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Training development of meat-based BASECHI to improve the quality of public health in meatball vendors

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ABSTRACT

Tumbang Nusa Village, located in Central Kalimantan, has natural resources in the form of purun plants, which can be utilized as raw materials for environmentally friendly products, one of which is purun straw. However, the traditional drying process produces inconsistent product quality and low productivity. This community service program aims to empower the Nusa Sehati Joint Business Group (KUB) by introducing appropriate technology as a purun straw dryer. The program consists of several stages, including problem identification, community service preparation, socialization, demonstration, and evaluation of the purun straw dryer's usage. The activity resulted in a significant increase in both production efficiency and product quality. The drying time, which initially took 3-4 days, was reduced to just 40 minutes, and the quality of the purun straws became more consistent, with each straw losing 22 percent of its mass during drying. Evaluation results from pre-test and post-test assessments revealed a significant increase in participants' understanding. Before the training, 80 percent of participants were aware of this technology, but only 53 percent had used it. After the training, 93 percent of participants stated that the technology was effective, and 100 percent reported improvements in the quality of purun straws. These results demonstrate the program's success in enhancing knowledge and productivity.

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1. INTRODUCTION

The advancement of technology and science in improving the quality of food consumed to achieve a healthy lifestyle, the quality of food products is a major concern, especially in the snack food sector which is widely popular in the community such as meatballs and other processed meats. Meatball vendors, as key stakeholders in this industry, are faced with the challenge of improving the quality and healthiness of their products. However, the lack of economic means to own a freezer to store meatballs for a longer period of time without changing the quality of the meatballs is the main challenge faced. The use of dangerous chemical preservatives is often the wrong solution taken to overcome these problems so that meatball traders do not lose money if the meatballs they sell become stale due to inadequate storage facilities. The results of the preliminary questionnaire conducted by the research team to 30

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respondents directly and randomly, the results of the study showed that all respondents answered knowing the preservatives in food. The food preservatives known to the majority of respondents are borax, formalin, salt, and spices.

The application of appropriate technology is needed to solve this problem. One of the solutions being developed is BASECHI (Bakso Sehat Chitosan), an innovation that combines the advantages of meat as a source of protein with the health benefits of Chitosan. As explained by (Safirin et al., 2023) advances in food technology have played an important role in encouraging the improvement of the quality of food products consumed by the public. However, there are meatball traders who are not even familiar with chitosan which has been widely used as a natural preservative and skills in applying chitosan to their products so it is necessary to introduce chitosan and its application to food products, especially meatballs so that people are no longer unfamiliar with chitosan. This needs to be done because 27 out of 30 respondents did not know chitosan products, while the other 3 answered doubtfully. This is certainly unfortunate because the benefits of chitosan have not been applied to the community evenly both in the lower, middle and upper classes. Sari et al. (2023) revealed that the use of hazardous preservatives in the community needs to be stopped by switching to environmentally friendly natural preservatives such as chitosan.

Chitosan can be obtained by processing chitin contained in shrimp shells. Chitosan is a strong antimicrobial agent. The antimicrobial character of chitosan is due to its cationic nature. Antimicrobials work by killing microorganisms or inhibiting their growth. Chitin and chitosan can be easily used by utilizing the primary reactivity of primary and secondary amino and hydroxyl groups to be applied in various fields ranging from the scope of health, cosmetics to industrial activities (Boeriu & van den Broek, 2019). Chitosan can be obtained by processing chitin through a chemical process that includes demineralization, deproteination, and deacetylation. Innovation in the implementation of chitosan also continues to grow. The use of chitosan has also been licensed by the Food and Drug Administration as a food additive for food preservatives. Several previous studies on the effectiveness of using chitosan in a product have been conducted. Chitosan is able to maintain the freshness of curry fish (Nirmala et al., 2016), as a preservative for fried chicken (Harjanti, 2014) and is able to maintain the quality of dried salted anchovies (Sedjati et al., 2007). In the environmental field, chitosan can act as a coagulant for river water purification (Mustafiah et al., 2018). Many uses of chitosan have been carried out by previous researchers but unfortunately have not been widely applied and felt by the community. Preliminary research conducted by the team regarding the benefits of chitosan on sausages with several different concentrations found that sausages using 1 percent chitosan coating were able to maintain their quality until the 3rd day of storage with a bacterial count of 1.7 x 103 CFU/gram with a clear zone area created of 5.41 ± 1.10 mm. 1 percent chitosan concentration is the optimal concentration that can be used to inhibit bacterial growth on sausages compared to other treatments (Gita & Waluyo, 2022).

