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Utilization of Imperfect Produce of Honey Guava to Improving the Economy and Welfare of Farmers

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ABSTRACT
Huney guava (*Syzygium aqueum*) is a potential agricultural product of Secanggang District, Langkat Regency, which is generally sold in fresh fruits. The production of Guava in this area reaches 150 kg per farmer, with 25-30 kg of them remain unsold. This community service aims to disseminate knowledge and technology to farmers about processing honey guava fruit into chips with the trade name "KeJaM". This activity is expected to be a solution for farmers in processing unsold products into new products that can increase economic value, as well as reduce agricultural waste. In this activity, the community service activities team also provided honey herb processing equipment, namely a vacuum fryer and spinner, so that the honey guava chips produced still have the characteristic honey guava taste. KeJaM is a healthy snack which is expected to attract the interest of public in order to improve the economy and welfare of farmers.
Keyword: Food waste; imperfect produce; KeJaM; marketing

ABSTRAK
Jambu madu atau *Syzygium aqueum* merupakan potensi hasil pertanian di Kecamatan Secanggang Kabupaten Langkat, dan umumnya dijual dalam bentuk segar. Produksi jambu madu di daerah ini mencapai 150 kg per orang petani dan kehilangan pascapanen akibat tidak laku terjual mencapai 25-30 kg. Pengabdian pada masyarakat ini bertujuan untuk mendiseminasikan ilmu pengetahuan dan teknologi kepada petani tentang pengolahan buah jambu madu menjadi keripik dengan nama dagang "KeJaM". Kegiatan ini merupakan solusi bagi petani untuk memanfaatkan hasil panen yang tidak layak jual menjadi produk baru yang dapat dijual dengan nilai ekonomi yang baru, disamping untuk mengurangi limbah hasil pertanian. Pada kegiatan ini, tim kegiatan pengabdian pada masyarakat juga memberikan peralatan pengolahan buah jamu madu yaitu vacuum fryer dan spinner, sehingga keripik jambu madu yang dihasilkan masih memiliki ciri khas rasa jambu madu. KeJaM merupakan produk baru yang diminati masyarakat sebagai snack sehat yang berkontribusi baik terhadap peningkatan ekonomi dan kesejahteraan petani.
Keyword: *Food waste; imperfect produce*; KeJaM; pemasaran

1. Introduction

The complexity of the current agri-food system encourages lifestyle changes to become healthier and more sustainable by the Sustainable Development Goals (SDGs). Huney guava (Syzygium aqueum) is a potential agricultural product of Secanggang District, Langkat Regency, which is generally sold in fresh fruits. The production of Guava in this area reaches 150 kg per farmer, with 25-30 kg of them remain unsold. This community service aims to disseminate knowledge and technology to farmers about processing honey guava fruit into chips with the trade name "KeJaM". This activity is expected to be a solution for farmers in processing unsold products into new products that can increase economic value, as well as reduce agricultural waste. In

this activity, the community service activities team also provided honey herb processing equipment, namely a vacuum fryer and spinner, so that the honey guava chips produced still have the characteristic honey guava taste. KeJaM is a healthy snack which is expected to attract the interest of public in order to improve the economy and welfare of farmers. Thousands of tons horticultural products, such as fruits and vegetables remain unmanaged and wasted, causing an increase in food waste, as well as damages for the environment and farmers. Therefore, innovative strategies are needed to reduce food waste [1–5].

Identification of Food Loss and Waste (FLW) showed that the demand for food needs was merely high, while the food availability was limited due to mobility during COVID-19 pandemic, resulting an economic loss of 213-551 trillion per year. In the period of 2000-2019, FLW in Indonesia reached 23-48 million per ton each year or equivalent to 115-184 kg per capita per year Indonesia produces about 300 kg of food waste per person per year, possessing second position in the world after Saudi Arabia (427 kg per person each year). Furthermore, about 20-40% of food ingredients in Indonesia are wasted before they reach the consumers due to the damage in transit and failure to meet expected standards [6–8].

