

## INNOVATION IN PROCESSING SOY MILK PULP INTO BROWNIES IN MSMES IN RANDEGAN VILLAGE A CASE STUDY AND ITS IMPLICATIONS

Arief Wisaksono <sup>1</sup>, Dinda Tia Tinara <sup>2</sup>, Aldi Pradana <sup>3</sup>

Kafita Luluk Anjani <sup>4</sup>, Jurotul Islamiah Nur Rahmawati <sup>5</sup>, Mai Rizki

Fauziyah <sup>6</sup>, Aldo Adiansyah <sup>7</sup>

<sup>1,2,3,4,5,6,7</sup> Lecturer of the Faculty of Economics, Darul 'Ulum Islamic University

ariefwisaksono@umsida.ac.id<sup>1</sup>, tinaradinda@gmail.com<sup>2</sup>,

aldiii140474@gmail.com<sup>3</sup>, kafitala126@gmail.com<sup>3</sup>,

jurorahmawati8@gmail.com<sup>5</sup>, mairizkifauziyah2805@gmail.com<sup>6</sup>,

Aldoardiansyah5@gmail.com<sup>7</sup>

DOI: <https://doi.org/10.61796/jscs.v1i3.177>

Received: 29-08-2024

Accepted: 10-09-2024

Published: 13-09-2024

### Abstract:

**General Background:** Soybean dregs, a by-product of soybean juice processing, are typically regarded as waste, despite their nutritional potential. **Specific Background:** In Randegan Village, local UMKM (Micro, Small, and Medium Enterprises) have begun utilizing soybean dregs to create innovative products, such as brownies, offering a healthier alternative to conventional baked goods. **Knowledge Gap:** Despite the environmental and economic benefits, limited research has been conducted on the processing techniques, challenges, and broader impacts of using soybean dregs in food production within small-scale industries. **Aims:** This study aims to explore the innovation process of transforming soybean dregs into brownies, examining the production methods, nutritional benefits, challenges faced by UMKM, and the resulting economic and social impact on the local community. **Results:** The findings indicate that this innovation not only reduces waste but also increases the value of soybean dregs by converting them into high-nutrition brownies. The initiative has enhanced community empowerment, boosted local income, and decreased unemployment in Randegan. **Novelty:** This research highlights the transformation of an underutilized waste product into a marketable and health-conscious food product, filling a gap in the literature on sustainable waste utilization in food production. **Implications:** The study provides practical recommendations for further developing UMKM in rural areas and promotes the adoption of soybean dregs as a resource for local economic growth. Furthermore, it offers insights for policymakers on the benefits of integrating waste-to-product innovations into regional development strategies.

**Keywords:** *innovation, MSMES, soy milk dregs, brownies, Randegan Village, local economy*

## INTRODUCTION

The Community Service Program (KKN) at the University of Muhammadiyah Sidoarjo (UMSIDA) consists of two different types, namely the Enlightenment Community Service Lecture (KKN-P) and the Integrated Community Service Lecture (KKN-T). KKN-P is designed for morning class students with a shorter duration of service, around 1 month. The program focuses on specific projects that aim to provide solutions to specific problems in society. Students in KKN-P are usually involved in targeted activities, providing enlightenment, and encouraging positive change in the local community.

Meanwhile, KKN-T is intended for evening class students or employees and lasts for about 2 months. In 2024, KKN-T will collaborate with the Muhammadiyah Branch of Sidoarjo Regency, which expands the scope of service activities. This program started from July 12 to September 21, 2024, with 30 student groups distributed to various branches of Muhammadiyah Branch in Sidoarjo. Student involvement in KKN-T provides an opportunity to explore community problems, collaborate with local organizations, and have a greater impact through more intensive service activities.

