

Hygiene Principles Training for Rural Food SMEs in Kaliagung Village, Kulon Progo, D.I. Yogyakarta

Anjar Ruspita Sari¹, Putri Rousan Nabila^{2*}, Fajar Budi Lestari³, Febri Ariyanti⁴,
Rochmad Hidayat⁵, Singgih Utomo⁶, Achmad Yoga Sundava⁷, Nara Husnal Aufa⁸

^{1,2,3,4,5,6,7,8}Universitas Gadjah Mada

*Corresponding author, e-mail: rousannabila@ugm.ac.id

Abstract

Small and Medium Enterprises (SMEs) operating within rural communities frequently encounter significant hurdles in the effective implementation of food hygiene and sanitation protocols. This struggle is largely attributable to limited financial resources and a critical deficit in fundamental food safety knowledge. A critical gap exists in the understanding of relevant food safety legislation, which often results in non-compliance with significant implications for regulatory enforcement. In response to this pervasive need, a targeted training intervention was developed and executed for food SME operators in Kaliagung Village. The objective of the training was to empower participants by equipping them with the general principles of food hygiene and sanitation. The training employed an interactive methodology, strategically blending theoretical presentations with practical, site-specific self-assessments. The program was rigorously designed based on the Indonesian National Standard (SNI) CAC/RCP 1:2011, focusing on five critical domains: environmental sanitation, facility hygiene, personal hygiene, process control, and record-keeping. The effectiveness of the program was evaluated using pre- and post-training assessments to quantify changes in participants' knowledge and comprehension. The evaluation demonstrated a positive and substantial impact, with the average participant score on food hygiene knowledge increasing from 3.5 to 4.85 (using 5 scale). This statistically reflected increase in the average score validates the utility of the training activity. In conclusion, this program highlights the critical role of structured training in enhancing food safety practices within rural communities. By providing practical, standards-based knowledge, such interventions are vital for fostering a safer and more compliant food industry landscape in these key areas.

Keywords: Food hygiene; GMP; SMEs.

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Introduction

Food and beverages transcend their status as mere market commodities. They are fundamental human necessities, indispensable for sustaining life, fueling cognitive function, and maintaining optimal physiological health. Consequently, the assurance of quality, safety, and nutritional integrity within the food supply chain must be prioritized not simply as a regulatory requirement, but as a paramount ethical objective essential for safeguarding the overall welfare of the community. In an era of heightened health consciousness, meeting stringent standards in food quality and safety directly addresses increasingly sophisticated consumer expectations. Modern consumers are no longer passive recipients but active participants who demand transparency regarding the safety and origin of what they consume. As highlighted by contemporary research, the alignment of industrial practices with these safety expectations fundamentally underpins public well-being and fosters the critical element of consumer trust (Nie et al., 2021).

Within the dynamic and often high-pressure environment of the culinary and food processing industry, the rigorous application of hygiene and sanitation principles is non-negotiable. These practices cannot be viewed as isolated, sporadic tasks or "checkbox" compliance activities. Rather, they must form a comprehensive continuum of control, a holistic "farm-to-fork" approach. This rigorous oversight spans the entire production lifecycle, from the initial sourcing and selection of fresh, high-quality raw materials, through hygienic processing and handling, to the final packaging, storage, and service of clean, safe food to the end consumer. Each phase within this production chain plays a critical, preventative role against potential contamination. A proactive stance is essential to effectively identify and neutralize hazards before they reach the consumer. This is crucial for preventing the introduction of pathogenic microorganisms, hazardous chemicals, or unwanted foreign objects that are known agents of foodborne illnesses.

