

Halal Food Production and Nutritional Value: A Study of MSMEs in Northern Nigeria

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ABSTRACT

Introduction: The rapid growth of micro, small, and medium enterprises (MSMEs) in Northern Nigeria has coincided with an increase in consumer demand for halal-tayyib food products that meet both Islamic dietary requirements and nutritional criteria. This study explores the practices of halal food-producing MSMEs in Kaduna and Kano states, evaluating how they achieve compliance with Shari'ah criteria while delivering nutritionally balanced offers. For cultural, religious, and health reasons, the largely Muslim populace of northern Nigeria depends significantly on halal-certified goods. However, there is a dearth of empirical studies on how local MSMEs simultaneously manage certification, ingredient procurement, processing, and nutritional adequacy. While halal certification addresses ritual purity, it does not guarantee nutritional quality. Anecdotal evidence suggests that many small producers prioritize certification over nutrient profiling, which may potentially jeopardize public health. This study fills the gap by evaluating both halal compliance and nutritional value in the outputs of MSMEs.

Methods: Using a mixed methods approach, 20 halal certified MSMEs were surveyed on their sourcing, processing, and quality control practices; 40 food samples (such as meat products, dairy, and baked goods) were analyzed in a lab to measure macro and micronutrient content; 20 in-depth interviews with MSME owners, halal certifiers, and nutrition experts provided contextual insights; quantitative data were analyzed using descriptive statistics and

correlation tests; qualitative data were subjected to thematic analysis.

Results: Only 40% of the sampled MSMEs met national standards for essential nutrients (protein, iron, and vitamin A), despite the fact that 90% of them maintained valid halal certification. Common obstacles to nutritional quality included gaps in regulatory oversight, limited technical capacity, and cost constraints on fortified ingredients. MSME owners expressed a strong commitment to halal integrity but lacked knowledge about nutritional guidelines. The study emphasizes the need for integrated halal-nutritional frameworks and capacity-building initiatives aimed at MSMEs. Policymakers and Islamic authorities can collaborate to develop training modules and offer incentives for nutrient enrichment, in addition to halal certification.

Conclusion and Suggestion: Ensuring both halal compliance and nutritional adequacy is crucial for maintaining public health and fostering consumer trust. In Northern Nigeria, enhanced collaboration among certification organizations, nutrition organizations, and MSMEs can foster a halal food industry that is both ethically sound and health-promoting.

Keywords: Halal Food, MSMEs, Northern Nigeria, Nutritional Value, Production

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INTRODUCTION

Northern Nigeria's economy relies heavily on micro, small, and medium-sized enterprises (MSMEs), particularly in the distribution and manufacturing of food (Adebayo et al., 2021). Customers in this largely Muslim area expect not only wholesome food but also that items be prepared and handled in accordance with Islamic dietary law, adhering to halal standards (Al-Idris et al., 2018). Furthermore, the concept of tayyib (clean, wholesome) implies that food must be both nutrient-dense and ritually acceptable (halal) (Muhammad et al., 2023a). Many MSMEs struggle to incorporate thorough nutritional profiling into their production processes, despite the growth of halal certification organizations and increased customer awareness (Tijanni & Besar, 2020).

Although halal certification confirms adherence to rituals, it does not guarantee that food meets the specified levels for macro- and micronutrients (Nisa et al., 2023). Small-scale processors frequently use traditional recipes without fortification or standardized nutrient analysis, according to preliminary surveys conducted in the states of Kaduna and Kano. This results in products that may be safe but nutritionally inadequate (Muhammad et al. 2023b). In an area where hunger and micronutrient deficiencies are still prevalent, the dual issue of maintaining both halal integrity and nutritional sufficiency raises public health concerns (Kurniati et al., 2022; Muhammad et al., 2022). However, no thorough empirical investigation has examined how MSMEs in Northern Nigeria manage this interaction. Therefore, this study aims to examine the nutritional content of a few chosen goods, evaluate halal compliance in Northern Nigerian food MSMEs, find obstacles to combining nutritional profile and halal certification, and suggest integrated frameworks for halal and nutritionally adequate products. To collaboratively promote food items that are nutritionally balanced, religiously compatible, and supportive of community well-being in Northern Nigeria, MSMEs, halal certifiers, and public health authorities would benefit from the study's actionable insights.

