

**EDUCATION ON TEMPE PRODUCT DEVELOPMENT AS PRODUCT
DIVERSIFICATION AT TEMPE RADJA, JABAL NUR MOSQUE, SENTUL, BOGOR**

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ABSTRACT

Tempeh is a fermented food that is typical of Indonesian culture. Tempeh is produced from the fermentation process and is produced using soybeans which is the most popular source of vegetable protein in the world. The development of tempeh products in various MSMEs needs to be carried out further to increase the potential of tempeh. The partner of this activity is Tempe Producer with the Radja Tempe brand. Radja Tempe is a tempeh production business unit managed by the Tahfiz Qur'an Islamic Boarding School, Sentul City Muslim Foundation located at the Jabal Nur Sentul City Mosque, Jl. MH. Thamrin, Cijayanti. The activity will be held in May 2024. This PKM stage consists of 1) Identification of Partner Needs, 2) Review materials according to Partner needs, 3) Preparation of Educational Materials, 4) Educational Activities, 5) Evaluation of Program Knowledge, Attitudes and Benefits. Based on the results of the analysis that has been carried out, it was found that there was an increase in the average knowledge of participants who in the pre-test had a knowledge value of 80.42 ± 10.83 , which increased during the post-test with a knowledge value of 85.83 ± 8.81 . Based on the analysis that has been carried out, the results of the study show that there is a significant difference in participants' knowledge before and after educational activities ($p < 0.05$). This significant difference shows that the knowledge value of participants after educational activities is higher than the value of participants before educational activities are carried out.

Keywords: template, instructions, conference, publications

INTRODUCTION

Tempeh is a fermented food that is typical of Indonesian culture and is embedded in the daily lives of Indonesian people. Notes about tempeh are listed in Serat Centhini and several other sources. Indonesia, as the origin of tempeh, has many types of tempeh and its processed products. Currently there are many types of tempeh sold on the market such as fresh tempeh, tempeh chips, tempeh flour, tempeh gembus, tempeh mendoan, tempeh kemul, tempeh bacem, tempeh mendol and others (Shurtleff dan Aoyagi 2020; Sunjata, 2014; Romulo & Surya, 2021; Ahnan-Winarno, 2020). As an effort to preserve tempeh, it is important to carry out cultural preservation efforts for various targets such as craftsmen, young people and the community. Recent research shows that across generations agree that the preservation of tempeh culture must be carried out, including through training activities about tempeh (Anwar et al 2023).

Tempeh is produced from a fermentation process and is produced using soybeans which are one of the most popular sources of vegetable protein in the world. Globally, tempeh is also widely popular as a typical Indonesian fermented product which has various types of benefits, including benefits in contributing to individual nutritional needs, health benefits and also other benefits such as economic benefits (Ahn-an-Winarno, 2020; Romulo & Surya, 2021; Astuti et al, 2023; Astawan et al, 2018). Soybean tempeh is a type of tempeh that is widely consumed in Indonesia and in various parts of the world. The process of making tempeh is carried out at the MSME level through various specific stages that form tempeh (Romulo & Surya, 2021). Currently, various research has shown various health benefits of tempeh. Some of the benefits of tempeh include being a source of antioxidants, a source of protein, improving blood lipid profiles such as reducing LDL, triglycerides and cholesterol, preventing obesity, and also for diabetes sufferers (Asbur & Khairunnisyah, 2021; Kuligowski et al, 2017; Astawan et al 2018; Puspitasari et al, 2020; Astawan et al. 2023). Currently, various tempeh products have been developed so that Indonesia has been able to export tempeh products to various countries in recent years (Kemendag 2021; Data Indonesia.id, 2023).

The development of tempeh products in various MSMEs needs to be carried out further to increase the potential of tempeh. Tempeh product development can be made through several alternatives such as variations in ingredients, or variations in derivative products from tempeh that have been produced into other types of products. This activity partner is a Tempe Producer with the Radja Tempe brand. Radja Tempe is a tempe production business unit managed by the Tahfiz Qur'an Islamic Boarding School, Sentul City Muslim Foundation which is located at the Jabal Nur

Sentul City Mosque, Jl. MH. Thamrin, Cijayanti, District. Babakan Madang, Bogor Regency, West Java 16810. This business unit produces tempeh which is wrapped in plastic and sold around the mosque location. Currently, partners only have one type of product, namely fresh tempeh. In this regard, education about the importance of developing processed tempeh products is needed to increase the sales potential of Radja Tempe.