Based on the background above, it is important to conduct socialization and transfer of knowledge so that the use of chitosan can be known and applied in the community. One of the institutions engaged in the field of production and food units in Jember Regency is the Muchlisul Amin Barokah Abadi (MABA) Cooperative. The MABA Cooperative was chosen because its members, who are food producers, especially meatballs, still do not know about chitosan products and their applications. The purpose of this activity is to improve the knowledge and skills of meatball traders in making BASECHI a healthier processed meat product while introducing the health benefits of chitosan in food products.

2. METHODS

This activity was carried out at Muchlisul Amin Barokah Abadi (MABA) Cooperative. This cooperative is located at Jl. Tawang Mangu, Panji Neighborhood, Tegalgede, Sumbesari District, Jember Regency. The cooperative, which consists of many producers in the fields of food, livestock and agriculture, was chosen

as the target of socialization because there are many people not only meatball producers, but also other food producers so that the application of chitosan can be more varied in the future in the community. This activity was carried out on August 19, 2024 which consisted of several series of activities (Figure 1).

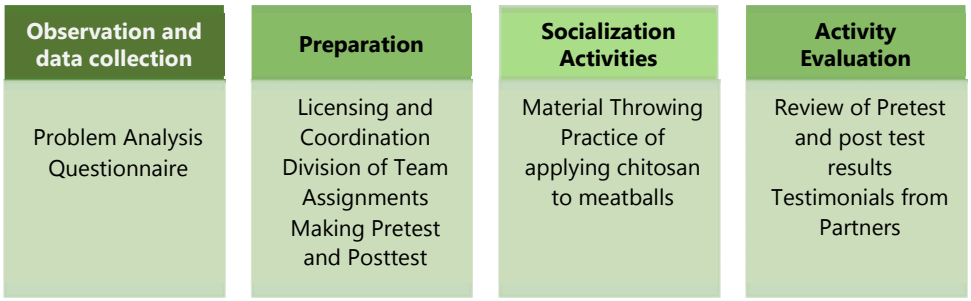

Figure 1. Series of community service activities

Observation and Data Collection

In the first stage, namely the preparation stage, the community service activity team analyzes the problems that occur and the needs of the community regarding the synergy of academics and the younger generation towards efforts to improve public health by switching to using natural preservatives that are not harmful to the body and the environment. Observation and data collection were carried out by filling out a short questionnaire to 30 random respondents to be able to corroborate data on actual field conditions. After knowing the field conditions, the team began to identify and seek to help overcome the problems that arose.

Preparation

The second stage is the preparation stage. The key to success in achieving the objectives of the activity is very dependent on the preparation of organizing socialization activities to the community. Preparations are made by licensing and coordinating with related parties, dividing tasks in the team, making pre-test and post-test questionnaires, presentation materials to the preparation of tools, materials and supporting facilities and infrastructure that support the socialization activities to be carried out. This socialization activity also introduces the work of appropriate technology for meatball printing machines that can benefit the community.

Socialization Activities

The third stage of activities in the form of socialization was carried out on August 19, 2024 at the Muchlisul Amin Barokah Abadi Cooperative. The socialization consists of a series of activities such as opening, pre-test, providing material by resource persons, introducing appropriate technology tools, practicing the application of chitosan in meatballs, post-test, and ending with closing activities. Resource persons come from the community service activity team with capacities and abilities that are in accordance with the objectives of community service activities.

Participants were also introduced to appropriate technology tools that can assist in the efficient and effective application of chitosan in the meatball production process. These tools are designed to support small to medium scale production, which are suitable for use by meatball vendors in their daily activities. The tool introduction session was followed by hands-on practice, where participants were given the opportunity to try applying chitosan to their own meatball products. With guidance from

resource persons and the service team, participants were able to understand the practical steps in using chitosan, so it is hoped that they will be able to apply it independently after this activity ends.