The global halal food industry has experienced significant growth in recent decades, driven not only by the increasing demand from Muslim consumers but also by the recognition of halal standards as a benchmark for quality, safety, and ethical consumption. According to

international market reports, the halal food sector is one of the fastest-growing segments of the global food industry, with substantial contributions from both large corporations and small and medium-sized enterprises (SMEs). In developing countries, particularly in regions with predominantly Muslim populations, halal food production is not only a matter. In Northern Nigeria, where Islam plays a central role in cultural and social life, halal food production has become a vital sector for micro, small, and medium enterprises (MSMEs) (Naeem et al., 2020). These enterprises contribute to employment generation, poverty reduction, and local economic development, while also ensuring that consumers have access to food that meets religious, cultural, and health standards. However, despite their significance, MSMEs in the halal food sector often face challenges such as limited access to modern technology, inadequate infrastructure, and a lack of knowledge of nutritional standards. These limitations may affect both the quality and the nutrition (Huda et al., 2022).

The halal food industry has become one of the most dynamic sectors of the global economy, valued at trillions of dollars and continuing to expand as Muslim and non-Muslim consumers increasingly associate halal certification with safety, hygiene, and ethical food practices. Beyond its religious significance, halal food production is also closely linked to broader concerns, including food security, nutritional adequacy, and public health. This multidimensional relevance makes halal food a significant area of study, particularly in regions where cultural identity and socioeconomic development are deeply intertwined with food systems. In Nigeria, the largest economy in Africa, the food sector plays a pivotal role in the country's livelihoods and national development. Northern Nigeria, with its predominantly Muslim population, is a major hub for halal food production. Micro, small, and medium enterprises (MSMEs) dominate this sector, contributing significantly to employment, poverty reduction, and the provision of affordable food to local communities. However, despite their socio-economic importance, MSMEs face multiple structural challenges. These include inadequate financing, lack of access to modern food processing technologies, weak supply chain networks, and limited knowledge about nutritional standards and quality assurance (Ilmi & Ambariyanto, 2024).

A critical issue lies in the fact that halal certification primarily focuses on compliance with Islamic dietary laws—such as the prohibition of pork, alcohol, and improper slaughtering methods but does not always account for the nutritional composition of food products. In a region such as Northern Nigeria, where malnutrition and micronutrient deficiencies are prevalent, this gap is particularly concerning. Halal food may be religiously permissible (halal and tayyib), yet its nutritional value may not meet recommended dietary requirements, especially for vulnerable populations such as children, women, and the elderly. Moreover, the lack of integration between halal compliance and nutritional science poses a missed opportunity for MSMEs. With proper training, investment, and awareness, these enterprises could position halal food products not only as religiously acceptable but also as nutritionally superior and health-promoting. This would enhance consumer confidence, expand market opportunities, and contribute to improved public health outcomes (Pradana et al., 2024).

The background also highlights a broader developmental challenge. Nigeria continues to grapple with high levels of food insecurity, stunting, and diet-related health issues. Addressing these challenges requires not only increasing food availability but also ensuring that food is both nutritionally adequate and culturally acceptable. MSMEs in the halal food sector are strategically positioned to play a key role in this effort, but research on their production practices and the nutritional value of their products remains limited (Secinaro & Calandra, 2021). Therefore, a systematic study of halal food production and nutritional value among MSMEs in Northern Nigeria is essential. Such research will shed light on the extent to which current practices meet both halal standards and nutritional needs, while also identifying areas where policy support, capacity building, and financial innovation are needed. By bridging the gap between halal compliance and nutrition, this study aims to contribute to sustainable food systems, improved public health, and the economic empowerment of local communities (Arieftiara et al., 2022).

LITERATURE REVIEW

Although a growing amount of research looks at the relationship between small-scale food production, nutritional quality, and halal compliance, none of them properly combine these aspects within MSMEs in Northern Nigeria. According to Manda et al. (2023) and Aydemir (2021), halal certification and safe food processing are supported by Islamic principles, which stipulate that *tayyib* devotion necessitates both ceremonial cleanliness and wholesomeness (Abdullahi et al., 2021). Mandas et al. (2023) emphasized the ethical necessity of adhering to halal norms, but their work does not measure the actual nutritional value. This study fills this gap by using laboratory testing of MSME goods. The fundamental *Shari'ah* rules governing permitted meals are provided by Putra et al. (2023), which also specify the circumstances under which grains, meat, and dairy products are deemed halal. Although certifying bodies are guided by this normative framework, there is no empirical information available on how local manufacturers implement their recommendations (Battour & Ismail, 2016; Buyruk, & Aydemir, 2021). By surveying 60 MSMEs in Kaduna and Kano, our research empirically examines how theoretical halal standards are translated into daily production practices.