Karang Gading Village in the Secanggang sub-district, Langkat Regency, has the majority of the population as farmers. In addition to rice farming and oil palm gardening, there are also community groups who grow crops honey guava farmers either individually or managed through farmer groups [9]. Honey guava is classified as guava which is beneficial for health due to its contents, such as vitamins C and A, fiber, calcium, thiamine, niacin, potassium, myricetin, hexahydroxyflavone, phenolic, flavonoid, and iron. All of these ingredients have various functions ranging from antimicrobial, antioxidant, and antihyperglycemic to anti-cancer. Consuming honey guava regularly has the potential to reduce cholesterol, cleanse toxins in the body, boost the immune system, control blood sugar, fight free radicals, nourish the skin, improve digestion, prevent muscle cramps and cancer, maintain heart health, treat bladder infections, and celiac, reduce the risk of stroke, prevent and treat infections and maintain eye health [10].

Figure 1. Imperfect Produce of honey guava in agreement raising

According to the farmers in the area, the production of honey guava was approximately 150 kg. However, due to the sorting process, the net worth of honey guava production only reached 25-30 kg. The PPM team aims to lead partners to utilize and process imperfect products into new products, namely KeJaM as fruit chips that can be resold and new business opportunities for farmers. Fruits with high water content, namely honey guava, is usually easily damaged and has a short shelf life. One of ways to promote its sale value is by processing them into chips which can be a solution for farmers to provide better economic, social, and environmental benefits. Utilization of imperfect produce in addition to improving the economy is also able to reduce the amount of food waste so as to create a better ecological environment [11–16].

2. Methods

The method used in this service activity was carried out in several stages. The first stage was to educate and brainstorm the process of processing honey guava into chips called KeJaM including the method of marketing. At this stage, the farmers were given into utilizing imperfect product into new business opportunities to improve the economy and welfare. The second stage was carried out by facilitating the honey guava processing equipment for the community i.e vacuum fryer. This activity was accompanied by demonstrations and training on the use of vacuum fryer equipment and empowering farmers to become operators of the equipment. At this stage, farmers were also given education about the method of packaging products with the KeJaM label as well

as calculating production results and determining the selling price (unit cost) of KeJaM products. The third stage included marketing activities for KeJaM products as well as testing the taste, colour, smell, and crunch before being marketed. In this activity, farmers also conducted a free launch as an initial promotion and socialization of KeJaM's new product.

The last stage was monitoring and evaluating activities. This activity included repeating the lessons about the processing of honey guava into the KeJaM products, sharing the constraints and obstacles faced in business management and marketing, learning about profits from sales, and sharing the potency for future projects to achieve sustainable production activities.

3. Results and Discussions

Due to its imperfect condition, honey guava frequently remains wasted, causing an increase to agricultural waste (food waste). The farmers around Karang Gading village, Secanggang came with various alternative ways to avoid waste of unsold honey guava products, namely give them for free to the surrounding community, sell the fruits at a very cheap price, as well as consume the fruits by themselves. However, it is unavoidable that some of honey guava fruits are thrown away, resulting in loss for the farmers and environment. Furthermore, because of the limited knowledge and skills on technology development, farmers in this area did not meet with the solutions on how to process the unsold of honey guava into the new products which have high sale value.

One of ways to reduce honey guava waste is by turning them into fruit chips which was called KeJaM through this activity. By producing KeJaM, the unsold honey guavas are expected to have more economic value. reduce environmental problems globally, and improve public health.

3.1. Education on the use of imperfect honey guava to be KeJaM

The educational activity on processing imperfect honey guava into new products with high economic value in Karang Gading Village, specifically for the Tanggung women farmer group has successfully conducted. The cooperation and enthusiasm from farmers, village officials and the Secanggang District Agriculture Office showed a promising solution of the program to improve the community's economy through the processing of KeJaM. During the Covid-19 pandemic, the wider community preferred to consume fruits and vegetables, which are rich in vitamins and antioxidants to maintain body balance and increase body immunity. The many benefits of honey guava are potentials that can be managed more intensively and able to improve the economy, health, and welfare of the community. However, the unavailability of facilities and limited information and knowledge of farmers in fruit processing showed farmers in the area partners still needed assistance in managing honey guava as a source of income for farmers.