To effectively implement food safety measures, it is necessary to distinguish between the concepts of hygiene and sanitation. While often used interchangeably in casual discourse, they represent distinct technical domains within food science. According to guidelines established by the Indonesian Ministry of Health (2013), hygiene is formally defined as the set of practices undertaken to maintain individual health and prevent disease transmission. It encompasses a wide range of measures aimed at promoting health and controlling the spread of infections (Presterl et al., 2018). In the specific context of food handling, hygiene focuses heavily on practices that have a direct interface with the food product includes personal hygiene and environmental hygiene. Personal hygiene is identified as a key point of vulnerability. Food handlers can be significant vectors for contamination. Therefore, handlers must meticulously attend to their personal health status, adhere to strict hygienic practices (such as proper washing hands, brushing teeth, bathing, and maintaining clean clothing and surroundings), and maintain healthy lifestyles (Pérez Pico et al., 2022). Whether environmental hygiene involves the immediate surroundings of the food, ensuring that surfaces and tools do not transfer pathogens to the product. It encompasses various aspects, including the management of waste, water quality, air quality, and the control of vectors and pests. The goal of environmental hygiene is to create a safe and healthy environment that minimizes the risk of disease transmission and enhances overall well-being.

Complementing hygiene, food sanitation is a systematic effort covering the entire production lifecycle, aiming to neutralize biological, chemical, and physical hazards. Through the implementation of robust sanitation practices, operators can ensure food safety, prevent food-borne diseases, and elevate product quality (Rohmah et al., 2019). Effective sanitation requires not only the cleanliness of the physical environment and equipment but also the rigorous management of the personal hygiene of workers, recognizing that humans are significant potential sources of contamination (Noviastuti & Putranti, 2021). Sanitation efforts must be carried out effectively to ensure there are no microbes harmful to health while preserving the intrinsic safety factors and nutritional value of the food consumed. The failure to maintain these standards results in unsafe food, which causes significant waste and inflicts negative impacts on trade, the erosion of consumer trust. Therefore, effective hygiene control is essential to prevent both health crises (food poisoning outbreaks) and the economic losses associated with spoilage and recalls. Responsibility for food safety is collective, resting on everyone involved in the food chain, from primary producers to distributors, livestock breeders, and farmers.

Business operators in the food and beverage sector must implement hygiene practices to protect food from contamination and the growth/survival of pathogens by storing, handling, and preparing it properly. This mandate is particularly challenging yet critical for Small and Medium Enterprises (SMEs). The Food Processing operator in Kaliagung Village, Sentolo District, Kulon Progo, D.I. Yogyakarta, is classified as an SME. SMEs often play a pivotal role in the local food supply, acting as the backbone of the rural economy. However, they frequently struggle with the implementation of hygiene and sanitation due to limited resources, outdated infrastructure, and a lack of technical knowledge. For SMEs that produce processed foods and beverages, food safety is vital to protect consumers from health hazards. Furthermore, an

understanding of proper food safety practices is increasingly essential for economic survival. Knowledge of food safety standards helps SMEs to maintain operational efficiency and access broader markets. SMEs that understand and implement food safety standards can significantly improve their market orientation and competitiveness (Qamar et al., 2024). Conversely, the inability to meet these standards relegates rural SMEs to local, low-value markets, hindering their growth potential. To address the gap between regulatory requirements and current practices in Kaliagung Village, a targeted intervention is required. Training on the General Principles of Hygiene according to SNI CAC/RCP 1:2011 serves as a critical tool for empowerment. One of the primary objectives of implementing general principles of food hygiene is to identify important principles that apply throughout the food chain (including primary production to end consumers) to achieve the goal of ensuring food is safe and suitable for human consumption (BSN, 2011). By aligning training with the SNI CAC/RCP 1: 2011 standard, local SMEs are provided with a structured framework that covers environmental sanitation (site selection and waste management), facility Hygiene (layout, ventilation, and water supply), personal hygiene (health status and behavioral standards), process control (temperature management and cross-contamination prevention), and record-keeping (traceability and accountability).