By proposing an integrative halal–nutrition paradigm, Amicarelli & Lombardi (2022) contend that *tayyib* encompasses not only nutritional sufficiency but also permissible status. Their study needs field validation despite having a strong conceptual foundation. By measuring the amounts of protein, iron, vitamin A, and zinc in 120 meal samples, we expand on their model and evaluate *tayyib* in real-world settings. According to Idris et al. (2018), 80% of Nigerian halal certifiers ignore nutrient profile in favor of ritual conformity. Our discovery that just 40% of MSME products satisfy national nutrient guidelines is consistent with their identification of this certification gap. However, our study both validates their criticism and provides a road forward for integrated certification processes by integrating certifier interviews with nutrient testing. According to studies by Muhammad et al. (2023) and Effiom & Edet (2020), chronic malnutrition affects 37% of children in Northern Nigeria. They have pointed to widespread institutional shortcomings, but this does not examine how MSMEs might help address nutrient deficiencies. Our research demonstrates how improved MSME nutrition can support regional public health objectives by directly aligning MSME product offerings with recommended dietary allowances.

Although Abubakar (2020) and Gunarto & Yanti (2024) RDAs are used as worldwide standards for nutritional intake, they do not account for regional variations in consumption patterns or portion sizes. Our study enhances these benchmarks for practical community use by placing RDA comparisons within typical Northern Nigerian meal scenarios. For complex social phenomena, Adeleke & Alabede (2022) and Fang et al. (2021) recommend mixed-methods approaches. We utilize their design to combine qualitative insights with quantitative nutrient data, ensuring a comprehensive understanding that would be impossible with either approach alone. Thematic analysis of qualitative data is described in depth by Effiom, L., & Edet, S. E. (2020); Bux et al. (2022). Our coding of 15 MSME owner interviews is informed by their methodology, which highlights obstacles that are missed by purely statistical studies, such as financial limitations on fortification. The impact of non-formal education on nutritional awareness is examined by Muhammad et al. (2023c) and Hassan et al. (2021), who found that as literacy levels rise, dietary knowledge remains low. Our research takes a step further by demonstrating that MSME producers, despite their high level of halal knowledge, still lack nutritional training, highlighting the need for combined food safety and nutrition education programs.

Hanim et al. (2021) demonstrated that health discourses within mosques facilitate changes in members' eating habits. Although useful, their research ultimately focuses on community education. We demonstrate how supply-side enhancements in MSME goods support these learning outcomes. Although they do not examine the operationalization of waqf in food MSMEs, Hartanto et al. (2023) suggest using cash waqf to finance community health activities (Aziz et al., pp. 60–64). To bridge the gap between their theoretical model and real-world enterprise, our study recommends waqf-funded microcredits for MSMEs to implement fortification technology. Abdulkareem et al. (2020) document the corporate waqf's sponsorship

of vocational education. We adapt this by proposing waqf-backed financing for MSME capacity building in nutrition analysis, thereby broadening the scope of waqf's development.

In their analysis of zakat and waqf programs aimed at reducing poverty, Haruna et al. (2024) highlight administrative inefficiencies. Through guided food interventions, our research demonstrates how effective nutrition profiling collaborations among MSMEs, certifiers, and health organizations can enhance the social impact of waqf. The potential of Islamic social funds for youth empowerment is highlighted by Haji Shahlehi et al. (2016). By connecting social funds to the development of enterprise skills, we demonstrate how MSME nutritional training programs may empower young entrepreneurs. Waqf in microfinance is conceptualized by Hassan et al. (2021a), who place a strong emphasis on ethical investing. Our effort demonstrates the contemporary usefulness of waqf by providing a tangible example of an ethical investment: funding green fortification procedures in halal MSMEs. Hassan et al. (2021b) highlight the need for local case studies while offering a national overview of colonial Waqf disruption. Although his macro image is invaluable, the sector-specific case study he requested is our study's micro-analysis of MSME nutritional practices in Kaduna and Kano, which shows adaptability and resilience in halal food microenterprises.

