

## ***The Appropriate Technology Introduction for Tempeh Brownies Diversification in BROWNIESTA SMEs***

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Submitted: 15-02-2023; Accepted: 26-05-2023

### **ABSTRACT**

A small medium enterprise (SME) of BROWNIESTA produces tempeh brownies products and is located in Pengkok Village, Kedawung District, Sragen Regency. The community service activities in 2020 conducted by the service team of Universitas Sebelas Maret (UNS) were proven to increase the production capacity and quality of tempeh brownies. The COVID-19 pandemic impacted the cessation of BROWNIESTA SMEs' production activities. Along with the improvement in post-pandemic conditions, product demand is increasing. However, the increase in product demand could not be fully handled by BROWNIESTA SMEs. BROWNIESTA SMEs experienced difficulties, such as inadequate production equipment and lacking marketing techniques. BROWNIESTA SMEs must also be maintained through product innovation, such as steamed tempeh brownies production. Hence, this service activity aims to increase production efficiency and capacity, elevate tempeh brownies diversification, and improve product marketing techniques at BROWNIESTA SMEs. The service activities involved the appropriate technology introduction through the following activities: 1) a stand mixer and steamer introduction; and 2) the training of entrepreneurship, information technology (IT)-based marketing, and direct selling strategies. A stand mixer introduction succeeded in increasing brownies' production efficiency by preventing the repetition of dough production in each batch. Brownies' production capacity also increased up to 20-25% products/day. The steamer introduction successfully produced steamed tempeh brownies, thus tempeh brownies diversification was accomplished. Several training activities were proven to increase BROWNIESTA SMEs' knowledge, especially regarding online marketing, by launching their first Instagram account to improve business activities.

Keywords: IT-based marketing, product diversification, production efficiency, steamed tempeh brownies.

### **INTRODUCTION**

Tempeh is a traditional food product that is processed through a fermentation technique by the fungus *Rhizopus* sp. involving soybean or non-soy bean as a raw material (Suknia & Rahmani, 2020). Generally, tempeh has chemical characteristics such as 41.5% of protein, 29.6% of carbohydrates, 61.2% of water content, 7.5% of nitrogen, and 3.4% of crude fiber, and contains superoxide dismutase, which can suppress cell damage or cell aging. Therefore, tempeh is widely known as a superfood because it contains complete nutrition, such as protein, carbohydrates, fat, dietary fiber, vitamins, and antioxidants (Asbur & Khairunnisyah, 2021; Cahyadi, 2006).

Tempeh is an original Indonesian food product which easily found on Java Island. Pengkok Village, Kedawung District, Sragen Regency, is a popular area for its tempeh products. Tempeh products in this village are widely used in fresh form or processed into other derivative products, such as tempeh brownies (Ishartani *et al.*, 2021). Brownies are a type of cake that evenly distribute in the market. Types of brownies are also known to be very diverse. Along with the development of food science, many brownies products have evolved. To improve the final product's quality by using local ingredients, brownies' production processes involve substituting or fortifying raw materials. Some examples of brownies production processes that have been innovated are the production of brownies using arrowroot starch,

barley flour, mocaf flour, rice bran flour, or tempeh (Latifah, 2019; Muhammad *et al.*, 2020; Suhendri *et al.*, 2022).

A small medium enterprise (SME) is a form of business with a household scale or small to medium scale and has less than 100 members, even often having 1-20 members only (Ardiyanto, 2018). An SME of Brownies Tempe April (BROWNIESTA) is one of the producers that produce tempeh brownies products. This business was pioneered by Aprilia Evi Lathifah, who graduated from Technology of Agricultural Product, Vocational School of Universitas Sebelas Maret. Aprilia founded the business to implement her final project topic, which covered the production of tempeh brownies products. An SME of BROWNIESTA is located in Pengkok Village, 01/03, Kedawung District, Sragen Regency, Central Java.