Similar training initiatives globally have been shown to improve knowledge and practices significantly. For instance, training interventions in Kenya led to better hygiene practices and a measurable reduction in microbial contamination in food processing environments (Malavi et al., 2021). Similarly, training activities in the Piedmont region of Italy successfully increased awareness and simplified the application of complex food safety management systems for smaller operators (Ceballos et al., 2020). These studies validate the hypothesis that structured education is the most effective pathway to compliance for resource-constrained businesses. Based on this comprehensive background, the training of general hygiene principles for the Food Processing Business Group in Kaliagung Village, Sentolo District, Kulon Progo, D.I. Yogyakarta, is not merely a technical exercise but a strategic community empowerment initiative. The primary objective is to improve the competence of food SMEs to produce food products that are suitable and safe for consumption. This enhancement of human capital is designed to increase the economic potential of the Village. Furthermore, this initiative aligns local development with global objectives, specifically SDG 2: Zero Hunger (by ensuring food security and nutrition) and SDG 17: Partnerships to Achieve Goals (by fostering collaboration between academic institutions, local government, and the private sector). Through the rigid application of food safety principles, MSMEs can not only maintain the continuity of their businesses but also play an active, responsible role in improving community welfare through the provision of safe and nutritious food products. This program, underscores the critical role of structured training programs in fostering a safer, more compliant, and economically resilient food industry landscape in rural communities.

Method

This community empowerment initiative was executed using a Participatory Action Research (PAR) framework, specifically designed to enhance the food safety competence of local Small and Medium Enterprises (SMEs). Leveraging a participatory framework, this training method drives empowerment and delivers measurable improvements in community awareness and competency (Sulaeman et al., 2023). The study was conducted on Saturday, September 7, 2024, at the Pendopo of Kaliagung Village, Sentolo District, Kulon Progo, D.I. Yogyakarta, serving as a central accessibility point for the community. The study population was selected through purposive sampling, targeting active members of the Food Processing Business Group within the village. Purposive sampling, also known as judgmental or selective sampling, is a non-probability sampling technique where the researcher selects participants based on specific characteristics or qualities that align with the study's objectives. This method is particularly useful when the researcher needs to study a specific cultural domain or gather information from knowledgeable experts within a particular field (Wu Suen et al., 2014). Purposive sampling is a strategic method used to gather detailed and relevant data from specific segments of a population, enhancing the depth and quality of research findings. A total of 24 participants (n=24) attended the session, representing a diverse cohort of local enterprises, including KWT Mawar, KWT Bunda Mandiri, Desa Prima, Jamur Crispy Nglotak, Mekar Sari Nglotak, UPPKS Degung, Sereinity Kalipeten Group, Nila Lestari Ngrandu Group, and UPPKS Kue.

The intervention program was rigorously structured based on the Indonesian National Standard (SNI) CAC/RCP 1:2011 regarding General Principles of Food Hygiene and was delivered in three distinct phases. Initially, a baseline assessment was established via a pre-test questionnaire to gauge the participants' existing knowledge of hygiene protocols. This was immediately followed by the core instructional module, which utilized a blend of didactic presentations and interactive discussions. Didactic presentations are a traditional educational approach where knowledge is disseminated primarily through lectures and presentations. These presentations are often supported by slides and other visual aids to enhance the learning experience (Gottlieb

et al., 2024). While interactive discussions involve active participation from learners, fostering a more engaging and dynamic learning environment. The curriculum covered the definitions of Good Manufacturing Practices (GMP), the strategic hierarchy of GMP within Food Safety Management Systems, and detailed operational guidelines for environmental, facility, and personal hygiene. To bridge the gap between theory and practice, the training concluded with a guided self-assessment session. Participants utilized a Sanitation Checklist adapted for Home Industry Food Production (IRTP) to evaluate their own production facilities, enabling them to identify their specific IRTP risk level (Level I–IV) and prioritize areas for improvement. To evaluate the efficacy of the intervention, data were collected using pre- and post-test instruments designed to measure cognitive changes regarding specific hygiene domains. The data were analyzed using descriptive statistics to compare mean scores before and after the training, providing a quantitative measure of knowledge gain. Additionally, participant satisfaction and the perceived relevance of the material were assessed through qualitative evaluation forms administered at the conclusion of the activity.