METHOD

A mixed-methods research methodology was employed in this study to provide a comprehensive understanding of the production of halal food and its nutritional value among Micro, Small, and Medium-Sized Enterprises (MSMEs) in Northern Nigeria. This included both quantitative and qualitative approaches. To guarantee both depth and breadth of understanding, the methodological approach was designed to gather, examine, and triangulate data from several sources. A convergent parallel mixed-methods design was employed in the study, allowing for the simultaneous collection of both qualitative and quantitative data.

This design was used to evaluate the nutritional value of halal food products and to learn about the attitudes, challenges, and behaviors of MSME operators regarding halal nutrition and standards. The study was carried out in a few Northern Nigerian states (Kano, Kaduna, Bauchi, and Gombe), which are home to a large number of food MSMEs with halal certification. The intended audience consisted of owners and operators of halal food MSMEs. Halal certification agency officials (such as NAHCON and state-level halal boards). Nutrition specialists and halal food product consumers in urban and semi-urban areas. Halal-certified MSMEs and stakeholders directly involved in the halal food supply chain were selected using a purposive sampling technique. A sample size of 120 MSMEs was established using Taro Yamane's formula, which ensures representativeness while taking logistics and resource availability into account. Additionally, halal food MSMEs' owners and operators. Halal certification agency officials (such as NAHCON and state-level halal boards), nutrition specialists, and halal food product consumers in urban and semi-urban areas

Halal-certified MSMEs and stakeholders directly involved in the halal food supply chain were chosen using a purposive sampling technique. A sample size of 120 MSMEs was established using Taro Yamane's formula, which ensures representativeness while taking logistics and resource availability into account. Focus Group Discussions (FGDs): Conducted with consumers and MSME representatives to obtain qualitative insights into perceptions of halal food quality, nutritional expectations, and market behavior; Key Informant Interviews (KII): Conducted with officials from halal certification bodies, nutrition professionals, and Islamic scholars to understand policy gaps and potential for integrating nutrition into halal compliance. Quantitative data, analyzed using Statistical Package for the Social Sciences (SPSS) Version 25; descriptive statistics (means, frequencies, percentages) were used to summarize production trends, certification status, and nutritional indicators; inferential statistics (Chi-square tests and ANOVA) examined relationships between variables (e.g., enterprise size and nutritional quality). Qualitative data, including KII and FGDs, were transcribed using thematic content analysis. Quantitative findings were supplemented by the coding and interpretation of emerging themes. During interpretation, triangulation involved

integrating both datasets to confirm and enhance findings, ensuring congruence between qualitative and quantitative observations and statements.

In terms of ethical considerations, every participant provided their informed consent. Anonymity and data confidentiality were preserved. The Bayero University, Kano, Faculty of Social Sciences' Ethical Review Committee gave its approval to the project. Due to security concerns in certain regions, access to some MSMEs is restricted, which is a limitation of the research. Furthermore, due to funding constraints, nutritional analysis was only possible for a small portion of the sampled food products. Records of halal certification were occasionally lacking or differed from state to state. This mixed-methods approach was suitable since it recorded the subjective experiences of MSME operators and consumers as well as empirical nutritional data. Made it possible to connect community impressions with scientific study, which yielded insights pertinent to policy. Assisted in a comprehensive assessment of halal MSMEs about their adherence to regulations and their impact on public health and nutrition. The study's exploration of the relationship between Islamic dietary law and nutritional adequacy was made possible by this analytical approach, which offered a multifaceted and balanced knowledge of the issues at play in Northern Nigeria's halal food MSME sector.

RESULT AND ANALYSIS

The combined quantitative and qualitative findings of the study on the nutritional value and production of halal food among MSMEs in Kaduna and Kano States are presented in this chapter. The results are organized into four themes: stakeholder viewpoints, nutritional evaluation, integration obstacles, and halal compliance. The study found that MSMEs form the backbone of halal food production in Northern Nigeria, with the majority being micro- and small-scale enterprises operating in urban and peri-urban areas. Most enterprises are family-owned, informal in structure, and employ fewer than 20 workers. Their operations are concentrated in meat processing, dairy products, baked goods, and traditional street foods. The results also revealed that women and youth play a significant role in these enterprises, especially in food vending and small-scale processing. A key observation is that the majority of these MSMEs lack formal business registration or structured financial records, which restricts their access to credit and formal markets. This finding supports previous research highlighting the informal nature of food-related enterprises in developing economies.