From several groups that have been determined, group 22 whose members consist of 17 students and female students from various different study programs are mandated to serve in Randegan village, Sidoarjo Regency. KKN-T is a challenge for members and Field Supervisors (DPL). This is the first time that the service is carried out by each member, so it requires adjustments and strategies that are different from previous experiences to get better results. As done by group 22, where the theme that will be raised in this KKN-T program is to find and make management about the potential in Randegan Village, to be developed into Micro, Small and Medium Enterprises (MSMEs) that are able to attract consumer interest and improve the local economy. It is hoped that the existing potential can support the KKN-T group 22 program, so that it can become an icon as well as a superior product in the Randegan Village area, Sidoarjo Regency. Meanwhile, after a field survey was carried out, there were problems, one of which was the large amount of waste or leftover soybean milk residue in Randegan village. Soybeans are rich in protein, fat, vitamins, and minerals, and are beneficial for heart health, reduce the risk of disease, and support brain function. With a protein content of 35-43%, soybeans have more protein than other food ingredients. Soybean products are divided into non-fermented and fermented. Soy milk is a cholesterol-free option that is good for the heart, while fermented soy milk has antioxidant and anti-cancer properties [1], [2].

In Randegan village, especially for MSME actors, the problem that exists for MSMEs is about the large amount of leftover products from the production process or waste that is only thrown away and there is no processing process. Soybean pulp waste can be used to be processed into many kinds of products, one of which is by processing soy milk pulp products to be processed into brownies. Brownies are one of the ways to process soybean waste by mixing it

into brownie dough. The goal is to obtain economic value on the product. In the use of leftover soy milk pulp in Randegan Village, this ingredient can be processed into high-value brownies and developed as MSMEs for the local community. The main program of this KKN-T is to optimize the use of soy milk dregs.

Several community service services have processed soy milk dregs as part of their community service work, which is an innovative approach to the growth of MSMEs, including: carried out by Putri who uses soybean dregs into crackers Then there is the making of wet noodles from soybean dregs flour carried out by Hidayatullah [3] [4]. Some of the research was carried out as a result of the suboptimal use of soybean dregs by the community, even though soybean dregs have high nutritional value. Soybean pulp has a fairly high nutritional content, including crude fat (2.95%), crude protein (27.22%), ash (2.96%), crude fiber (13.81%), P (0.04%), and Ca (0.09%). Soybean pulp is composed of the following nutrients: crude protein 28.36%, crude fiber 7.6%, fat 5.52%, B vitamins, lysine, and methionine are also included in amino acids. [5]

The potential of soy milk dregs can be used as a form of innovation from processing soybean dregs into brownies as an increase for MSMEs in Randegan village, Sidoarjo Regency. The diversity of MSMEs increases people's income and absorbs the workforce, which helps reduce unemployment and support economic development. MSMEs play an important role in economic growth and labor absorption in Indonesia [6]. The processing of soy milk pulp has an impact on reducing waste produced in the production process and has a very high economic value.

Therefore, the community service activity program carried out seeks to increase the potential owned by Randegan village, Sidoarjo Regency. So the focus of this research is "Innovation in Processing Soybean Milk Pulp into Brownies in MSMEs in Randegan Village: A Case Study and Its Impact". It is hoped that by participating in this KKN-T, students can apply the knowledge they have learned, take real action in the field, and expand their horizons and networks between study programs.

## RESEARCH METHODS

This study adopts a qualitative approach with a case study design to understand the innovation process in processing soy milk pulp into brownies and has an impact on Micro, Small and Medium Enterprises (MSMEs) in Randegan Village, Sidoarjo Regency. The location of the study was chosen based on the large potential of soy milk dregs that has not been optimally utilized by the local community, carried out from May to July 2024. The subjects of the study include MSME members involved in the processing of soy milk dregs, local communities, and KKN-T students who participate in service activities. Subject selection is carried out by purposive sampling to ensure that the information obtained is relevant and in-depth.

The data was collected through several techniques, including in-depth interviews with MSME administrators, the community, and students, which aimed to gain insight into their perceptions and experiences regarding the innovation of brownie products from soy milk dregs. In addition, participatory observation is carried out to understand the brownie production process and the interaction between producers and consumers. Documentation studies also need to be carried out to collect secondary data on MSMEs, production data, and health information related to soybeans and their processed products.

