

Packaging Innovation as an Effort to Increase the Selling Value of Bu Gan's Frozen Food MSME Products

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ABSTRACT

This community service program was conducted at UMKM Bu Gan, located in Mergan Village, Malang City, with the objective of improving the quality and competitiveness of its frozen food products through the provision of a vacuum sealer machine. The partner's main challenge was limited packaging capabilities, as the products were previously wrapped using simple plastic packaging, resulting in low durability and an unattractive product appearance. To address this issue, the service team provided training on the importance of hygienic, informative, and appealing packaging, along with hands-on demonstration of the vacuum sealer machine's operation. The results indicate that UMKM Bu Gan is now able to operate the machine independently, producing neater and more professional packaging with extended shelf life. The application of this simple technology is expected to strengthen consumer trust, expand marketing opportunities both offline and online, and increase the overall selling value of frozen food products.

Keywords: *packaging, quality, selling value, community service, vacuum sealer machine*

1. INTRODUCTION

Malang City is widely recognized as an educational hub, characterized by its heterogeneous population. The presence of students from various regions who come to pursue their studies creates significant economic opportunities for the local community. One of the most rapidly growing sectors is Micro, Small, and Medium Enterprises (MSMEs), particularly in the culinary field. It is therefore not surprising that Malang is also renowned as a culinary paradise (**Deanova et al., 2023**). MSMEs in Malang City take advantage of the influx of students each year as a major business opportunity by providing traditional homemade dishes that are highly favored by both local residents and newcomers. The National Amil Zakat Agency (BAZNAS) has an organizational objective to support MSMEs through the provision of financial loans. One of its divisions, BAZNAS Microfinance Desa, operates in Malang City. Currently, BAZNAS has approximately 600 fostered partners, of which only 45 are considered potential partners in Malang. One of these potential partners is UMKM Bu Gan, a culinary business located in Mergan.

Sukun, Mergan, is one of the densely populated areas in Malang City with diverse occupational characteristics among its residents. One of the culinary entrepreneurs in this area is Bu Gan, the owner of a home-based food business that has been operating since her youth. The business has been passed down through generations, starting from her parents and later continued by Bu Gan herself. The flagship products of this enterprise are processed beef lung (paru) and beef tendon (kikil). Based on observations, it was found that these products are not only in demand among local residents but have also reached markets outside the city, such as Jakarta, Lombok, and several other regions.

However, the delivery process has not been carried out optimally. The main obstacle lies in the product packaging technique. In the business sector, packaging and labeling are essential components that play a crucial role in increasing consumer appeal (**Ulum, 2023**). At present, the packaging used in Bu Gan's business is still carried out in a simple manner, utilizing basic plastic containers, which are insufficient to maintain the durability of food products during long-distance delivery (**Daman et al., 2021**). Packaging has become a serious issue since the quality of food products is a key determinant of customer repeat orders (**Ayustia et al., 2023**). The limitation of available equipment has made Bu Gan reluctant to sell her products to distant markets. In fact, considering the characteristics of the business owner, Bu Gan has strong potential to expand market reach and enhance product competitiveness. The use of appropriate tools could instead improve efficiency in meeting market demand. (**Sarasmitha et al., 2024**). The equipment in this context refers to a packaging machine.

To address these issues, the community service team developed and provided a modified vacuum sealer machine featuring an ergonomic technology innovation. Unlike conventional sealers, this machine is equipped with an ergonomic worktable designed to match the posture of the business owner based on field observations, allowing the user to work comfortably without fatigue. In addition, the table height and the inclination of the sealer's position are adjusted to ensure product stability during the sealing process. The machine is also equipped with lockable wheels to enhance flexibility in placement while maintaining stability during operation. These adjustments were made to create an appropriate technology suitable for MSME capacity in terms of power consumption, heating temperature, and ease of maintenance. The innovation in the table design and machine structure represents a tangible form of technological application in the community service program, which not only focuses on equipment operation training but also incorporates simple engineering development to improve productivity, work efficiency, and the quality of food packaging results.

Such a machine plays an important role in boosting business productivity (**Tsamroh et al., 2024**). The demand for food delivery extends not only at the local level but also across provinces; however, it has not been maximized due to the limitations of the available equipment. In addition, the business owner also aims to diversify sales by offering frozen food products such as *bandeng presto*, marinated dishes, and others. Unfortunately, this has not yet been realized since equipment remains a major obstacle, even though the owner already has a freezer that supports proper food storage. The objective of this community service activity is to provide a sealer machine to improve the quality of both frozen and non-frozen food products, thereby enabling the business to increase its turnover.