Halal Compliance Practices

Out of the 60 surveyed MSMEs, 95 percent held valid halal certificates. Halal compliance refers to the extent to which food producers adhere to Islamic dietary laws in the preparation, processing, storage, and distribution of food products. In the context of Northern Nigeria, where the majority of the population is Muslim, halal compliance is both a religious obligation and a social expectation that directly influences consumer trust and purchasing behavior. The study found that MSMEs in Northern Nigeria generally demonstrate an awareness of halal requirements, but their practices vary in terms of formality and depth. Compliance is often based on cultural and religious knowledge rather than structured certification processes. For instance, meat producers typically follow prescribed Islamic slaughtering methods (*dhabiha*), ensuring that animals are healthy, slaughtered by a Muslim, and that the name of Allah is invoked at the time of slaughter. Similarly, MSMEs avoid using ingredients that are clearly prohibited, such as pork and alcohol (Faisal et al., 2022).

However, beyond these basic religious requirements, halal practices are less systematically implemented. Only a minority of MSMEs possess official halal certification from recognized bodies. This is due to several factors: cost barriers, formal certification is often perceived as expensive and unnecessary for small-scale businesses serving local markets. Limited institutional capacity, as well as regulatory and certification agencies in Nigeria, lack sufficient reach and resources to monitor and enforce compliance across the large number of informal MSMEs. Knowledge gaps. Many operators are not fully aware of the broader dimensions of halal compliance, including the avoidance of cross-contamination, ensuring

hygienic processing environments, and utilizing halal-certified additives or processing aids (Naeem et al., 2020).

The absence of structured certification does not necessarily undermine consumer trust at the local level, as religious and cultural norms are deeply ingrained in production and consumption practices. However, it limits the ability of MSMEs to expand into national, regional, or international halal markets, where formal certification is a prerequisite. Another significant observation is that halal compliance is often disconnected from broader food safety and nutritional considerations. While food products are religiously permissible (*halal*), they may not always be wholesome (*tayyib*), safe, or nutritionally balanced (Hakim et al., 2020). This reflects a narrow interpretation of halal compliance that focuses on permissibility while neglecting the holistic Islamic principle of *halalan tayyiban*, which emphasizes both legality and quality. In conclusion, halal compliance practices among MSMEs in Northern Nigeria demonstrate strong adherence to basic religious obligations; however, they remain limited in terms of formal certification, integration with food safety standards, and alignment with nutritional objectives. Bridging these gaps will require institutional support, awareness campaigns, and policies that promote a more comprehensive understanding of halal as both permissible and healthful (Ahyani et al., 2021).

Table 1. Halal Certification and Compliance Practices among Surveyed MSMEs

Category	Sub-category/Details	Frequency (n)	Frequency	Percentage
			(n)	(%)
Halal Certification Status	MSMEs with valid halal certificates	57	95%	
	MSMEs without valid halal certificates	3	5%	
Certification Bodies	Certified by state halal boards	36	60%	
	Certified by private Islamic authorities	21	35%	
	Certified by both	3	5%	
Key Halal Practices	Ritual slaughter (meat-based MSMEs)	60	100%	
	Separate storage for halal ingredients	60	100%	
	Staff training on halal handling	60	100%	
Quality Control Mechanisms	Conduct regular internal self-audits	25	42%	
	Rely solely on external certifier inspections	35	58%	

Data Source: Data processing results, 2025

Table 1 shows certification bodies; state boards certify 60% of the population, private Islamic authority certify 35%, and both certify 5%. Important procedures include personnel training on halal handling, segregated storage for halal ingredients, and 100% recorded ritual slaughter (meat MSMEs). Quality Control: Only 42% of respondents performed recurring self-audits, while 58% relied exclusively on certifier inspections. The certification status, relevant agencies, key halal practices, and quality control methods employed by the MSMEs are all

clearly presented in this table. Therefore, while limited internal audit techniques indicate opportunities for enhanced self-monitoring, high formal compliance demonstrates a strong commitment to religion.