Result and Discussion

The demographic characteristics of the training participants provide critical insight into the social fabric of the local food industry in Kaliagung Village. A total of 24 respondents participated in this study. As detailed in Table 1, the cohort was predominantly composed of individuals within the productive age range of 36–50 years. Furthermore, the majority of participants possessed a secondary education background (High School/Vocational School), suggesting a sufficient level of literacy and absorptive capacity to comprehend technical regulatory material such as SNI standards and Good Manufacturing Practices (GMP). A striking feature of the participant profile was the overwhelming dominance of female participants, who constituted 96% of the group. This demographic distribution is not merely coincidental but reflects broader labor market trends. Milyan et al. (2021) note a significant and rising trend in female workforce participation in recent years, particularly within the informal and semi-formal sectors. This phenomenon aligns with shifting socio-economic dynamics that increasingly necessitate and value women's economic contributions outside the traditional domestic sphere. In the context of rural development, this high female participation underscores the pivotal role women play as the backbone of the micro-economy.

The involvement of women in advancing Micro, Small, and Medium Enterprises (MSMEs), specifically in the culinary sector is profound. Women in these communities operate as dual-role agents, they manage domestic health while simultaneously driving economic activity. The concentration of women in this sector presents a strategic advantage for food safety interventions. Women are frequently the pioneers of product innovation at the village level. They possess the unique agility to adapt traditional recipes using modern ingredients or to create novel products that align with contemporary market trends. By targeting this specific demographic for hygiene training, the intervention leverages their central role in production. When women, who are often the primary decision-makers in food processing, internalize hygiene principles, the translation of knowledge into practice is immediate and effective. Their ability to modernize traditional recipes must be paired with modern hygiene standards to ensure that local innovations are not only delicious but safe for wider distribution (Qamar et al., 2024). Therefore, empowering this female-dominated workforce with technical sanitation knowledge is a direct investment in the sustainability and competitiveness of the village's food industry.

Table 1. Profile of Participants in the General Principles of Hygiene Training

Type	Category	Amount	Percentage (%)
Academic Background	Primary School	4	17
	Junior High School	5	21
	High School/Vocational High School	15	63
Age	20-35	4	17
	36-50	10	42
	>50	8	33

Despite their significant contribution to the rural economy, women-led SMEs frequently encounter structural barriers. One of the most cited challenges in the literature is a disparity in formal education, which can impede the professional management of businesses and the adoption of complex regulatory standards. Low educational attainment often correlates with difficulties in navigating bureaucratic requirements, such as obtaining hygiene permits (P-IRT) or Halal certification. However, the demographic profile of this study's cohort presents a promising deviation from this general trend. As indicated by the data, the participants

possess a relatively high level of education, with 63% holding high school or vocational diplomas. This educational baseline is a critical asset. It suggests that the participants possess the necessary literacy and absorptive capacity to comprehend technical training materials, such as the specific clauses of SNI CAC/RCP 1: 2011. This educational readiness indicates great potential for the sustainability and scalability of the SMEs being run, as these operators are better equipped to transition from traditional practices to standardized, professional management systems. Educational readiness is closely linked to organizational learning readiness, which is crucial for adapting to changes and fostering innovation. SMEs with higher educational levels among employees tend to develop a learning culture that supports organizational readiness (Wang et al., 2019). According to Eisenschink et al. (2022) SMEs that invest in education and training for their employees often see improved performance. This is because educated employees are better equipped to handle new technologies and processes, which can lead to enhanced productivity and competitiveness. The age distribution of the participants further reinforces the potential for successful intervention.