Data analysis was carried out by conducting a demonstration trial that included interview transcription, to identify the main themes, and the preparation of emerging themes to understand the impact of soy milk pulp processing on MSMEs and the community. Information from interviews, observations, and documentation. In terms of ethics, this research will respect the privacy rights of participants by obtaining consent from them before conducting interviews and maintaining data confidentiality. Participants will also be informed about the objectives of the research as well as their right to withdraw at any time without consequences. The results of this study are expected to provide practical recommendations for the development of MSMEs in Randegan Village and encourage the community to utilize soy milk dregs as an innovative raw material. In addition, the results of this research will be a study material for related parties in formulating local economic development programs.

## RESULTS AND DISCUSSION

The results of this study revealed that the processing of soy milk dregs into brownies in Randegan Village has a significant impact on the development of Micro, Small and Medium Enterprises (MSMEs) and the improvement of the local economy. The brownie production process involves the steps of selecting raw materials, processing, marketing, and product development, all of which contribute to the success of MSMEs in the village.

The results of the study show that the innovation of processing soy milk dregs into brownies has had a significant impact on the development of MSMEs and the local economy in Randegan Village. This discovery is in line with previous studies that state that the utilization of agricultural waste and processed food products can increase the added value of products and strengthen the economic sustainability of the community [8].

### 1. Utilization of Soybean Milk Pulp

From the results of interviews with MSME members, it was revealed that they had difficulties in managing soy milk waste produced from the soy milk making process. Prior to this innovation, soy milk dregs were only thrown away and considered waste. However, after the training provided during the KKN-T program, the community began to understand the potential nutritional value of soy milk dregs, which are rich in protein and fiber. Processing the pulp into brownies not only helps reduce waste, but also increases the economic value of soy milk pulp.



Figure 1. Processing of soy milk pulp into brownies.

The use of soy milk dregs as an innovative product in MSMEs in Randegan Village provides an overview of significant changes in the way people manage waste that was previously considered useless. Based on the results of interviews with MSME members, it was revealed that before the intervention through the KKN-T program, soy milk waste in the village was generally only disposed of without any effort to utilize it. This condition not only causes environmental problems, but is also a waste of resources that actually have high nutritional value.



Figure 2. Smoothing of Soybean Milk Pulp Waste.

Soy milk dregs, which are rich in protein and fiber, have great potential as a raw material in the food industry. Previously, the village community did not realize that this pulp could be used as a processed product that has high economic value, such as brownies. After the training

and mentoring provided by the KKN-T team, the community began to realize that the processing of soy milk pulp can not only reduce waste, but also create products that have a high selling value. The use of this pulp is the right solution in dealing with waste while providing an additional source of income for the community.

Increasing the economic value of soy milk dregs through processing into brownies makes a significant contribution to the development of MSMEs in Randegan Village. Additionally, this step is in line with previous research that emphasized the health benefits of soy-based products, such as their ability to reduce the risk of heart disease and improve digestive health. It also supports research showing that soy-based products have significant health benefits, including reducing the risk of heart disease and improving digestive health. By utilizing soybean dregs, MSMEs in Randegan Village not only contribute to waste reduction, but also increase public awareness about the nutritional value contained in local foodstuffs [9], [10].



Figure 3. Brownies from Soy Milk Residue Waste.

Apart from the economic aspect, this innovation also has a positive impact on the environment by reducing the volume of organic waste discarded. This reduction in waste directly contributes to efforts to preserve the environment and manage natural resources more wisely. With this program, public awareness of the importance of using local raw materials that were previously not used, such as soy milk dregs, is increasing.



Table 1. Details of the total cost of production materials.