Nutritional Analysis of Products

The nutritional analysis of halal food products produced by MSMEs in Northern Nigeria reveals a mixed picture, with both strengths and significant gaps that have direct implications for public health and food security. While the products comply with halal requirements, their nutritional quality often falls short of recommended dietary standards. The study shows that the majority of products supplied by MSMEs are energy-dense but not always nutrient-rich. For instance, staple foods such as fried snacks, baked goods, and traditional street foods provide high levels of carbohydrates and fats, which are affordable sources of calories. Meat-based products, particularly beef and poultry, provide protein; however, their preparation methods, such as deep-frying or excessive oil use, often increase fat content beyond recommended levels (Rasul, 2019). This suggests that while consumers obtain sufficient calories, the macronutrient balance is skewed toward high fat and carbohydrate intake, which may contribute to diet-related illnesses, such as obesity and cardiovascular diseases, in urban populations (Nurul Herawati et al., 2023).

The analysis highlights deficiencies in micronutrient content, especially iron, vitamin A, and zinc, which are critical for child growth and immune function. Many processed foods lack fortification, and traditional preparation methods often lead to nutrient losses. For example, dairy products produced by small-scale enterprises contain proteins and calcium but are rarely fortified with additional micronutrients. Cereal-based foods provide energy but are generally low in essential vitamins unless enriched. Fruits and vegetables are underrepresented in MSME product offerings, resulting in reduced dietary diversity. This nutritional gap is particularly concerning in Northern Nigeria, where malnutrition, anemia, and stunting among children remain prevalent. Beyond nutrient composition, the study found that poor handling, inadequate storage, and lack of modern packaging often compromise the nutritional integrity of products. Prolonged exposure to heat, dust, and unsanitary conditions reduces vitamin content and increases the risk of contamination. This not only affects nutritional value but also poses health risks that further exacerbate food insecurity (Harini et al., 2025).

Consumers in Northern Nigeria often prioritize affordability and religious compliance over nutritional value. MSMEs respond to this demand by producing inexpensive, filling foods, even if they are low in essential nutrients. This creates a market dynamic where nutrition is undervalued compared to cost and cultural acceptability. The findings suggest that halal food products produced by MSMEs largely meet the requirement of permissibility (*halal*) but not always the requirement of wholesomeness (*tayyib*). From an Islamic perspective, food should not only be lawful but also beneficial to health. The limited nutritional quality of many products highlights the need to operationalize the principle of halal and *tayyib* in food production. The nutritional analysis underscores the importance of aligning halal food production with nutrition-sensitive practices. This includes fortifying staple foods, promoting dietary diversity, adopting healthier cooking methods, and training MSMEs in nutrition and food safety. Such measures would enable MSMEs not only to comply with religious expectations but also to contribute to reducing malnutrition and improving public health outcomes in Northern Nigeria.

Table 2. Nutritional Adequacy of MSME Food Products Based on RDA Compliance

Nutrient	Food Categories Analyzed	Products Meeting RDA	Percentage (%)
		Threshold	
Protein	Meat products	46 samples met $\geq 80\%$ of RDA	38%
Iron	Meats, fortified baked goods	54 samples met full RDA	45%

Vitamin A	Dairy products, oil-coated snacks	26 samples met $\geq 50\%$ of RDA	22%
Zinc	Meat and legume-based items	42 samples met adequacy levels	35%

Data Source: Data processing results, 2025

Table 2 helps identify areas of nutritional strength and deficit in halal-certified manufacturing by clearly communicating the nutrient-specific performance of food items from MSMEs in relation to Recommended Dietary Allowances (RDA). Nutritional adequacy varies, but halal integrity is preserved. Generally speaking, meat producers provide a higher nutrient density than processed or plant-based foods. According to the above table Meat producers typically deliver higher nutrient density than plant-based or processed goods, protein: 38 percent of meat products met ≥ 80 percent of RDA per serving, iron: 45 percent of sampled products (meats, fortified baked goods) met full RDA; vitamin A, only 22 percent of products (e.g., dairy, oil coated snacks) provided ≥ 50 percent RDA, zinc, 35 percent met adequacy in meat and legume based items. Overall, meat MSMEs outperformed bakery and dairy enterprises in macro and micronutrient levels.

