

Nutritional value and contamination testing assistance for the improvement of the processed food products quality

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ABSTRACT

Micro, Small, and Medium Enterprises (MSMEs) are one of the business sectors driving the country's economy. MSMEs produce many quality products that can compete in the market, where one of the products that is marketed quite a lot is food products. Several MSMEs in the Purwakarta Regency area have not included information on nutritional value and contamination on labels or packaging so these products cannot be widely marketed or traded in official stores and can only be marketed in their production areas. The community service activities carried out aim to carry out nutritional value and contamination tests, followed by improving product quality through workshops and mentoring. The food products targeted are simping and instant turmeric drinks produced by MSMEs in Pondoksalam District, Purwakarta Regency. Laboratory test results show that instant turmeric does not meet several SNI standard parameters, so quality improvement is still needed to be able to adapt it to become a product that meets standards. The results of the questionnaire show that several MSME owners in the Purwakarta area have a poor understanding of food product quality standards and ways to improve them. The coaching program for community service activities shows an increase in knowledge and understanding so that food products from Purwakarta MSMEs are expected to meet product quality standards in the future.

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1. INTRODUCTION

MSMEs are government assets and a key driver in the country's economic development, specifically contributing to the improvement of household economic resilience (Ghassani & Wardiyanto, 2015; Halim, 2020; Permana, 2017). The movement of MSMEs sector is highly strategic in creating economic growth and employment opportunities, as well as promoting income equality and the distribution of development outcomes (Murti et al., 2021; Wahyunti, 2020).

Purwakarta Regency is one of the regencies in West Java Province actively developing its region in MSMEs sector (Damiri et al., 2021). The total number of MSMEs in the regency is 117,790, according to West Java Province data. These MSMEs operate in trade, industry, and various services, providing a

significant amount of employment. The Purwakarta Regency government has been making sustained efforts for quite some time to develop Galeri Menong, a place for marketing the creative products of MSMEs practitioners in the regency (Supriyadi et al., 2015). Products that can be sold here are those of high quality, accompanied by information on nutritional value, contamination, and shelf life (Harris & Fadli, 2014).

There are several MSMEs products in the Pondoksalam District, Purwakarta Regency that still cannot be sold at Galeri Menong, including simping and instant turmeric products. This is because these products have not yet included nutritional value and contamination information on their packaging labels (BPOM RI, 2021b). Simping and instant turmeric produced by home-scale MSME have been marketed for quite some time and have customers in their respective areas but have not been able to reach a wider market. According to the Regulation of the National Agency of Drug and Food Control Number 16 of 2020 concerning the Inclusion of Nutritional Information for Processed Foods Produced by Small and Micro Businesses, high-quality food product labels must contain information on nutritional value, product name, composition, net weight, producer's name and address, halal certification, and must include the production date, code, and expiration date of the product (BPOM RI, 2020).

Higher education institutions, through community service programs, can assist in improving the quality of MSME products by addressing various aspects. Collaboration between universities and MSME practitioners can serve as a strong foundation for the advancement of all parties, aligning with the government program through the Ministry of Education and Culture and Research and Technology that encourages universities to play a role in the advancement of the community's economy (Wibowo, 2013; Wijaya, 2022). MSMEs needs accurate information about regulations, production, and marketing to drive the improvement of product quality and broader market reach, enabling MSME to survive and grow as a pillar of economic growth for the community. MSME practitioners in the food production sector often lack understanding of nutritional value and contamination information as required by government regulations. Additionally, MSME practitioners need knowledge on how to conduct necessary testing or the institutions that can assist them (BPOM RI, 2021a).

The cost of laboratory analysis to determine nutritional value and contamination information for food products is relatively high, making it difficult for some MSME to afford (BPOM RI, 2020; Muthiah et al., 2022; Wulandari & Arief, 2022). Furthermore, MSME's understanding of the quality of their products, especially food products, is still relatively low and needs improvement. This is the situation faced by MSME in the Pondoksalam District. Therefore, this community service program aims to establish nutritional value and contamination information for simping and instant turmeric products, as well as provide assistance to improve the quality of products that do not yet meet the Indonesian National Standards (SNI).