1.1 Partner Problems

The problems faced by our partner are as follows:

- a. Lack of equipment for product packaging
- b. Lack of knowledge related to food quality

1.2 Intention and Objectives

The objective of this Community Service Program, carried out by the 2025 DPPM grant team under the auspices of the Institute for Research and Community Service (LPPM) Universitas Merdeka Malang, is to provide solutions in the form of developing a vacuum sealer machine and conducting training on its use. This Community Service Program, implemented under the 2025 Community-Based Empowerment Scheme of DPPM, aims to improve the quality of food products, thereby increasing business turnover. In addition to providing training, the program also delivers a packaging tool in the form of a vacuum sealer. The provision of this machine is expected to enhance product variety in order to meet market demand, which in turn not only increases turnover but also creates employment opportunities for local women.

2. METHOD

The Community Service Program was conducted on Saturday, August 20–21, 2025. The activity was attended by 10 participants consisting of 5 business owners, 3 lecturers from Universitas Merdeka Malang, and 3 students from Universitas Merdeka Malang. The method employed by the service team included training and evaluation, as follows:

1. Training.

This activity aimed to enable the partners to understand how to package processed food products as well as how to operate the machine.

- a. The first session emphasized the importance of packaging in maintaining food quality until it reaches consumers. In addition, participants were guided on how to select appropriate plastic packaging according to product size.
- b. The second session involved practical training on the use of the sealer machine, starting from switching on the machine to turning it off. Participants were directly engaged in hands-on practice using products prepared by the business owner.

2. Evaluation.

This stage aimed to assess the partners' understanding of the materials delivered by the service team of Universitas Merdeka Malang. The evaluation continued in the field after the training program was completed. Observation was carried out through independent trials conducted by Bu Gan, the owner of the food business.

3. RESULT AND DISCUSSION

3.1 Ergonomic Design of the Vacuum Sealer Machine

The supporting table for the vacuum sealer machine was designed with careful consideration of ergonomic, safety, and space efficiency aspects. The table measures 65 cm in height, 50 cm in length, and 40.5 cm in width, adjusted to fit the dimensions of the vacuum sealer machine, which has a height of 36 cm, as shown in Figure 1. With these proportions, the total machine height reaches approximately 101 cm from the floor, allowing the operator to perform packaging tasks in a comfortable standing position without excessive bending.

In addition, the table is equipped with four lockable caster wheels, making it easy to move while ensuring stability during operation. The table frame is made of lightweight metal, providing both durability and resistance to machine vibrations. The tabletop surface is designed to be flat and corrosion-resistant, making it easy to clean and maintain hygiene standards, which is particularly important for frozen food packaging operations.

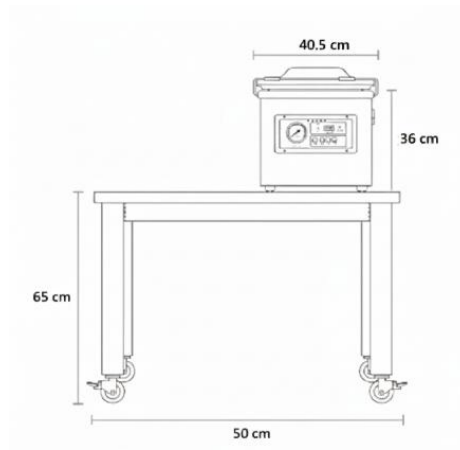


Figure 1. Ergonomic Table Design

This design not only enhances work comfort but also supports the efficiency of the packaging process by ensuring the machine's placement is more stable, easily accessible, and safe. Ergonomically, the table design contributes to reducing the risk of muscle fatigue and increasing the productivity of MSME partners during the product packaging process, as shown in Figure 2.



Figure 2. Vacuum Sealer with Ergonomic Table

3.2 Training on the Importance of Packaging

The community service activity began with an explanation regarding the importance of packaging for food products. The service team delivered information on the potential impacts of using inadequate packaging. The vacuum sealer machine was introduced as a reliable solution, as its airtight feature is considered capable of preserving the freshness and durability of food products (**Hamdan et al., 2023**). A similar point was emphasized by Mrs. Luly, a lecturer in Industrial Engineering, who explained that proper packaging can improve the quality of food products, ensuring that the taste remains consistent and does not deteriorate by the time it reaches consumers.