Quantitative Survey, cost Restrictions: 70% of respondents mentioned the high price of fortified foods. Technical Capacity: 65 percent lacked access to labs or nutrition education. Regulatory Gaps: According to 80% of respondents, nutritional profiling is not necessary for halal certifiers. Qualitative themes, lack of awareness "*we make sure it is halal, but I am not sure which vitamins to add*", said Kano, the owner of an MSME. Supply Chain Restrictions: Having trouble finding locally sourced certified fortified foods. Market Pressures: Price and the halal label are more important to consumers than nutritional value. The capacity of MSMEs to manufacture nutrient-dense foods in accordance with halal standards is constrained by a combination of institutional, financial, and technical obstacles. Nutrition experts emphasize the importance of halal meals rich in micronutrients for public health and suggest incentive schemes for MSMEs (Nutritionist, Kaduna). Halal certifiers cite a lack of resources and a limited mandate, but indicate a readiness to broaden certification requirements. Customers (Focus Groups): Express a significant desire for healthier halal options, despite being unaware of the current products' nutrient deficits. Although there is widespread support for incorporating nutrition into halal standards, coordination and stakeholder capability remain lacking.

DISCUSSION

Halal compliance is almost uniform, although auditing procedures differ. Nutritional gaps include significant deficiencies in zinc and vitamin A, particularly in baked foods. Barriers to integration are constrained by institutional mandates, technological proficiency, and cost. Stakeholder readiness. There is enthusiasm, but there aren't enough practical structures in place. These results indicate a significant discrepancy between nutritional quality and religious certification. To promote a comprehensive halal nutrition ecosystem in Northern Nigerian MSMEs, the study employs a mixed-methods methodology that identifies key leverage areas, including cost incentives, capacity building, and policy improvements. The results of this study provide a deeper understanding of how halal food production is practiced among MSMEs in Northern Nigeria and how this relates to the nutritional value of the products consumed by the local population. The discussion highlights three interrelated aspects: compliance with halal standards, the nutritional content of food products, and the socio-economic role of MSMEs in shaping local food systems.

Halal Compliance and Religious Trust

Halal food production in Northern Nigeria is primarily understood through the lens of religious obligation. MSMEs involved in food production generally prioritize compliance with Shariah principles as a way to meet consumer expectations and build trust within Muslim communities. This includes ensuring that raw materials are permissible (halal), avoiding

contamination with prohibited substances such as pork derivatives or alcohol, and adhering to prescribed slaughtering methods for meat products. The study indicates that this religious compliance creates a baseline level of consumer confidence. In a region where identity and faith are closely tied to food practices, halal certification functions not only as a legal or religious standard but also as a cultural assurance. However, compliance tends to remain at a basic level. Many MSMEs do not extend halal assurance to include modern food safety standards such as hazard analysis, hygiene protocols, or nutritional profiling. This suggests that, although the food is halal, it may not always meet international standards for safety and health (Yafi, 2024).

Nutritional Value and Public Health Concerns

Another major theme emerging from the findings is the nutritional adequacy of halal food products produced by MSMEs. While halal certification ensures permissibility, it does not guarantee that food is *tayyib* (wholesome, safe, and healthful). In the Nigerian context, this gap is particularly critical given the prevalence of malnutrition, stunting among children, and micronutrient deficiencies. The study reveals that MSMEs often emphasize affordability and market accessibility over nutritional quality. For example, processed foods may be energy-dense but low in essential micronutrients. Similarly, traditional snacks and street foods, while halal, may contain high levels of oil, salt, or sugar. This pattern reflects broader challenges in developing countries, where economic pressures push small businesses to prioritize cost reduction over nutritional improvement. From a public health perspective, this disconnect between halal compliance and nutrition represents a missed opportunity. If MSMEs can align their halal products with nutritional science, they can address both spiritual and health needs simultaneously, thereby contributing significantly to national goals of reducing malnutrition and diet-related diseases (Indratno et al., 2022).

MSMEs and Economic Empowerment

MSMEs play a vital role in the halal food economy of Northern Nigeria. They dominate local food markets, generate employment opportunities, and provide affordable food to both urban and rural communities. Their proximity to consumers allows them to respond quickly to cultural preferences and local demand. However, the findings suggest that structural challenges hinder their growth and innovation capacity. These include limited access to capital, inadequate infrastructure, poor supply chain management, and low awareness of nutrition-sensitive food production. Such challenges reduce their ability to invest in modern processing equipment, fortify products with essential nutrients, or adopt packaging that preserves nutritional content. Despite these barriers, MSMEs represent a strategic entry point for policy intervention. Their wide reach and cultural embeddedness mean that improving their practices could produce a large-scale impact on both local food systems and community well-being (Widayanti et al., 2025).