2. METHODS

These community engagement activities target the owners of MSMEs involved in food production in the Pondoksalam District of Purwakarta Regency, comprising 16 groups. The food products subjected to nutritional value and contamination testing include simping and instant turmeric. Following the testing results for these products, a seminar is conducted to disseminate the findings to all MSME practitioners. The seminar aims to provide insights into the quality of food products in accordance with Indonesian National Standards (SNI) and outlines steps to enhance product quality. During the seminar, participants' comprehension levels regarding nutritional value and contamination information for food products are assessed. Technical assistance is provided for products exhibiting nutritional and contamination values that deviate from the standards, with the goal of improving the overall quality of these products.

Initial Visit and Sample Collection

The initial visit to the processed food production site was conducted to gather preliminary data related to the production facility's conditions, equipment, and manufacturing procedures. Simultaneously, interviews were conducted with the owner and staff responsible for the production process. The visit also involved acquiring product samples for subsequent analysis at the STFI campus laboratory.

Laboratory Analysis

Product samples of processed food were analyzed in the Laboratory of the Indonesian Pharmacy Higher Education (STFI). The analysis procedures followed the Indonesian National Standard SNI (1995) dan SNI (1992) (BSN, 2009). The analyses to be conducted include: (1) Proximate analysis, covering tests for protein, carbohydrates, fats, and fiber content; (2) Standard quality tests according to SNI. Testing is performed in accordance with the standards outlined in SNI for each product, including tests for water content, ash content, heavy metals, as well as total plate count and mold and yeast count (BSN, 2009); (3) Shelf life testing of the products, involving an examination of the time span from production, distribution to consumption, during which the product remains in a suitable condition according to the promised quality.

Seminar and Dissemination of Analysis Results

A seminar and dissemination session involved conveying information on the quality of food products in accordance with national standards, using case studies from the analysis of nutritional value and contamination in simping and instant turmeric products. The seminar was attended by the owners and administrators of 16 MSME in the Pondoksalam area of Purwakarta Regency. The event took place in the sub-district hall and was graced by the Sub-district Head and relevant officials. During this session, the comprehension level of MSME owners regarding food product quality standards was assessed through pre-test and post-test evaluations, as detailed in the following link: https://bit.ly/PkM_mutu_pangan.

Technical Assistance

Technical assistance was provided to MSME producers of simping and instant turmeric, products that underwent nutritional value and contamination testing. The assistance was conducted on-site during the production process, with a focus on improving parameters that did not align with national standards. The assistance process involved two meetings for each MSME.

Evaluation Design

The community service program, delivered through information dissemination and the nutritional value and contamination testing of two food products, is guided by three criteria as fundamental benchmarks for the activity's success. The effectiveness of the program is gauged by the timely acquisition of data on the nutritional value and contamination of simping and instant turmeric products.

Success criteria for the participants include understanding the nutritional value and contamination information of food products, comprehending the standards to be met for quality products, and being able to apply this knowledge to the products they produce. While success criteria for the organizers involve providing explanations and support that aid participants in enhancing their comprehension of product quality and improving the marketing of their produced goods.

3. RESULTS AND DISCUSSION

Site Visit and Sample Collection

Visits and product sampling from MSME partners were conducted at the outset of the project to obtain samples for laboratory testing. Simultaneously, field analysis was performed to identify and determine factors influencing product quality. The quality of food products is influenced by the environmental conditions of the production site, the equipment used, manufacturing procedures, and the human resources involved in the production process. Field observations indicated that both products were produced in sections of homes designed for production. Both MSME had maintained cleanliness in the environment and equipment during production. They demonstrated a good understanding of production procedures to create products preferred by customers.

The Purwakarta Regency government regularly provides guidance to MSME within its jurisdiction. This condition is one of the factors contributing to MSMEs practitioners having a good understanding of maintaining their work environment. The government's guidance primarily focuses on the production process but has not yet extended to testing the products produced. Crucial factors such as nutritional value and contamination information, essential for marketing development, have not been addressed either by the government or any other parties (Lestari, 2020).