METHOD

The activity was carried out at the partner location, namely Radja Tempe, which is managed by the Tahfiz Qur'an Islamic Boarding School, Sentul City Muslim Foundation which is located at the Jabal Nur Sentul City Mosque, Jl. MH. Thamrin, Cijayanti, District. Babakan Madang, Bogor Regency, West Java 16810. The activity carried out in May 2024. The target of this community service activity is the management of Radja Tempe. This PKM activity is carried out in several stages consisting of 1) Identifying Partner Needs, 2) Reviewing materials according to Partner needs, 3) Making Educational Materials, 4) Educational Activities, 5) Evaluation of Knowledge, Attitudes and Program Benefits.

Program preparation begins with obtaining permits, coordinating with partners including coordinating partner needs and coordinating activities that have been carried out, so that the team makes adjustments according to partner needs. Creating materials that will be used during education and training. This is based on the results of joint discussions between the PKM Team and partners according to the partners' needs. Some of the material collected is material that is appropriate to the topic that will be educated on the target. After all the materials and media are ready to be used, trial activities are carried out on educational models, training and questionnaires for the targets. The results of the trial are evaluated and improved on the media that will be used. Educational materials are also prepared in the form of power points that will be used during educational activities.

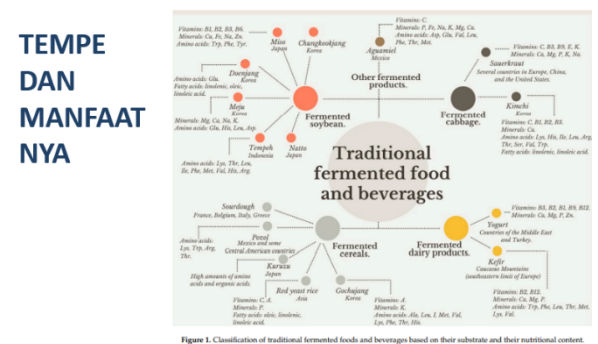
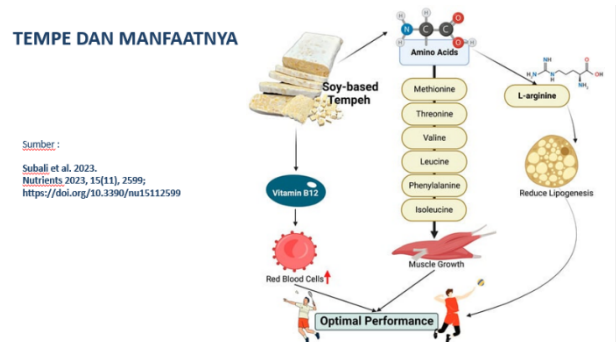


Figure 1. PPT materials used in educational activities

Educational activities provided to partners using active participation methods that involve partners in discussions. Education is provided using materials that have been prepared and followed by discussion sessions about the material provided and sharing about what partners have done related to the topics provided by the PKM team. Education carried out includes, Tempe Product Development. Evaluation of knowledge, attitudes and program usefulness is carried out using a questionnaire given to partners. The questionnaire covers knowledge, attitudes before and after education and practice regarding the activities provided. Apart from that, evaluation of the program's usefulness is also provided using a questionnaire given to partners which is equipped with video testimonials of activities. Questions given in the knowledge evaluation include the nutritional content of tempeh, the benefits of tempeh for health, the benefits of

tempeh for the environment and the development of various tempeh products that can be carried out. The data obtained was then subjected to univariate analysis to see a picture of partners' knowledge, and a different test was carried out using an independent t-test to determine the difference in knowledge before and after education.