Figure 3. Explanation on the Importance of Packaging

Packaging plays an important role not only in product appearance but also in enhancing the quality of food products (**Robiani et al., 2024**). So far, the packaging used has been thin-wall containers, which often led to complaints because the packaging was not neat, such as spills from gravy and the mixing of food. As shown in Figure 3, the service team explained that proper packaging can increase the selling value of food products, and selecting the right packaging can protect the food. Packaging can also attract consumer purchasing power, thereby contributing to an increase in sales turnover.

The next activity was an explanation regarding how to use and maintain the machine. The service team provided detailed guidance on how to properly switch the machine on and off so that it can be used for the long term (**Subiyantoro et al., 2024**). After the business owner understood the instructions and independently practiced the process, as illustrated in Figure 4.



Figure 4. Independent Operation of the Machine

The next stage was training on the use of the vacuum sealer machine, in which the service team conducted a product trial, followed by the business owner practicing independently. The prepared product was *bandeng presto*, which would be directly distributed to consumers by the business owner. Bu Gan practiced independently, starting from placing the product into the vacuum plastic packaging show in figure 5, ensuring that the position was accurate so that no part of the product was exposed to the sealing area.



Figure 5. Placement of the product into the plastic sealer

The next process was training on operating the vacuum sealer machine. Figure 6 illustrates the service team assisting the business owner in operating the machine using the prepared product. The service team explained the operational steps to ensure that the product was properly vacuum-sealed.



Figure 6. Assistance in Operating the Machine

Next, the business owner was given the opportunity to operate the machine independently. Figure 7 shows the owner practicing the process on her own. During the hands-on practice, several challenges were encountered, such as a mismatch between the product size and the vacuum plastic, which led to several failures in the vacuuming process. The selection of suitable packaging materials, such as the type of plastic, was also emphasized to ensure that the owner understood how packaging directly affects product quality (Wahyuni1 et al., 2025).



Figure 7. Independent Use of the Machine by the Business Owner

After a product failure occurred, the team conducted an evaluation to identify the stages that caused the vacuuming process to fail. Figure 8 shows the service team observing each step carried out by Bu Gan and discovering that the mismatch was due to the product being smaller than the packaging plastic, resulting in improper sealing.



Figure 8. Evaluation of Machine Usage

After understanding the concepts explained by the service team and practicing the use of the machine independently once again, Bu Gan was able to operate it correctly. As a result, the vacuum process produced better outcomes than before, with neatly sealed products that were more attractive to consumers, as shown in Figure 9.



Figure 9. Trial Results of Independent Practice by the Partner

3.3 Food Product Packaging Equipment

The improvement of food product packaging quality can be achieved through the use of a vacuum sealer machine. The machine is equipped with the following specifications: Power supply: 220 $\pm$ 10V, 50 Hz; Power: 500 W; Sealing speed: 0–12 m/min (adjustable); Sealing width: 6–12 mm (adjustable); Temperature: 0–300 °C (adjustable); and Sealing length: unlimited. One of the advantages of this machine is its user-friendly operation, making it suitable for beginners. In addition, it is supported by a fixed working table and wheels, which enhance the flexibility and mobility of the machine like figure 10.



Figure 10. Vacuum Sealer Machine

The working principle of a vacuum sealer is to remove air from the packaging and seal it tightly so that the food product becomes more durable. Air removal is the main operation that aims to inhibit the growth of bacteria and mold, maintain the texture of the food, and preserve the original taste of frozen products. This process is highly important to be adjusted to the partner's needs in order to prevent a decline in product quality and to meet food safety standards.

The vacuum sealer machine is designed with a fixed table, ensuring that the machine can be used stably without easily shifting during operation. In addition, the machine is equipped with wheels, allowing the business owner to move it conveniently according to production needs. The table height has also been adjusted to the posture of the business owner, making the use of the machine more ergonomic, comfortable, and less fatiguing.

The advantages of this machine include its ability to: (a) Package frozen food tightly and hygienically, (b) Maintain the freshness, color, and taste of products to remain appealing to consumers, (c) Reduce the risk of packaging leakage that may lower quality, and (d) Provide neat, modern, and professional packaging that enhances product competitiveness in the market.