Figure 1. Pictures showing site visit and sample collection

Laboratory Analysis of Food Products

The food products selected for testing were simping and instant turmeric. Both products underwent nutritional content and contamination tests in accordance with SNI regulations. The subsequent testing results were then issued in the form of analysis certificates from the STFI laboratory. Data on the nutritional value and contamination of simping and instant turmeric are detailed in the following Table 1.

The test results demonstrate that the simping product meets all SNI parameters, justifying the inclusion of analysis results on its packaging as a consumer protection measure through labeling (Leliya, 2018). However, as of the publication of this article, this has not been implemented due to the existence of remaining old packaging stock. In the case of the instant turmeric product, some parameters did not comply with SNI regulations. Therefore, through a support process, adjustments have been made in the manufacturing and storage of the product.

Seminar and Mentoring

A seminar presenting the laboratory test results of simping and instant turmeric products was conducted to provide explanations to owners and managers about the quality of the products they

produce (Figure 2). This seminar was also extended to other MSME managers, totaling 16 MSME. The test results of simping and instant turmeric products served as the primary material to convey information about the quality of food products in accordance with national standards. The level of understanding among MSME managers regarding the determining factors of food product quality was assessed using questionnaires and interviews, with the results presented in Figures 3-8.

Table 1. Result of nutritional value and contamination testing for simping products

Parameter	Analysis Method	Unit	Result	SNI Requirements
Water content	Gravimetric	%	4.93	Max. 5
Protein	Kjeldahl	%	5.85	Min. 4.5
Free fatty acids	Conventional	%	1.19	Max. 10
Pb	SNI.06-6989.8-2004	mg/kg	0.00	Max. 0.5
Cd	SNI.06-6989.16-2004	mg/kg	0.00	Max. 0.5
As	Spectrofotometer	mg/kg	0.00	Max. 0.5
Total plate count	Conventional	colony/g	2,25 x 10 ²	Max. 1 x 10 ⁴
Microbiological Analysis				
Coliform	SNI.2897-2008	APM/g	≥ 11	< 20
<i>Escherichia coli</i>	SNI.2897-2008	APM/g	< 3	< 3
Salmonella sp.	Biochem analysis	-	Negatif	Negative/25g
<i>Staphylococcus aureus</i>	Biochem analysis	colony/g	< 1 x 10 ¹	Max. 1 x 10 ⁴
<i>Bacillus cereus</i>	Biochem analysis	colony/g	< 1 x 10 ¹	Max. 1 x 10 ⁴
Mold	Konvensional	colony/g	< 1 x 10 ¹	Max. 1 x 10 ⁴
Yeast	Konvensional	colony/g	< 1 x 10 ¹	Max. 1 x 10 ⁴

Table 2. Test results for nutritional value and contaminants of instant turmeric products

Parameter	Analysis Method	Unit	Result	SNI Requirements
Water content	Gravimetric	%	4.69 *	Max. 3.0
Ash content	Kjeldahl	%	1.22	Min. 1.5
Sugar content (sucrose)	Conventional	%	9.84	Max. 85.0
Pb	SNI.06-6989.8-2004	mg/kg	0.03	Max. 0.2
Cu	SNI.06-6989.6-2004	mg/kg	0.00	Max. 2.0
Zn	SNI.06-6989.7-2004	mg/kg	0.09	Max. 50
As	Spectrofotometer	mg/kg	0.00	Max. 0.1
Microbiological Analysis				
Total plate count	Conventional	colony/g	9,7 x 10 ⁵ *	3 x 10 ³
Coliform	SNI.2897-2008	APM/g	≥ 11 *	< 3

Remarks: * exceeding SNI requirement

Management of MSME in the Purwakarta region is dispersed across each village, with managers generally having educational backgrounds below a bachelor's degree. In fact, there are instances where managers have not completed primary education. The relatively low level of education is one of the causes of the lack of understanding regarding the regulations that must be followed by processed food

producers, as indicated by the results of the pre-test conducted before the seminar. The understanding level regarding product quality shows low scores, especially for contaminants that should not be present in food products.