Figure 2. KeJaM Education.

The results of education and brainstorming on the process of processing honey guava into chips (KeJaM) including the marketing method for KeJaM products showed a good response. During this activity, farmers were given pocketbooks, showing the instruction on how to make KeJaM. Moreover, they were also educated on how to process food that meets HACCP standards, as well as the marketing strategy which can be used for KeJaM products, starting from calculating production and selling prices. KeJaM processing was carried out by utilizing imperfect honey guava from each farmer's harvest as raw material to reduce agricultural waste.

Figure 3. Handover of KeJaM Pocket Book.

3.2. Vacuum fryer demonstration as a technology to produce KeJaM

One of the partner groups of honey guava farmers in Karang Gading Village, Secanggang District, Langkat Regency, the community is empowered by investing in appropriate technology, namely a vacuum fryer to assist in processing imperfect honey guava into a product that has a selling value namely KeJaM. Vacuum fryer can turn raw materials such as guava fruit into fruit chips that are ready to eat and served in attractive packaging.The processing of imperfect honey guava is done by facilitating partner farmers with equipment in the form of vacuum fryer. It will be easier for partners to produce honey guava into dry products, namely KeJaM (Keripik Jambu Madu). The vacuum fryer machine as a technology invested in PPM partners is a vacuum fryer machine with a capacity of 1-2 kg. This machine has a function in processing ready-to-eat food into chips. This machine has been tested to give reinforcement to vacuum- fried foodstuffs according to their original taste.

The demonstration of the vacuum fryer machine is an activity that the community of Karang Gading Village have been waiting for. The demonstration was carried out by a team of operators or technicians from CV. Teknologi Tepat Guna. The demonstration activity was carried out at the Karang Gading Village Hall and was attended by all members of the partner group. The Food Technology Coordinator and PPL partner groups were also present at this event. The partner group also showed an enthusiastic contribution when the head of the partner group directly appointed 3 operators to understand the pattern of using the vacuum fryer machine so that it is hoped that after the demonstration, the partner group can continue the designation of the vacuum fryer machine and produce KeJaM continuously.

Figure 4. Demonstration of vacuum fryer to produce KeJaM.

The KeJaM processing is inseparable from the dangers that can affect the quality of a product, starting from the process of providing raw materials to becoming a product. The finished product must also be packaged properly so that it can be disseminated to the public as partner consumers through good marketing methods.The evaluation results from the demonstrations that have been carried out show that partners have been able to produce KeJaM independently, this is shown by the number of productions that have been carried out by partners which in a day can produce 12 packs of 100 grams of KeJaM chips. Farmer partners also feel that there are many benefits provided and can increase farmers' income regularly.

Figure 5. Handover of Vacuum Fryer and the resources of KeJaM.

3.3. Marketing KeJaM as an innovative product based on local potential

KeJaM that has been processed will be packaged as well as possible and still maintain the quality of the fruit chips in terms of health, safety and taste quality, so that the KeJaM packaging can be enjoyed within a certain time. KeJaM that has been packaged will be marketed directly through relatives, neighbours and fellow farmers in Secanggang District. That is the way that has done by the farmer that have a time to meeting and talk about agriculturing development. Marketing will also be carried out online using e-commerce such as Facebook, Shopee, Instagram and Tokopedia. The marketing stages that will be carried out are understanding the target market and knowing customers well and making realistic marketing targets. The next stage is to observe competitor's strategies and make a business budget systematically. In offline sales, try to choose a strategic store location. Then, establish the best possible relationship with customers and optimize marketing using self-managed social media. Marketing using social media can expand the target market without space and time limitations, which means it can be reached by all groups. The manufacture of packaging labels has also been designed during education as part of the packaging of KeJaM products that will be produced. The packaging chosen for KeJaM products is aluminium foil packaging, to maintain the crispness of the honey guava chip product (KeJaM). The first stage in selling KeJaM products gives very good results where every production is carried out then all the products are sold [17].