Evaluation

The final stage of this community service activity is evaluation. Evaluation is carried out through post-test and testimonials from community service partners. The questions in the pre-test and post-test given on the test sheet contain questions related to the participants' knowledge before and after participating in the activity regarding chitosan as a natural preservative that can be applied to meatballs and other processed meat products. The achievement of this community service program is shown by the increase in participants' knowledge based on the results of the pre-test and post-test comparison. This valuation aims to measure the increase in participants' knowledge and skills in utilizing chitosan as a natural preservative after attending the training. The results of the pre-test and post-test were analyzed using statistical charts and interpreted quantitatively. The questions given in the pre-test and post-test were specifically designed to measure the extent to which participants understood the concept and application of chitosan before and after the training.

Collecting testimonials from community service partners is essential to gain first-hand insight into the impact of the training on their daily production practices. These testimonials also help in identifying areas that may require further improvement or additional training. Thus, this evaluation not only serves as an indicator of the program's success, but also as a basis for better program development in the future. The evaluation in the form of pre-test, post-test, and testimonials is essential to measure the real impact of the community service program and ensure that the program objectives have been effectively achieved.

3. RESULTS AND DISCUSSION

Results

Observation

Analysis of the problems that occur and the needs of the community regarding the synergy of academics and the younger generation towards efforts to improve public health by switching to using natural preservatives that are not harmful to the body and the environment. Observations and data collection were carried out by completing a short questionnaire with 30 respondents randomly around the service location. The results showed that 30 respondents did not know about chitosan products. So this phenomenon was used as an initial observation to describe the condition of the community, especially members of the MABA cooperative.

Preparation

Preparation is the second activity of this community service program. At this stage, the team designs a program of activities that will be carried out during the service which is divided into two stages, such as: (1) the first stage, in the form of an explanation of the activities carried out during the training implementation and also an explanation in the form of material presentation. In its application, the implementation of this training was carried out in 1 meeting which explained the material about chitosan, explained the benefits and application of chitosan and handed over appropriate tools; (2) the second stage is the practical stage. Participants were given the opportunity to apply chitosan to meatball samples that had been brought by each group member. In addition, participants also practiced making meatballs using appropriate technology tools that had been prepared.

Preparations carried out include coordinating with related parties, writing correspondence, preparing presentation materials, making pre-tests and post-tests, purchasing necessary necessities such as appropriate technological tools, chitosan materials and other necessary equipment.

Socialization activities: Introduction to chitosan and its application in meatballs

Community service activities regarding the socialization of BASECHI (Bakso Sehat Chitosan) product development are as follows: (1) at the beginning of the presentation, the resource person explains the purpose of the training and the series of activities that will be carried out. This explanation aims to ensure that participants understand the overall structure and flow of the training; (2) the resource person also provides information on the schedule of activities and procedures that must be followed during the training. This helped participants to prepare themselves and follow each stage more effectively; (3) the resource person explained the various materials that would be used in the practice of making meat-based healthy meatballs with chitosan. These include the main raw materials, such as meat and chitosan, as well as other necessary additives; (4) the presentation ended with a Q&A session, where participants could ask questions related to the technique, or the use of materials. This ensures that participants get the necessary clarifications before starting the practical.

This presentation stage is an important foundation of the training, as it gives participants a clear understanding of the process they will undergo, the materials to be used and the techniques to be applied. With comprehensive explanations and relevant examples, participants are expected to be able to follow the practice more confidently and effectively.

After a series of material provision and material selection activities, the socialization of BASECHI (Bakso Sehat Chitosan) training was continued with a practical session, where participants actively applied the application of chitosan to meatballs (Figure 3). The discussion on material processing revealed that participants were able to follow the processing procedures well and produce healthy meatballs that meet quality standards. The process of mixing the meatball dough and molding it to applying chitosan as edible coating on the meatballs showed that the participants were able to apply chitosan on the meatballs and overcome the challenges that arose during the practice. This socialization activity not only improved the participants' practical skills but also strengthened their understanding of the use of chitosan and technology in the manufacture of more nutritious food products.

Figure 2. Presentation activities that were enthusiastically followed by participants
Figure 3. Practical application of chitosan to meatballs

Evaluation and review of results

At the final stage of the implementation of this community service program is the evaluation and review of the participants' work. At this stage, the products that have been made by the participants

are shown again as the final product of the practice that has been carried out. This stage aims to assess and demonstrate the participants' achievements in designing BASECHI (Bakso Sehat Chitosan) products. During this final stage, participants presented their designs, which included the design of the healthy meatballs as well as the processing techniques applied (Figure 4). The instructor team provides an in-depth explanation of the products that have been created, including the aesthetic, functionality, and quality aspects achieved. This explanation included how the design was applied in making the healthy meatballs and how the product met the set standards. The instructors also provided constructive feedback on each of the decorated products, describing strengths and areas that required improvement. In addition, the explanation by the instructor team included recommendations for further development and application of the design in a real production context. By showing the final results and providing detailed explanations, this stage ensures that participants not only understand the theory and techniques, but can also see the practical results of their designs.