Figure 2. Mentoring, interview, and MSME assistance activity

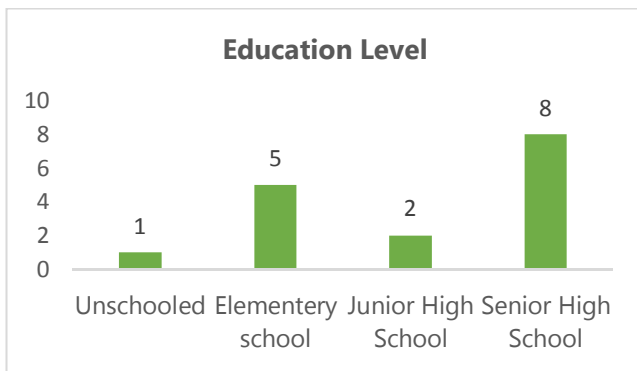


Figure 3. Questionnaire about education level result

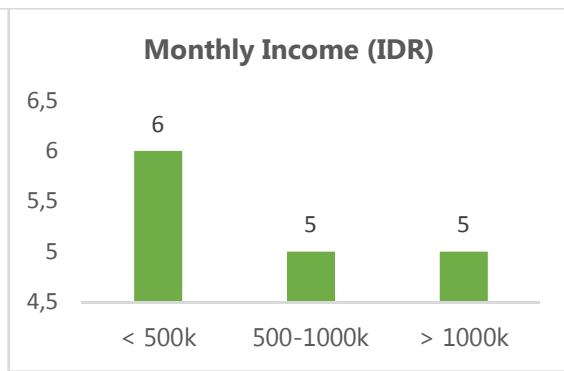


Figure 4. Questionnaire about monthly income result

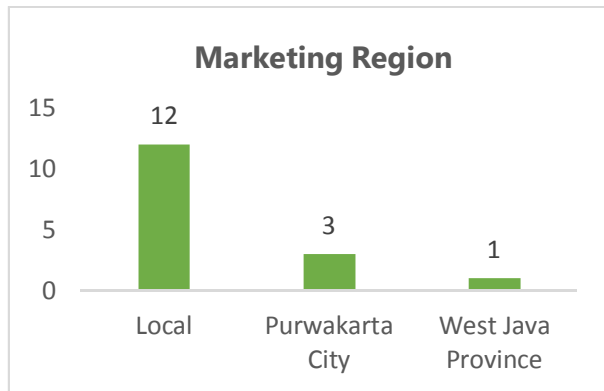


Figure 5. Questionnaire about marketing area result

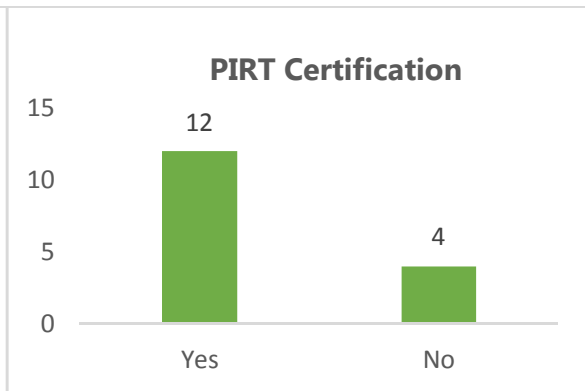


Figure 6. Questionnaire about PIRT status result

The post-test results distributed after the seminar indicate an improvement in knowledge regarding the quality and contamination of food products. The seminar also introduced methods to enhance nutritional value and reduce potential contaminants in each product.