In 2020, an SME of BROWNIESTA became a partner for independent community service activities done by the UNS service team. This service activity benefits BROWNIESTA SMEs and is verified by the increasing production capacity and quality of tempeh brownies. These service activities involved the introduction of portable gas ovens and the introduction of product packaging (Ishartani *et al.*, 2021).

The COVID-19 pandemic triggered a halt in production activities at BROWNIESTA SMEs. As conditions improve after the pandemic, the demand for these products at the SMEs increases. The amount of production has also increased compared to the previous pandemic conditions. BROWNIESTA SMEs currently produce 4-5 packs of tempeh brownies, 8-10 packs of banana cakes, and 15-17 packs of sweet potato cakes daily. However, an SME of BROWNIESTA cannot fully handle the increasing product demand. This is caused by several obstacles currently being experienced by BROWNIESTA SMEs. Based on the latest situation analysis and discussions conducted between the service team and partners, the following obstacles were obtained: 1) inadequate production equipment and 2) a lack of marketing techniques. In addition, efforts are also needed to maintain the existence of BROWNIESTA SMEs so the business can last a long time. Hence, product and process innovation is urgently needed.

Based on the obstacles explained, an SME of BROWNIESTA was re-chosen as a partner in community service activities. Thus, the purpose

of this community service activity is to increase the efficiency and capacity of production, elevate the diversification of tempeh brownies products, and improve product marketing techniques in BROWNIESTA SMEs. The service activities involved the introduction of tools granted to partners (a stand mixer and a steamer) and the training of entrepreneurship, information technology (IT)-based marketing, and direct selling strategies.

## METHODS

Community service activities were held at BROWNIESTA SMEs which is located in Pengkok Village, Kedawung District, Sragen Regency, Central Java. The activities were carried out from February to November 2021. The participants of this community services activities consisted of service team members and partner team members. The activity begins by introducing a stand mixer and steamers to partners. The next activity involved training and socialization. Lastly, the evaluation and monitoring activities.

The production equipment was introduced through counseling methods and direct practices regarding the working principles, usage procedures, and maintenance techniques of a stand mixer and a steamer. The training activities were done by lecture and discussion method via an online platform (Zoom) with speakers, namely Ridho Taqobalallah, S.S. and Ima Nurul Safitri, M.Pd. The training in IT-based entrepreneurship and product marketing includes tips and tricks for successful entrepreneurship, marketplace development and management, and direct selling strategy through motivation and negotiation techniques. The training activities provided information about product photography techniques to support the success of an online business.

The evaluation and monitoring stages were conducted three months after the granted tools were introduced and the training activities were completed. These activities were held through an online platform (Zoom). The evaluation was done involved the following activities: 1) the evaluation of the changes in production efficiency and capacity regarding before and after a stand mixer introduction; 2) the evaluation of the successful diversification of tempeh brownies regarding before and after the steamer introduction; and 3) the evaluation of online-based business techniques application.

## RESULTS AND DISCUSSION

### The introduction of a stand mixer and steamer

The service team has introduced a stand mixer and steamer to partners to increase production efficiency and capacity and develop brownies product innovations at BROWNIESTA SMEs (Figure 1). A mixer type that partners have used for a long time is a hand mixer with a small dough capacity. Therefore, dough making should be done repeatedly so the efficiency and production capacity were low. The repetition of dough production can trigger the instability of dough and result in inconsistent brownies' texture. Based on this case, through the service activities, partners are introduced to a stand mixer with a larger capacity than the used one, which is expected to increase the efficiency and capacity of brownies production. Using a stand mixer with a large capacity can produce a smoother batter because there is no repetition in dough production so the texture of brownies is better and consistent (Figure 1).

Mixing materials is one of the important stages in an industry. The working principle of material mixing is based on increasing the scrambling and distribution of several components with different characteristics using a machine called by mixer (Perangin-angin *et al.*, 2015). The introduction and a grant of a stand mixer with a large capacity to partners (BROWNIESTA SMEs) are considered appropriate. Compatibility of equipment specifications with the production capacity is an important factor in increasing the efficiency and production capacity of an SME. This is supported by Pristiana *et al.* (2015), who explained that community service activities with mixer equipment grants service which have match specifications to the production needs of an SME are proven to increase the production capacity and shorten the processing time.

