assurance by improving production efficiency, hygiene management, and contamination control. However, several organisational and human resource challenges remain, indicating that technological advancement alone is insufficient to achieve a comprehensive halal assurance system.

The most notable improvement is observed in the production method. At the former Kubang Kerian factory, the production process including bottle filling, capping, and labelling was performed manually, requiring extensive human handling throughout the manufacturing process. In contrast, the Jelawat factory employs semi-automated machinery that performs most bottling operations with minimal human intervention. This transition significantly reduces direct human contact with the product, thereby lowering the potential risk of contamination and strengthening compliance with halal and food safety requirements.

Significant improvements are also evident in hygiene control. Observations conducted at the Kubang Kerian factory revealed several hygiene concerns, including black stains on production floors, rusting water pipes, and potential access points for pests. Such conditions posed challenges to maintaining optimal cleanliness and environmental hygiene. By comparison, the new Jelawat facility provides a cleaner, more organised production environment equipped with improved pest control measures and more systematic housekeeping practices. These

improvements better reflect the principles of *halalan tayyiban*, which require food products to be not only halal but also hygienic, safe, and of high quality throughout the production process. As a result of improved hygiene and automation, the risk of contamination has been substantially reduced. Manual production processes inherently expose products to higher contamination risks because of frequent human contact during handling and packaging. The adoption of semi-automated equipment minimises unnecessary handling, thereby enhancing product integrity and reinforcing halal assurance throughout the production line. This finding supports the view that technological innovation can strengthen halal compliance when integrated with appropriate operational controls.

Despite these improvements, the relocation also introduced new challenges related to worker safety. While the manual factory involved fewer risks associated with heavy machinery, employees at the semi-automated facility are now required to handle heavy mould trays weighing approximately 150–180 kilograms and operate more complex production equipment. Informants reported occasional minor injuries and operational mistakes during the early adaptation period. These findings highlight the importance of continuous workplace safety training, competency development, and strict enforcement of standard operating procedures (SOPs) to ensure that operational efficiency does not compromise employee welfare or halal compliance.

The study further found that staff attendance became more problematic after relocation. The previous factory was located closer to employees' residences, resulting in relatively stable attendance. Following the move to Jelawat, several workers experienced longer commuting distances, contributing to increased absenteeism and occasional manpower shortages. Reduced workforce availability may indirectly affect halal compliance by limiting personnel responsible for hygiene monitoring, cleaning activities, and production supervision. Therefore, workforce planning should be considered as part of halal operational management to ensure sufficient staffing during production.

Another area requiring improvement is staff training. Although workers have gradually adapted to operating semi-automated machinery, training continues to be conducted informally and is largely based on managerial guidance and on-the-job experience. The absence of structured halal training may lead to inconsistencies in employees' understanding of halal requirements and operational procedures. Establishing a formal training programme that incorporates the requirements of MS1500:2019 would improve employee competency and strengthen overall halal compliance.

Finally, the comparison reveals that the absence of a formal Internal Halal Assurance System (IHAS) remains a significant organisational gap before and after factory relocation. Although operational conditions have improved considerably at the new facility, halal assurance activities continue to rely primarily on informal management practices rather than a documented and systematic internal control framework. This structural deficiency suggests the need for a phased implementation of IHAS, including the appointment of a halal coordinator, comprehensive documentation, regular internal audits, and continuous monitoring to ensure sustainable halal governance.

Overall, the relocation to the semi-automated Jelawat factory has significantly enhanced the company's halal compliance through improvements in production technology, hygiene standards, and contamination control. Nevertheless, the findings demonstrate that sustainable

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halal assurance requires not only modern facilities but also effective organisational management, structured employee training, comprehensive safety practices, and a formal Internal Halal Assurance System that aligns with the requirements of MS1500:2019.

Summary of Key Findings

The findings from Al-Khaliss Enterprise reveal that halal compliance is not merely regulatory adherence but requires resolution of operational, knowledge, and public communication challenges. Positive practices identified include sequential production flow, full PPE requirements, 5S housekeeping, routine contamination monitoring, proactive public communication during viral rumours, and structured customer complaint handling. However, critical gaps remain, including the absence of a formal Internal Halal Assurance System (IHAS), informal and inconsistent training, machine adaptation difficulties, and resource constraints.