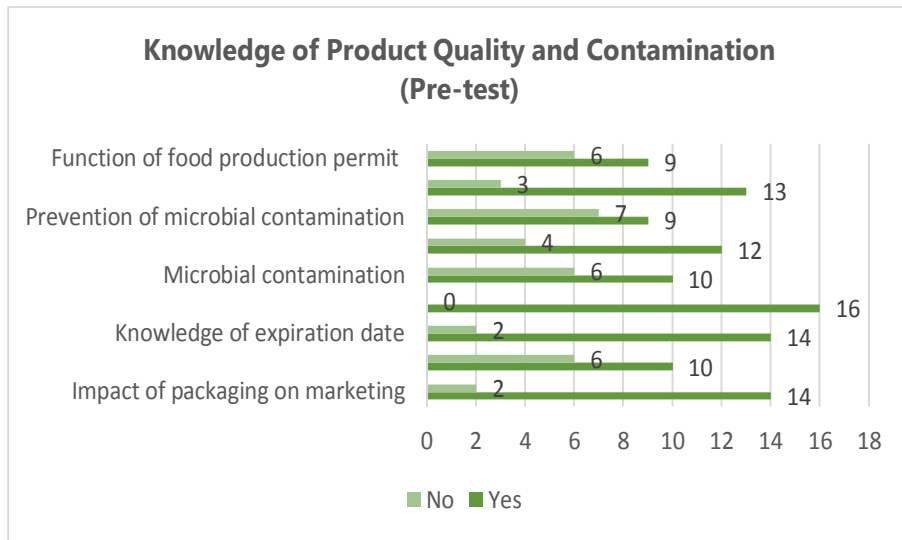


Figure 7. Questionnaire results on the level of understanding of MSME managers regarding food quality and contamination (pre-test)

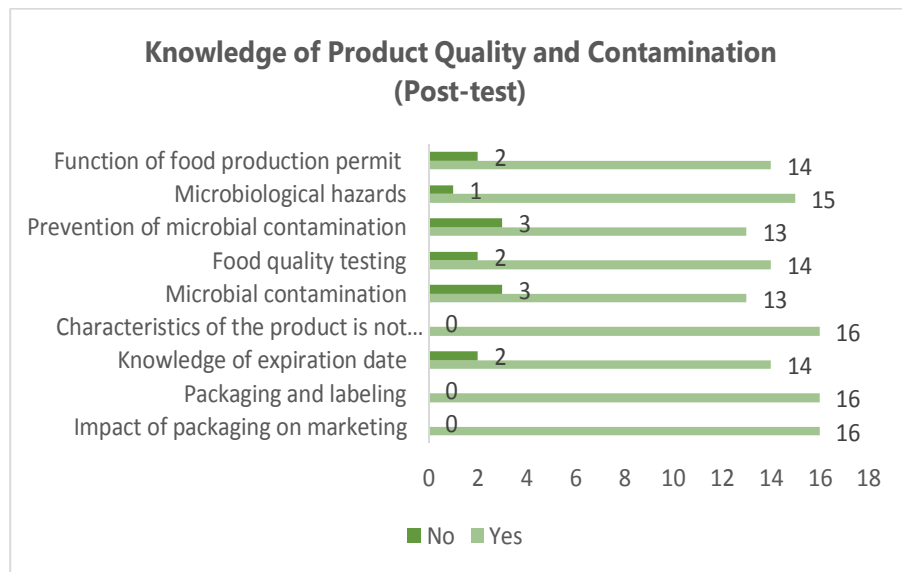


Figure 8. Questionnaire results on the level of understanding of MSME managers regarding food quality and contamination (post-test)

For simpling producers, where test results revealed parameters not in compliance with SNI, mentoring was implemented. The mentoring process, led by the activity's lecturer with assistance from students, involved providing information and advice to modify or adjust certain production processes, aiming to reduce contaminants that did not meet the required standards. The results obtained after mentoring showed a reduction in contamination parameter values, thus meeting the requirements outlined in SNI.

4. CONCLUSION AND RECOMMENDATIONS

MSMEs products in the Purwakarta Regency shows reasonably good quality, although some contamination parameters beyond the SNI limits were identified. These issues can be addressed through mentoring activities. The relatively low understanding of factors influencing product quality is a determining factor in the presence of unmet standard parameters. The seminar on nutritional value and contamination information resulted in an improved level of understanding among MSMEs managers. This condition is expected to positively impact the quality of the products they produce.

A follow-up program is necessary to ensure that products meeting SNI standards can be marketed in official stores through mentoring in packaging production. Other products lacking nutritional value and contamination information need assistance in obtaining such data. Additionally, mentoring for larger-scale production, coupled with marketing strategy training, is essential to enhance community income.

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