Introducing a steamer aims to increase the diversification of new brownies variants, such as steamed brownies (Figure 1). An SME of BROWNIESTA has solely produced baked brownies so far. Thus, there is an opportunity to produce steamed brownies with different characteristics from baked brownies.

Based on the conducted evaluation and monitoring, it was known that a stand mixer introduction significantly affected the increase of production efficiency and capacity. There was no repetition of dough production in each batch

after introducing a stand mixer with a 1-liter dough capacity. This indicated that brownies' production efficiency has increased compared to before, which was always produced dough repeatedly in each production batch. Brownies' production capacity appeared to increase by 20-25% per day after the introduction of a stand mixer compared to before, which was only able to produce around 4-5 brownies products per day.

The process of steamed food production is a cooking process that involves the heat of water vapor. The steamer consists of several layers of pots with holes in the surface bottom and a bottom pot filled with water for boiling stages (Atmoko & Krestanto, 2017). Steaming with the heat of the water vapor produces brownies with a soft texture overall, while the baking process produces brownies with a dry texture on the outside and a soft texture on the inside (Daforte & Sobari, 2018). Food product diversification can be interpreted as an effort to procure food products by depending on one type of product and a variety of other product choices (Lukum, 2022). Hence, the diversity of characteristics resulting from the two types of processing is an important reason for innovating steamed tempeh brownies so the consumer acceptance of brownies at BROWNIESTA SMEs is increasing. The granted stand mixer has a mixing bowl capacity of up to 1 liter. Meanwhile, the granted steamer has three levels of steaming trays (Table 1).



Figure 1. A stand mixer (top left) and steamers (top right). Handover of tools from the service team to BROWNIESTA SMEs (bottom)

Table 1. A stand mixer and steamer specifications

Tools	Specifications	Notes
Stand mixer	Brand	Phillips
	Type	HR1559
	Material	Plastic
	Bowl Capacity	1 Liter
	Power	170 watt
	Voltage	220 volt/50 Hz
	Dimensions	35x24x22cm
Steamer	Size	40x40x25cm
	Tray	3 layers
	Material	Stainless steel 0,4 mm



Figure 2. Steamed tempeh brownies (top) and other types of cakes (bottom)

According to the evaluation and monitoring results, it was known that the introduction of a steamer succeeded in encouraging BROWNIESTA SMEs to diversify tempeh brownies products by innovating the processing through steaming techniques to create innovative products, namely steamed tempeh brownies. These innovative products are starting to be marketed by BROWNIESTA SMEs (Figure 2). BROWNIESTA SMEs have also innovated other types of cakes such as banana cake, pandan cake, and cheesecake. Based on these conditions, BROWNIESTA SMEs are expected to be able to maintain their existence amidst the rise of other SMEs engaged in the bakery industry and continue to develop their potential according to market interest and current developments.

#### **The training in entrepreneurship, information technology-based marketing and direct selling strategy**

The purpose of training activities for partners is to increase the enthusiasm of BROWNIESTA SMEs regarding product development. The COVID-19 pandemic majorly impacted production activities at BROWNIESTA SMEs. The decline in the number of orders was the main struggle during the pandemic which even caused a stop in production activities at these SMEs. The decrease in demand for brownies products is also thought to be caused by a lack of promotional or marketing activities. Unoptimal marketing results in less well-known tempeh brownies products in the surrounding community. The less intensity of promotion, the lack of attractive language and types of promotion, and the limited promotion through WhatsApp groups have caused a decline in product demand. Based on these obstacles, training in entrepreneurship, IT-based marketing, and direct selling strategies are considered appropriate actions to implement. The training materials explained a lot of tips and tricks about successful entrepreneurship, online-based marketing tricks, marketplace development and management, personal branding, soft selling, and product photography techniques.