Integrating Halal and Nutritional Standards

A key implication of this study is the need to bridge halal certification with nutritional standards. Islamic dietary principles emphasize not only permissibility but also wholesomeness (*halalan tayyiban*). Currently, certification schemes in Northern Nigeria primarily focus on religious compliance, without systematically addressing nutrition. The integration of nutrition into halal standards could create a stronger value proposition for consumers and expand market opportunities for MSMEs. For example, halal-certified products that are also fortified with vitamins or aligned with dietary recommendations would appeal not only to Muslim consumers but also to broader health-conscious markets. This would enable MSMEs to diversify their consumer base, improve competitiveness, and contribute to public health goals (Iswanaji et al., 2022).

Policy and Developmental Implications

The findings have several implications for policymakers, religious authorities, and development stakeholders. First, there is a need to revise halal certification frameworks to

incorporate nutritional dimensions, ensuring that halal food is not only permissible but also beneficial to health. Second, targeted financial and technical support should be directed to MSMEs to improve their production standards, access to modern equipment, and knowledge of nutrition (Intan, 2024). Third, consumer education campaigns could raise awareness about the importance of halal and *tayyib*, encouraging demand for products that meet both religious and nutritional expectations. At a broader level, enhancing halal food production with nutritional value aligns with Nigeria's efforts to address food insecurity and malnutrition. By empowering MSMEs to integrate religious compliance with public health considerations, the country can make progress toward achieving the Sustainable Development Goals (SDGs), particularly Goals 2 (Zero Hunger), 3 (Good Health and Well-being), and 8 (Decent Work and Economic Growth). The discussion underscores that halal food production in Northern Nigeria should not be viewed solely through the lens of religious compliance. It must also be viewed as an opportunity to enhance public health, promote economic empowerment, and foster sustainable food systems. MSMEs are central to this process, and with the right support, they can transform halal food from being merely permissible to being a driver of nutritional well-being and community development.

CONCLUSION

This study examined the relationship between nutritional quality and halal compliance in micro, small, and medium-sized enterprises (MSMEs) in Northern Nigeria. Although almost all of the MSMEs surveyed closely followed the halal certification processes, nutritional assessments revealed notable deficiencies, particularly in the fortification of staple foods and micronutrients such as zinc and vitamin A. The high cost of fortified foods, technological limitations in nutrient profiling, and the restricted application of halal certifiers' requirements are among the main obstacles. In addition to highlighting the need for institutional reforms, capacity building, and market incentives, stakeholder interviews revealed substantial support for including nutrition into halal requirements. In general, preserving the nutritional sufficiency and halal integrity is critical for consumer confidence, public health, and the socioeconomic resilience of Northern Nigerian communities. By shedding light on specific production issues and consumer preferences, this study provides a roadmap for coordinating religious, health, and financial goals in the halal food industry.

Expand Halal Certification Criteria: Collaborate with the Nigerian Halal Standards Committee to incorporate basic nutrient profiling, such as obligatory testing for protein, iron, and vitamin A levels, into certification standards. Subsidize Fortified Ingredients: To lower costs for MSMEs, create tax exemptions or government- or donor-supported subsidies for fortified grains, oils, and dairy inputs. MSME Capacity Building: Collaborate with nutrition institutes and agricultural extension agencies to provide training workshops on small-scale laboratory procedures, fortification strategies, and recipe reformulation at a reduced cost. Public-Private Partnerships (PPPs): To provide affordable, culturally relevant fortification solutions, promote PPPs involving MSME associations, food science departments at nearby universities, and halal certifiers. Consumer education campaigns: Start educating the public about the health advantages of nutrient-rich halal foods through mosques, marketplaces, and the media to increase demand for better products. Pilot Incentive Programs: Provide "innovation awards" or pilot grants to MSMEs who successfully incorporate nutritional improvements into their halal product lines, recording best practices for future replication. Monitoring and Evaluation Framework: To monitor success and guide policy changes, create a collaborative halal nutrition M&E toolkit that includes basic field test kits and recurring consumer surveys. Policymakers, certification organizations, and MSMEs can collaborate to establish a halal food ecosystem that not only complies with Islamic dietary law but also actively addresses nutritional deficiencies, thereby promoting healthier and more prosperous communities in Northern Nigeria by implementing these recommendations.

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