PRODUCTION MATERIALS				
It	Item Name	Price (Rp)	Use	Total Price
1	Sugar (grams)	14	100	IDR 1,400
2	Wheat Flour (grams)	120	40	IDR 4,800
3	Pulp Flour (grams)	200	20	IDR 4,000
4	Cocoa Powder (gram)	180	20	IDR 3,600
5	Chocolate bars (grams)	240	50	Rp 12.000
6	Cooking oil (liters)	200	80	Rp 16.000
7	Salt (grams)	100	10	Rp 1.000
8	Eggs (grains)	2.000	2	Rp 4.000
9	Vanili (gram)	50	110	Rp 5.500
10	Baking Powder (gram)	20	60	Rp 1.200
11	SP (gram)	20	30	Rp 600
GAS				
12	Gas LPG 3kg (jam)	1.167	1	Rp 1.167
PACKAGING				
13	Sticker	100	40	Rp 4.000
14	Plastic	50	40	Rp 2.000
WAGES				
15	employee	1	45.000	Rp 45.000
Total				Rp 106.267
THE PRICE OF 1 SLICE OF BREAD				Rp 2.657
ADVANTAGE				
PROFIT 30% OF HPP (1 PIECE)				IDR 797
SELLING PRICE				
HPP + 30% PROFIT				<b>IDR 3,454</b>

In a broader context, this innovation also has the potential to be adopted by MSMEs in other regions, considering the large amount of soy milk production in various regions in Indonesia. Thus, the positive impact of this innovation can be widespread, not only in Randegan Village, but also in other communities that have similar problems in the management of soy milk waste residue.

In conclusion, the use of soy milk dregs into brownies not only provides a solution to the waste problem, but also opens up new economic opportunities for the community. This approach shows how simple interventions through training and education can bring about major changes in waste management practices and improved community well-being.

## 2. Brownie Production Process

The brownie production process from soy milk dregs is carried out by mixing soybean dregs with other ingredients such as wheat flour, sugar, eggs, and development materials. The production process of

brownies from soy milk grounds provides important insights into the steps that have been taken to create a quality product that is acceptable to consumers. This process begins by mixing soybean pulp with other ingredients such as wheat flour, sugar, eggs, and development ingredients, which are the basic ingredients for making brownies in general. However, the addition of soybean pulp as the main ingredient provides its own added value both in terms of health and in terms of economy.

The observation results show that the production method applied is not only effective in producing quality products, but also able to maintain the taste desired by consumers. The process of mixing and processing soybean pulp with other ingredients is done carefully to ensure that the texture and flavor of the brownies remain in accordance with the expected standards. The use of soybean meal which is rich in protein and fiber not only increases the nutritional value of the product, but also gives the brownies a distinctive taste and texture.

The taste test carried out by involving local community members gave very positive results. As many as 85% of respondents stated that the brownies produced have a good taste and are suitable for sale in the market. This shows that this product has great potential to be widely accepted by consumers. The positive response from the community not only reflects the success in terms of taste, but also shows that innovations in the use of soybean pulp as the main ingredient have been well received.

The production process involving soybean residue is also supported by research that shows that innovations in the processing process can improve product quality and attractiveness. Previous studies have shown that with the right method, food products can be improved both in terms of taste and nutritional value. In this context, the use of soybean dregs is not only an effort to reduce waste, but also as an innovation in creating new products that have competitiveness in the market. [11], [12]

In addition, the importance of research and development in creating new products is also emphasized in this process. Through experiments and trials conducted during the production process, it was found that the resulting brownies not only have a competitive taste, but are also able to attract consumer interest. This shows that innovations based on in-depth research can produce products that are not only quality but can also compete in a competitive market.

In conclusion, the brownie production process from soy milk dregs has succeeded in creating a product that is well received by the community. This innovation shows how materials that were initially considered waste can be turned into high-value products that consumers are interested in. This success also underscores the importance of research



and development in creating new products that can compete in the market and provide economic benefits to society.