Figure 4. Feedback and product evaluation

In addition, the socialization activities followed by filling out the post-test by the participants showed an increase in participants' knowledge and skills after the training. Competent resource persons from the community service team played an important role in providing useful feedback and suggestions for improving processing techniques. The results of the training showed that participants were able to utilize the knowledge gained to process raw materials effectively, resulting in healthy and quality meatball products.

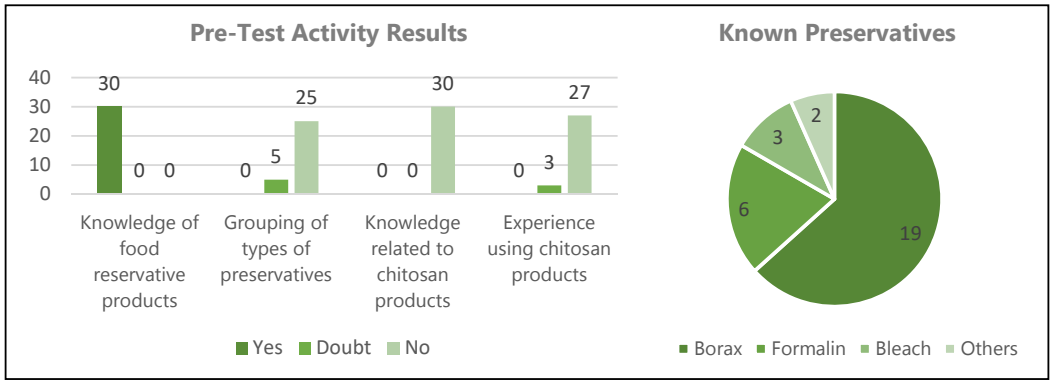

Figure 5. Pre-test activity results

The training on the development of meat-based BASECHI (Bakso Sehat Chitosan) showed positive results in improving the knowledge and skills of meatball vendors on making healthy meatballs. Based

on the data obtained from the pre-test and post-test, there was a significant increase in participants' understanding of the benefits of chitosan and healthy meatball making techniques. The initial knowledge in the pre-test results showed that most participants had limited basic knowledge about chitosan and healthy meatball making technology (Figure 5). Prior to the training, their knowledge tended to be general and did not include more in-depth technical aspects. The increase in the participants' knowledge of chitosan could not be separated from the material provided by the resource persons. Participants were able to show an increased understanding of the benefits of chitosan in improving the health quality of meatballs. The materials presented included the theory of chitosan, procedures for making healthy meatballs, and relevant appropriate technology.

The training was then continued with a practical session, where participants successfully applied BASECHI manufacturing techniques with direct guidance from resource persons. The use of appropriate technology tools also facilitates the production process and ensures the quality of the products produced. In the final evaluation, the post-test results showed a significant increase in knowledge after the training. Most participants were able to explain the benefits of chitosan and apply healthy meatball making techniques well (Figure 6).