RESULTS AND DISCUSSION

Partner Profile

Radja Tempe is a tempe production business unit managed by the Tahfiz Qur'an Islamic Boarding School, Sentul City Muslim Foundation which is located at the Jabal Nur Sentul City Mosque, Jl. MH. Thamrin, Cijayanti, District. Babakan Madang, Bogor Regency, West Java 16810. This business unit produces tempeh which is wrapped in plastic and sold around the mosque location. Currently, partners only have one type of product, namely fresh tempeh. In this regard, education about the importance of developing processed tempeh products is needed to increase the sales potential of Radja Tempe. Currently, consumers of Radja Tempeh are people living around Sentul. Apart from that, a production site that is clean and has a good system is one of the advantages that Radja Tempe has. Product development needs to be carried out to increase Radja Tempe's product diversification so that it can help increase their consumer market.

Product Development Educational Activities

The process of making tempeh consists of several stages, such as sorting the soybeans from impurities, boiling them in water for 30 minutes, soaking them in cold water for 5-8 hours, washing them to separate them from the bean shells, dousing them with hot water to kill germs and remove acid. mixed with yeast, wrapped in plastic with a small hole in the plastic measuring 15 x 25 cm, then flattened to facilitate the fermentation process. During the production process, there are several things that influence the economic value of tempeh products, such as production costs, salaries, tools, and material prices. One thing that is often a concern is cleanliness and critical points of contamination that occur at each stage of the production process. Improving hygiene and sanitation conditions is important to make a product of higher quality. Apart from improving hygiene and sanitation, product development is also needed to enrich the variety of products produced so that it can increase selling value and shelf life. This product development can be made through several alternatives such as variations in ingredients, or variations in derivative products from tempeh that have been produced into other types of products.

The tempeh produced in Indonesia is tempeh produced by communities within the scope of MSMEs and households with varying production capacities (BSN 2012; Ahnan-Winarno, 2020). In relation to hygiene standards, SNI 3144:2009 was issued which contains hygienic methods for producing tempeh. According to this standard, hygienic methods for producing tempeh, including how to prepare and handle it, apply provisions in accordance with the Guidelines for Good Processed Food Production Methods. During the tempeh production process, waste is also produced which is the remainder of the water and soybeans used during the tempeh making process. Waste management from tempeh production can be done by utilizing waste water to be used as liquid organic fertilizer and biogas from a mixture of household organic waste (Puspawati & Soesilo, 2018).

This educational activity began with an explanation about tempeh as a cultural heritage, the benefits of soybeans, the benefits of tempeh, and continued with various examples of product development carried out on tempeh products. Tempe as Indonesia's Intangible Cultural Heritage (WBTB) Indonesia needs to carry out a process of recording and determining it as WBTB carried out by the Indonesian Ministry of Education and Culture, Director General of Heritage and Diplomacy. Currently, various stages have been carried out for the process of recording and determining tempe as an Intangible Cultural Heritage (WBTB) Indonesia (Maskar et al 2018). Officially, tempe has been registered as WBTB with several registered names, namely Central Java Tempe with Registration Number 201700525 of 2017 and certificate number 60089/MPK.E/KB/2017 (Ministry of Education and Culture 2022).

Tempeh is a type of food source of vegetable protein that is popular with Indonesian people. Tempeh consumption contributes to protein adequacy by 10.27% - 14.6% and 30.25% to vitamin B12 adequacy (Trina et al 2023). Some other benefits of tempeh are as a source of antioxidants, a source of protein, isoflavones, bioactive components and peptides. Tempeh has sufficient nutritional value of iron, vitamin B12 and folic acid, so tempeh has the potential to increase hemoglobin levels in anemia sufferers. Tempeh has the benefit of increasing intestinal flora and can also increase the health benefits associated with paraprobiotics (Asbur & Khairunnisyah, 2021; Astawan et al. 2018; Puspitasari et al., 2020; Astawan et al. 2023; Pinasti et al. 2020; Sari et al. 2022;Divate et al, 2023).