### 3. Economic and Social Impact

The innovation of processing soy milk pulp into brownie products in Randegan Village has a significant impact both from an economic and social perspective. From an economic perspective, the increase in income obtained from the sale of brownies has a direct impact on the welfare of the families of MSME members. Based on the results of the study, 70% of respondents who participated in this program experienced a significant increase in income, which allowed them to more easily meet their daily needs. This increase in income not only has a positive impact on the family economy, but also helps strengthen the purchasing power of the community as a whole. (who attends BRP, BRP capital, minimum money turnover)

Furthermore, this positive economic impact is not limited to increasing individual incomes, but also has an impact on the development of the local economy more broadly. With increased income, MSME members are able to allocate part of their profits to reinvest in business, buy raw materials, increase production, and expand markets. This creates a positive chain effect for the village economy, where the increase in local economic activity also supports sustainable economic growth. The social impact of this innovation is also very felt in the Randegan Village community. The processing of soy milk dregs into brownies has increased community involvement in local economic activities. This can be seen from the increase in the number of trainees held during the KKN-T program, as well as the public's interest in being more actively involved in MSMEs. This involvement not only provides an opportunity for the community to learn new skills and develop their own businesses, but also builds solidarity and cooperation among the villagers. Through this collaboration, stronger social bonds are formed, which in turn creates a positive atmosphere in community development. [13]

The success of this innovation also has an impact on broader social change in society. Increased income and community involvement in economic activities have helped reduce the unemployment rate in villages. With the availability of new business opportunities, many members of the community who previously did not have jobs can now be involved in the production and marketing of brownies, so that they can contribute to the family and community economy. This shows that innovation in the processing of local raw materials can not only improve economic welfare, but also play an important role in the social development of the community.

In addition, the success of this program has created a new awareness among the community about the importance of utilizing local resources effectively. By understanding the potential economic and

nutritional value of soy milk dregs, people become more creative and innovative in finding solutions to overcome waste problems and maximize the use of available resources. This awareness encourages wider participation in local economic development efforts, where people no longer see waste as something to be disposed of, but as a potential raw material that can be processed into high-value products.

Overall, the economic and social impact of the innovation in processing soy milk pulp into brownies is very positive. Increased family income and welfare, reduction in the unemployment rate, and increased social involvement and solidarity are some of the main benefits felt by the people of Randegan Village. This success shows that innovation in the processing of local resources can be a key driver for sustainable economic and social development, as well as provide tangible benefits to local communities. (Reduced)

The results of this study show that the innovation of processing soybean milk pulp into brownies in Randegan Village not only succeeded in reducing waste, but also had a wide positive impact on the economy and society of the community. This research is expected to be a reference for the development of other MSMEs and encourage the sustainability of innovation in the processing of local products. The innovation of processing soy milk pulp into brownies not only increases economic value but also has a positive social impact on the community. With the right steps, the potential for MSME development in Randegan Village can be further increased, thereby providing wider benefits for the community.

## CONCLUSIONS

**Fundamental Finding:** The innovation of processing soy milk dregs into brownies by MSMEs in Randegan Village has significantly increased the value of soy milk by-products, empowered the local community, and positively impacted the local economy. **Implication:** This transformation highlights the potential for waste-to-product innovations to reduce environmental waste while creating economic opportunities in rural areas. **Limitation:** The study, however, is limited to the specific context of Randegan Village and may not fully reflect the challenges faced by MSMEs in other regions with different socioeconomic conditions. **Further Research:** Future studies should explore scaling this innovation across diverse regions and examine long-term sustainability impacts, both economically and environmentally.