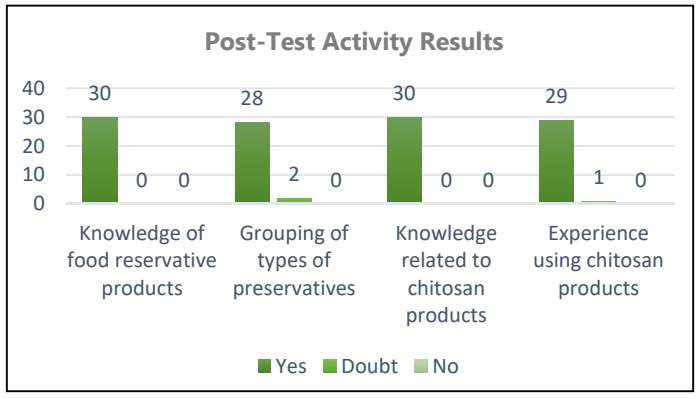

Figure 6. Post-test activity results

Discussion

This training successfully fulfilled its objectives in improving the quality of public health through healthy meatball product innovation. The increase in participants' knowledge and skills demonstrates the effectiveness of the training materials delivered. Competent resource persons played an important role in ensuring that the information provided was relevant and useful to meatball traders. The introduction of appropriate technology tools simplified the production process and improved efficiency, which in turn contributed to better meatball quality. As explained by Wahditiya et al. (2024), the introduction of appropriate technology in the food industry plays an important role in improving product quality and production efficiency, which ultimately contributes to public health through the provision of safer and more nutritious products. Hands-on practice gives participants the opportunity to apply the techniques learned, reinforcing their understanding and improving practical skills. The training program also includes closing activities that ensure that participants get constructive feedback and plan follow-up steps. The discussion and follow-up planning help to ensure that the knowledge gained during the training can be applied sustainably and have a positive impact on community health. This is in accordance with the opinion that community service activities need practical follow-up, not just the provision of material. This is in accordance with the opinion of Sulaeman et al. (2023), which states that community service activities

require practical follow-up, not just providing materials. This training is expected to serve as a model for other healthy food product development initiatives and contribute to the improvement of public health through the consumption of more nutritious products. Effective implementation of the BASECHI technique by meatballs vendors can potentially increase awareness of the importance of food quality and encourage the implementation of better health standards in the local food industry.

Based on the results of unstructured interviews between the implementing team and participants which were included with direct observation during the activity, the implementation of community service program activities by the implementing team from PGRI Argopuro University Jember provided the following results: (1) from the implementation of this community service program activity, it has increased and increased knowledge to meatball producers and other processed meat products in the introduction of chitosan products and their application to meatballs. The increase in knowledge can be seen from the activeness of the participants and the results of the post-test which found that they were interested in using chitosan as a natural preservative in their products; (2) increased participant knowledge about appropriate technology tools, namely meatball molding tools that make it easier for producers to produce meatballs. Aulia et al., (2021) also stated that follow-up practice after providing material is very important to ensure that the knowledge gained can be applied effectively by producers, so that they are better prepared to implement the innovations that have been taught.

In implementing this community service program, there are several factors that support the implementation of this community service activity, namely: (1) the assistance provided by the partners in providing facilities in the form of a place of implementation and participants who are residents who are mostly meatball traders who participate directly in the implementation and success of this community service program in the form of training; (2) the interest and enthusiasm of the participants during the activity; (3) there are no other activities that interfere with the running of this community service program. As stated by Ditta & Candrani (2023), participant enthusiasm in a training can be an important indicator of the success of the program, especially in facilitating the application of the knowledge gained.

In the implementation of this community service program, there are several inhibiting factors that occur during the implementation of activities, namely: (1) because the training carried out is in the form of hands-on training, there needs to be an explanation in the form of practice to the participants at each meeting. According to Nababan et al. (2022), effective time management in training programs is a crucial factor in ensuring that participants can participate in activities. This is based on the knowledge of the participants, the majority of whom are new to chitosan and have never used it; (2) due to the limited time period, it is necessary to coordinate with the participants so that they can still carry out the production process without being hampered by this socialization activity. This is important so that no one party feels disadvantaged due to the implementation of the socialization. To overcome these inhibiting factors, several strategic steps need to be implemented. First, in every training meeting, it is important to adopt a more interactive approach by combining theoretical and practical explanations in a balanced manner. Live demonstrations on the use of chitosan in the production of healthy meatballs (BASECHI) can help participants better understand the concept and its application. As suggested by Baharuddin et al. (2024), practical demonstrations are an important method to strengthen participants' understanding of the application of new technologies.

4. CONCLUSION AND RECOMMENDATIONS

This community service program aims to provide skills training and new knowledge to meatball producers related to natural preservatives, namely chitosan and its application in BASECHI. The target to

be achieved in this program is that participants are able to know and are interested in using chitosan as a natural preservative in their meatballs compared to using hazardous preservatives. The implementation of this program is divided into 2 stages, namely the material provision stage and the practice stage. Equipment and supporting facilities, availability of places, involvement of partners, and support from the community are the main factors in the success of achieving the objectives of this program. The results achieved were participants who were able to apply chitosan to meatballs. It is hoped that with this activity, meatball producers in Jember will begin to recognize and be interested in using chitosan and leave the use of hazardous preservatives.

It is necessary to disseminate information and introduce chitosan to the general public. This is because knowledge related to natural preservatives is still not widely known and many dangerous preservatives are still familiar to the public.

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