All participants fell within the productive age range (19–59 years). Economically and sociologically, the productive age is characterized as a period wherein individuals are physically, mentally, and socially primed to contribute to the workforce and society. Specifically, the majority of participants fall into the middle-age category. This demographic nuance is significant for several reasons, such as this group generally possesses substantial work experience and established business networks, tends to be more focused and intrinsically motivated, and less likely to switch careers rapidly compared to younger demographics. The delivery of the training material, as depicted in Figure 1, capitalized on this demographic potential. By leveraging the participants' educational background and maturity, the training successfully shifted the paradigm of food safety from a "burden" to a "necessity." Through this interactive intervention, participants demonstrated a comprehensive understanding of the supply chain integrity. They grasped that maintaining cleanliness, sanitation, and food safety is not limited to the cooking phase but is a holistic requirement. This encompasses the entire production continuum: from the rigorous selection of raw materials to hygienic processing, and finally, to the packaging process that ensures the product remains safe until it reaches the consumer. This holistic understanding is the foundation for creating a culture of safety within rural food industries.



Figure 1. Presentation of Material on General Principles of Food Hygiene

To bridge the gap between theoretical knowledge and practical application, the training program included a tangible intervention component: the distribution of Personal Protective Equipment (PPE) in the form of standardized aprons to all participants (Figure 2). This material assistance serves a dual purpose. First, it addresses the technical requirement of barrier protection. In the context of food processing, an apron is not merely a uniform, since it functions as a critical physical barrier that separates the food handler's street clothing which may carry environmental contaminants like dust, pet dander, or vehicle exhaust from the food product. This aligns directly with the "Personal Hygiene" domain of SNI CAC/RCP 1:2011, which mandates that handlers wear protective clothing to prevent cross-contamination. Second, the provision of aprons facilitates behavioral reinforcement. By equipping participants with the necessary tools, the program removes a barrier to entry for compliance. As highlighted by Karina et al. (2023), the consistent and appropriate use of PPE is one of the most effective preventive efforts in reducing the number of workplace incidents. In the specific context of SMEs, this practice not only improves Occupational Health and Safety (OHS) by protecting operators from thermal burns or chemical splashes but also safeguards the integrity of the product. Furthermore, the act of donning an apron serves as a psychological trigger, signaling to the operator that they are entering a "professional production mode," thereby encouraging greater discipline and adherence to hygiene protocols.



Figure 2. Training participants using the PPE provided

The effectiveness of the educational intervention is quantitatively demonstrated by the comparative analysis of pre-test and post-test scores, as illustrated in Figure 3. The assessment instrument utilized a strict 5-point scale, where a maximum score of 5 indicates a perfect command of the material. The results reveal a distinct upward trajectory in participant performance. The increase in the average post-test score serves as statistical evidence of cognitive knowledge acquisition. It indicates that the training successfully bridged the gap between the participants' prior understanding and the technical requirements of the SNI CAC/RCP 1:2011 standard. This improvement suggests that the pedagogical methods employed combining theory with practical examples were effective in ensuring the material was not just heard, but comprehended (Abdussamad et al., 2022). A critical insight is found in the distribution of the scores. The analysis highlights a more even distribution of scores in the post-test phase, as evidenced by a reduction in the standard deviation. In the pre-test phase, knowledge levels were likely disparate, with some participants having partial knowledge and others having none. However, the post-test results show a convergence of scores toward the higher end. This "homogenization of competence" is a positive indicator for community empowerment. It implies that the training was inclusive and accessible, effectively elevating the collective knowledge base of the group rather than leaving those with lower educational backgrounds behind. The "knowledge gap" among the SMEs in Kaliagung Village has effectively narrowed. Beyond the quantitative metrics, the qualitative feedback underscores a shift in mindset. Participants reported a deeper appreciation for the rationale behind hygiene protocols. They moved beyond viewing hygiene as a set of arbitrary rules to understanding its critical role in preventing biological and chemical hazards in processed food. This cognitive shift has translated into strong behavioral intention. Participants expressed high motivation to implement these protocols in their daily operations. Crucially, this motivation is linked to a tangible economic goal: the desire to upgrade their Home Industry Food Production (IRTP) Level. By understanding the General Principles of Hygiene, participants now possess the roadmap to transition their facilities from lower compliance levels to higher standards (e.g., moving from Level IV to Level II). This eagerness to improve compliance demonstrates that the training successfully positioned food safety not as a regulatory burden, but as a strategic asset for business growth and market expansion.