The development of information and technology greatly influences the development of various fields, one of which is marketing. Information technology-based marketing techniques or the usage of the internet as a marketing platform were considered appropriate to implement nowadays. The increase in internet users is directly proportional to its implementation in daily life (Ardiyanto, 2018). The utilization of information technology such as electronic commerce or social media has been proven to increase business competition and sales of goods or services in physical or digital form. The application of online marketing also proved to provide benefits for SMEs because their fast, practical, efficient, and free to apply. Other benefits include increasing brand awareness, expanding market connections, and increasing sales significantly (Mukhsin, 2019; Purwiantoro *et al.*, 2016). Therefore, implementing IT-based marketing at BROWNIESTA SMEs is expected to increase the brand awareness by the public regarding the tempeh brownies product and increase the efficiency of business processes in these SMEs.

The appropriate methods for product marketing also needed to be accompanied by guarantees for the product legality to expand the

market, ensure product quality, and increase consumer confidence in final products. This statement was in line with and supported by the report from Wirandhani *et al.* (2021), who explained the importance of legalizing an SME product through Home Industry Product Permits (PIRT). Based on government regulation article 42, No. 28 of 2004, explains that the home industry in the food sector must have a Home Industry Food Production Certificate known as SPP-IRT to guarantee the safety, quality, and nutrition of home industry food. Therefore, the follow-up activity that will be carried out after the implementation of the several community service activities above is assistance in managing those PIRT so the guarantee for product quality is ensured, and the product marketing of BROWNIESTA SMEs can also be broader.

The training activities were held through an online platform on Saturday, June 26<sup>th</sup>, 2021 (Figure 3). The participants consisted of the community service team and the partner team. Partners obtained a lot of new references regarding entrepreneurship skills, know-how about problem-solving during a pandemic situation, and basic online-based marketing.

Before the training activity, BROWNIESTA SMEs conducted business activities through direct selling (offline) or online-based but only limited to the WhatsApp application.

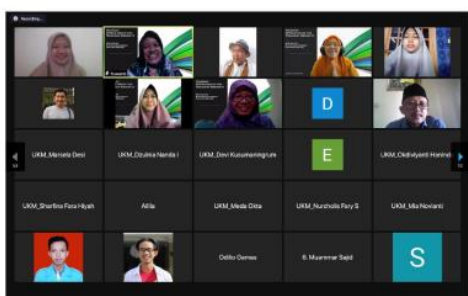


Figure 3. The picture of training activities through an online platform



Figure 4. Product marketing via Instagram

According to the evaluation and monitoring results, the training activities successfully encouraged BROWNIESTA SMEs to carry out online-based marketing through online platforms other than WhatsApp, such as Instagram with the account name “@umkm\_browniesta” (Figure 4). This Instagram account started to promote BROWNIESTA SMEs products actively. Besides that, this Instagram account also gradually functioned as a platform for buying-selling products to expand the market reach. Generally, the sales of tempeh brownies products appeared to increase by up to 10% after the launch of their Instagram account.

## CONCLUSION

Based on the fulfilled community service activities, several conclusions can be drawn. A stand mixer introduction prevented the repetition of dough production in each batch and increased up to 20-25% production capacity per day. Therefore, increased brownies production efficiency and capacity were achieved. The introduction of a steamer also succeeded in supporting partners to produce innovative products such as steamed tempeh brownies as an effort to diversify products. Training in entrepreneurship, IT-based marketing, and direct selling strategies has proven to increase partners’

knowledge and skills related to IT-based marketing, shown by launching their first Instagram account to improve and expand business activities such as buying, selling, and marketing activities. Advice that can be given based on these activities is the need for further assistance to partners, especially regarding arranging the Home Industry Food Production Certificate (SPP-PIRT).

## ACKNOWLEDGMENT

The community service team would like to thank the Universitas Sebelas Maret for the provided funds through the Non-APBN Funds PKM-HGR program, the year of 2021, with contract number: 261/UN27.22/HK.07.00/2021.

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