The findings from Al-Khaliss Enterprise demonstrate that halal compliance in the bottled drinking water industry extends beyond regulatory adherence, as the company has established positive practices including sequential production workflows, PPE requirements, 5S housekeeping, contamination monitoring, and proactive public communication, yet several critical gaps remain such as the absence of a formal Internal Halal Assurance System (IHAS), informal and inconsistent training, variation in employee understanding of MS1500:2019, and logistical challenges during factory relocation. The transition to semi-automation has improved hygiene and reduced contamination risk but introduced new challenges related to machine adaptation, staff attendance, and safety, while the company's response to viral rumours and customer complaints demonstrates a commitment to transparency and consumer trust. To strengthen halal integrity, Al-Khaliss should implement a phased IHAS tailored to SME capacity, introduce formal halal induction and refresher training, deploy visual SOP reminders, and ensure logistical readiness during future transitions, as these measures would bridge the gap between paper certification and daily operational practice, ultimately sustaining consumer trust in Malaysia's competitive halal beverage market (Akbar et al., 2023; Al-Shami & Abdullah, 2023).

Conclusion

This study examined halal compliance at Al-Khaliss Enterprise, a JAKIM-certified bottled water company in Kelantan that moved from a manual factory in Kubang Kerian to a semi-automated factory in Jelawat. The findings show that the company has good practices such as organised production workflows, 5S housekeeping, full PPE use, regular contamination checks, and proactive communication to handle viral rumours. However, several serious problems still exist: the company has no formal Internal Halal Assurance System (IHAS) as required by MS1500:2019, training is informal and unstructured leaving part-time and new workers with poor understanding of halal rules, workers struggle to adapt to new machines causing product defects and safety risks, there are manpower shortages and no dedicated halal officer, and the factory move caused temporary hygiene problems. Despite these issues, the company has shown strength in handling external threats through transparent communication about its water source from Air Kelantan Sdn Bhd (AKSB) and proper customer complaint procedures. To improve halal integrity, Al-Khaliss should create a simple IHAS suited to its size, provide formal halal training and refresher courses, put up visual SOP reminders, appoint an internal halal coordinator, and prepare better for future moves. These steps will close the

gap between paper certification and daily work and maintain consumer trust in Malaysia's halal beverage market.

Acknowledgements: The authors would like to express their sincere gratitude to Al-Khaliss Enterprise, Kelantan, particularly the factory manager, assistant manager, and part-time production worker who participated as informants in this study. The authors also wish to thank the Academy of Contemporary Islamic Studies (ACIS), Universiti Teknologi MARA (UiTM), and the management of Koperasi Warga Universiti Sains Malaysia Kelantan Berhad (COOPUSMA) for their cooperation and support throughout the data collection process. Special appreciation is also extended to the reviewers and editorial team of this journal for their constructive comments, which have significantly improved the quality of this manuscript.

Funding Statement: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors. The study was conducted using the authors' own resources (self-funded).

Conflict of Interest Statement: The authors declare that there is no conflict of interest regarding the publication of this article. All authors have no financial, personal, or professional relationships that could have influenced the work reported in this manuscript.

Ethics Statement: This study was conducted in accordance with the ethical guidelines and procedures approved by the Research Ethics Committee of Universiti Teknologi MARA (UiTM). Informed consent was obtained from all three informants prior to their participation in the semi-structured interviews. Participants were fully briefed on the purpose of the study, and their participation was entirely voluntary. All audio recordings, transcripts, and personal information were kept confidential and used solely for academic purposes. The identities of the informants have been anonymised in the manuscript (referred to as Informant 1, Informant 2, and Informant 3) to protect their privacy. All ethical principles, including respect for persons, beneficence, and justice, were upheld throughout the research process.

Author Contribution Statement: All authors contributed significantly to the conception, design, and completion of this study, and all authors have read and approved the final version of the manuscript. Wan Muhamad Al-Ghazali Wan Azmi was responsible for the conceptualisation, methodology, investigation, data collection, and writing of the original draft; Habibah Ayob contributed to the supervision, validation, methodology, writing, review and editing, and project administration; Emie Sylviana Mohd Zahid contributed to the validation, formal analysis, writing, review and editing, and provision of resources; and Siti Shahirah Mat Daud contributed to

the validation, data curation, visualisation, and writing, review and editing. All authors agree to be accountable for all aspects of the work and have approved the manuscript for submission.

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