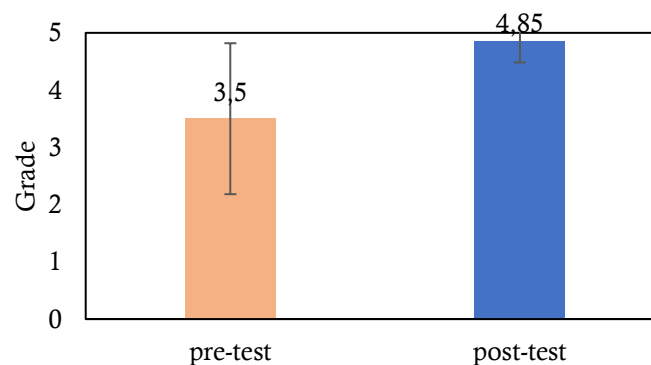


Figure 3. Pre-test and Post-test results of training participants

The qualitative observations revealed a palpable level of enthusiasm among the cohort following the session on General Principles of Hygiene. This enthusiasm signifies more than just satisfaction with the event; it indicates a profound internalization of the material. Participants demonstrated a critical realization: that hygiene in the production process is not merely a bureaucratic requirement, but a fundamental prerequisite for producing food that is safe and edible. The training successfully instilled a sense of moral and

professional agency. Participants now recognize that they, as producers, bear the ultimate responsibility for the safety of the end consumer. This shifts their perspective from being passive operators to active guardians of public health. By understanding that their daily actions from handwashing to temperature control directly impact human lives, the responsibility of production becomes a core value of their business identity.

By strictly adhering to hygiene standards, these SMEs can guarantee the safety of their products, thereby fostering a sense of security and comfort among consumers. When consumers feel confident that a local product meets safety standards, it dismantles the stigma often associated with rural food being unhygienic. This trust serves as a competitive advantage, allowing these SMEs to retain loyal customers and penetrate wider markets outside Kaliagung Village. Therefore, the implementation of hygiene principles acts as a catalyst for building a reputable brand image for the entire community. While the immediate impact of the training was positive, the long-term retention of technical knowledge remains a challenge. To achieve optimal and lasting results, this training program must be viewed not as a one-off event, but as the beginning of a continuous educational cycle. By establishing a mechanism for lifelong learning, the program ensures that the culture of safety becomes deeply institutionalized within the local food industry, securing the economic and health benefits for the future.

Conclusion

The implementation of the training program based on SNI CAC/RCP 1:2011 has proven to be a strategic and highly effective intervention for empowering Food Processing SMEs in Kaliagung Village. The program successfully bridged the gap between traditional production methods and formal regulatory requirements, resulting in a significant and statistically measurable increase in participants' knowledge. The integration of theoretical learning with practical aids, specifically the provision of Personal Protective Equipment (PPE) and self-assessment tools transformed the participants' perspective. The dominance of female participants within the productive age range further underscores the potential of women as the primary agents of change in modernizing the rural food economy. However, to ensure the longevity of these improvements and facilitate the upgrading of Home Industry Food Production (IRTP) levels, a singular intervention is insufficient. It is recommended that this initiative evolve into a continuous educational framework. Sustained mentorship and periodic refresher training are essential to help these SMEs navigate the dynamic landscape of food technology and regulations. Ultimately, this program not only secures the continuity of local businesses but also contributes to the broader goals of community welfare and economic resilience in line with the Sustainable Development Goals.

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