With the presence of this vacuum sealer machine, MSMEs are able to produce frozen food in larger capacities without worrying about rapid spoilage. Product distribution also becomes more flexible, both offline and online, as quality can be maintained even when the products are delivered over longer distances.

3.4 Evaluation Results of the Use of the Vacuum Sealer Machine with an Ergonomic Table

The evaluation results of the training activity on the use of the vacuum sealer equipped with an ergonomic table are presented in Figure 11. The evaluation was conducted through questionnaires distributed to training participants, consisting of business owners and MSME members. The evaluation utilized a Likert scale ranging from 1 to 5, where 1 indicated "strongly disagree" and 5 indicated "strongly agree." This scale was used to measure participants' perceptions of various aspects, including the quality of material delivery, the suitability of the tools for their production process, ergonomic comfort, and their ability to operate the vacuum sealer and ergonomic table. Based on the assessment results, the average scores ranged from 4.3 to 5.0, indicating a very high level of satisfaction and perceived usefulness among the participants. The consistently high mean values show that the training materials were well received, the tools were easy to operate, and the innovations provided—particularly the vacuum sealer and ergonomic setup were viewed as highly beneficial for improving product quality and production efficiency.

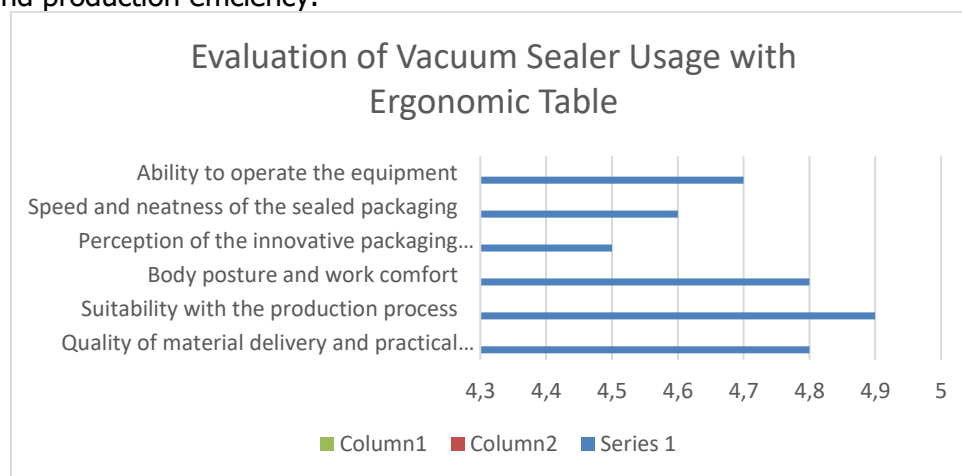


Figure 11. Evaluation Questionnaire Results

Based on the results, the community service activity achieved very positive feedback, with an average rating above 4.5 on a 5-point scale. The highest score was obtained in the compatibility of the tool with the MSME production process (4.9), indicating that the design and function of the vacuum sealer machine were considered highly relevant to the partners' daily production needs.

Additionally, the body posture and work convenience aspect (4.8) also received a high score, indicating that the ergonomic table design successfully provided comfort and reduced fatigue during the packaging process. The quality of material delivery and practical sessions also received a score of 4.8, reflecting the effectiveness of the training methods implemented by the community service team. The speed and neatness of packaging results and the ability to operate the machine independently both obtained scores of 4.7, showing that participants were able to master the machine operation effectively.

The lowest-rated aspect, with a score of 4.5, was the perception of the new packaging design, though it still falls within the very good category. This result indicates that partners may still need time to adapt to the more modern visual appearance of the new packaging compared to the previous one. Overall, the evaluation results demonstrate that the training activities and the innovation of the ergonomic vacuum sealer table successfully improved the partners' skills, work comfort, and the quality of packaged food products.

4. CONCLUSIONS

The design of the vacuum sealer machine for frozen food MSMEs has proven to improve product quality by maintaining freshness, preserving flavor, and extending shelf life. The machine's design, which is equipped with a fixed working table, wheels for mobility, and an adjustable height suited to the operator's posture, makes it more ergonomic, stable, and user-friendly. The resulting packaging is not only neat and hygienic but also professional in appearance, thereby attracting consumer attention and enhancing product competitiveness in the market. With the use of this vacuum sealer machine, MSMEs have greater opportunities to expand distribution both offline and online, while meeting larger market demands without compromising product quality.

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