## REFERENCES

- [1] P. McCUE and K. SHETTY, "Health Benefits of Soy Isoflavonoids and Strategies for Enhancement: A Review," *Crit Rev Food Sci Nutr*, vol. 44, no. 5, pp. 361-367, Sep. 2004, doi: 10.1080/10408690490509591.
- [2] S. Vij, S. Hati, and D. Yadav, "Biofunctionality of Probiotic Soy Yoghurt," *Food Nutr Sci*, vol. 02, no. 05, pp. 502-509, 2011, doi: 10.4236/fns.2011.25073.
- [3] A. D. Putri, F. Zuhro, and I. M. Al Habib, "Nutritional Analysis of Soybean Pulp Waste as Noodle Substitution Flour to Support Learning Resources for

- Biochemistry Courses," *BIOEDUSAINS: Journal of Biology and Science Education*, vol. 1, no. 1, pp. 11-22, Jun. 2018, doi: 10.31539/bioedusains.v1i1.249.
- [4] A. Hidayatullah, R. Amukti, R. S. Avicena, O. H. Kawitantri, F. A. Nugroho, and F. N. Kurniasari, "Substitution of Soybean Pulp Flour in Wet Noodles as a Food Innovation for Diabetics," *Indonesian Journal of Human Nutrition*, vol. 4, no. 1, pp. 34-47, Jun. 2017, doi: 10.21776/ub.ijhn.2017.004.01.4.
- [5] O. A. Ijabadeniyi, K. Naidoo, A. B. Oyedeji, S. A. Oyeyinka, and O. M. OGUNDELE, "Nutritional, Functional, and Pasting Properties of Maize Meal-Sprouted Soybean Flour Enriched with Carrot Powder and Sensory Properties of the Porridge," *SSRN Electronic Journal*, 2022, doi: 10.2139/ssrn.4145609.
- [6] T. R. Izzalqurny, A. Ilmia, and A. Mufidah, "UTILIZATION AND PROCESSING OF THE POTENTIAL OF CITRUS FRUITS FOR THE DEVELOPMENT OF MSME PRODUCTS IN SCISSOR VILLAGE, SUKOREJO DISTRICT," *Disseminated: Journal of Community Service*, vol. 4, no. 1, pp. 74-84, Mar. 2022, doi: 10.33830/diseminasiabdimas.v4i1.1866.
- [7] Sugiyono., *Quantitative, Qualitative, and R&D Research Methodologies*. Bandung: Alfabeta., 2022.
- [8] M. J. P. L. Dos-Santos, "Value Addition of Agricultural Production to Meet the Sustainable Development Goals," 2020, pp. 1-8. doi: 10.1007/978-3-319-69626-3\_55-1.
- [9] M. W. Tamangwa, F. T. Djikeng, R. D. Feumba, V. Z. N. Sylvia, V. D. Loungaing, and H. M. Womeni, "Nutritional composition, phytochemical, and functional properties of six soybean varieties cultivated in Cameroon," *Legume Science*, vol. 5, no. 4, Dec. 2023, doi: 10.1002/leg3.210.
- [10] P. Qin, T. Wang, and Y. Luo, "A review on plant-based proteins from soybean: Health benefits and soy product development," *J Agric Food Res*, Vol. 7, P. 100265, Mar. 2022, Doi: 10.1016/j.jFR.2021.100265.
- [11] P. E. Augusto, "Challenges, trends and opportunities in food processing," *Curr Opin Food Sci*, vol. 35, pp. 72-78, Oct. 2020, doi: 10.1016/j.cofs.2020.03.005.
- [12] A. Andika, J. Jennifer, J. C. Huang, and J. C. Sebastian, "Analysis of Digital Marketing Adoption in Indonesian Micro, Small, and Medium Enterprises," *Journal of Business Management*, vol. 18, no. 3, pp. 308-328, Jul. 2021, doi: 10.38043/jmb.v18i3.3173.
- [13] S. Kumar, "The Role of Digital Marketing on Customer Engagement in the Hospitality Industry," 2024, pp. 177-191. doi: 10.4018/979-8-3693-0815-8.ch010.
- [14] A. Irawan, "Challenges and Opportunities for Small and Medium Enterprises in Eastern Indonesia in Facing the COVID-19 Pandemic and the New Normal Era," *TIJAB (The International Journal of Applied Business)*, vol. 4, no. 2, p. 79, Nov. 2020, doi: 10.20473/tijab. V4. I2.2020.79-89.
- [1].