Currently, various creations have been made from tempeh in MSMEs. Some of the activities that have been carried out have resulted in several innovative products, including rainbow tempeh dumplings, tempeh cookies, Pamia's

creative tempeh, mocaf flour tempeh gelamai, fermented soybean dessert (Simanjuntak et al. 2023). Diversification of processed tempeh products has also been carried out in other areas with various variants of tempeh chips, tempeh nuggets, tempeh egg rolls, etc. (Nugroho et al. 2019). Other product development has also been carried out at one of the tempeh houses in Bandung by producing various innovative products that have been tested by the panelists including the ten best products, namely tempeh cereal, tempeh cookies, tempeh brownies, sterile tempeh rendang, tempeh milk, tempeh ice cream, drinks instant tempeh, tempeh sausage, tempeh nuggets, and tempeh crackers (Maskar et al. 2024).



Figure 2. Educational Activities for Tempe Product Development at Radja Tempe, Sentul, Bogor

Based on the results of the knowledge evaluation carried out in this activity, it was found that there were differences in knowledge before and after the educational activity was carried out. This evaluation assessment was carried out on 24 participants who attended the educational activity until completion. The questions asked included the definition of tempeh, tempeh as a cultural food, the nutritional content of tempeh, the health benefits of tempeh and the development of tempeh products. Based on the results of the analysis that has been carried out, it was found that there was an increase in the average knowledge of participants who at the pre-test had a knowledge value of 80.42 ± 10.83 , which increased during the post-test with a knowledge value of 85.83 ± 8.81 . This increase shows that the educational activities that have been carried out for partners have been able to increase the average value of participants' knowledge about tempeh and product development which can be carried out as an effort to diversify the processed products produced.

Table 1. Knowledge of participants in tempe product development education before and after the activity

| Knowledge | n | Min-Max | Mean±SD |
|-----------|----|---------|-------------------|
| Pre Test | 24 | 60-100 | 80.42 ± 10.83 |
| Post Test | 24 | 60-100 | 85.83 ± 8.81 |

The increase that occurs after education can be caused by interesting education, so it is hoped that it can help increase participants' knowledge. The method used in this activity is a participatory educational method that actively involves participants during the implementation of the activity. This method is one of various types of interesting methods and is widely used for various educational activities (Rachmah et al, 2022; Prameswari, 2018). Educational activities carried out by the community service team use PPT media which are delivered interactively. The activity was also continued with discussions and questions and answers by exploring various things that partners have currently done and plans that can be carried out in future product development so as to increase the diversification of products that will be produced.

After measuring changes in knowledge in participants, a different test was also carried out to determine the differences obtained from the participants' knowledge scores before the educational activity was carried out and the knowledge scores after the education was carried out. Based on the analysis that has been carried out, the results show that there is a significant difference in participants' knowledge before and after educational activities ($p < 0.05$). This significant difference indicates that the participants' knowledge scores after the educational activities were higher than the

participants' scores before the educational activities were carried out. The different test data obtained in this activity can be seen in Table 2 as follows:

Table 2. Test results of differences in participants' knowledge scores before and after educational activities

| Knowledge | Mean±SD | <i>p value</i> |
|------------------|-------------|----------------|
| <i>Pre Test</i> | 80.42±10.83 | 0,000 |
| <i>Post Test</i> | 85.83±8.81 | |

Several mentoring activities that have been carried out and accompanied by product development, can produce a variety of processed product diversification such as cireng tempeh, orek tempeh, vegetable tempeh, tempeh mendoan, peyek tempeh, kripik tempeh, bacem tempeh, nuggets tempeh, tempeh chocolate, chocolate tempeh and lodeh tempe, which has selling value, so it can increase economic value (Perdana et al, 2022). Apart from that, other efforts that can be made are through assistance in improving production quality, and increasing the role of various elements of actors/stakeholders, namely suppliers, traders, consumers, cooperative and SME services, industry and trade services, agriculture and food security services and financial institutions. (Lisa et al, 2023; Suparjo & Hariastuti, 2017). Other assistance that can be provided in product development efforts is through marketing the processed products that have been produced so that they can be absorbed by society (Setiawan et al, 2021).

CONCLUSION

Based on the community service activities that have been carried out, the results obtained are that education on tempe development for craftsmen with Radja tempe partners has been able to increase participants' knowledge. Interesting educational methods can be used to assist in further educational activities. Apart from that, this activity can be continued through mentoring activities so that the product development that will be produced can be absorbed into the market.

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