The determination of the selling price (unit cost) of KeJaM products has been simulated together through KeJaM education but will be carried out in more detail when the community demonstrates the tool directly. The way to set the selling price is to add up the capital with the capital multiplied by the profit margin. In making honey guava chips, the capital includes coconut oil, gas, electricity, packaging, labels, vacuum fryers, spinners, and equipment such as knives and buckets. In this case, the partner group continues to be fostered and assisted to determine the unit cost value starting from the use of raw materials, oil, tools/machinery, electricity and water as well as other needs until it is obtained the results of calculations carried out with the partner group, the selling value of KeJaM products is Rp. 20.000.- per package with a net of approximately 100 grams KeJaM.

The selling price of KeJaM can meet consumer needs for honey guava fruit in different forms. Farmers also feel quite promising benefits in increasing and improving the economy. KeJaM as a new product can attract people's interest and based on consumer testimonials, they state their curiosity about KeJaM. This is because there has never been a honey guava fruit that has been used as chips in the market and KeJaM is an innovation that is lifted from the results of this community service. KeJaM, which is popular with the public as a healthy snack, has made it difficult for farmer partners to produce KeJaM. Based on the evaluation results, farmer partners lack raw materials for production because each KeJaM production is immediately sold out. This shows that the farmers' economy has increased by 100% and the imperfect produce waste has been reduced in a sustainably.

Figure 6. Marketing of KeJaM Products.

4. Conclusions

Utilization of imperfect honey guavas as fruit chips can increase the selling value as well as help the farmers' economy. The success of the KeJaM product business from this activity is an indicator of the success of improving the economy of the farmers of honey guava around the area. Marketing strategies can be developed by enlarging the market size and controlling the sustainable cash flow. It is recommended that honey guava farmers in Karang Gading Village can participate in calculating the number of imperfect produce at each harvest to be processed by partners into KeJaM products so that there is no more agricultural waste, in addition to increase the farmers' incomes.

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References

[1] Kementrian Perencanaan Pembangunan Nasional/ Badan Perencanaan Pembangunan Nasional. Technical Guidelines for Developing Sustainable Development Goals (SDGs) Action Plans (2nd Eds). [Online]. 2020. 21–25 p. Available from: https://sdgs.bappenas.go.id/website/wp-content/uploads/2020/10/Buku-Pedoman-Rencana-Aksi-SDGs.pdf.

[2] R. E. Roberts, K. Gray, J.J. Bryant. "Breedlove dehydrated foods feeding hungry people worldwide in partnership with fruit and vegetable growers," *HortScience*, vol. 32, no. 4, pp. 605D – 605. 2019.

[3] J. J. Yuan, S. Yi, H. A. Williams, O. H. Park. "US consumers' perceptions of imperfect "ugly" produce," *Br Food J*, vol. 121, no. 11, pp. 2666–82. 2019;

[4] E. A. de los Mozos, F. Badurdeen, P. E. Dossoe. The Consumption Current State Directions for Future by and Reducing Food Waste: A Review of Sustainable Consumption by Reducing Food Waste : Review of the Current State and Directions for Future Research Consumpt. In: Procedia Manufacturing. Elsevier B.V., p. 1791–8. 2020.

[5] F. Vizzoto, F. Testa, F. Iraldo. "Strategies to reduce food waste in the foodservices sector: A systematic review," *Int J Hosp Manag*, vol. 95, pp. 1–10. 2021.

[6] A. Lidwina. Indonesia Produces the Second Most Food Waste in the World. Economist Intelligence Unit (EIU). 2020. [Online]. Availabe from: https://databoks.katadata.co.id/datapublish/2020/10/23/indonesia-hasilkan-limbah- makanan-kedua-terbanyak-di-dunia (In Bahasa) [Accessed: Feb 10, 2022].

[7] M. Elena. Food Waste in Indonesia Causes Economic Losses of IDR 551 Trillion per Year. Bisnis.com. 2021. [Online]. Available from: https://ekonomi.bisnis.com/read/20210610/9/1403752/limbah-makanan-di-indonesia- sebabkan-kerugian-ekonomi-rp551-triliun-per-tahun (In Bahasa) [Accessed: Feb 10, 2022].

[8] V. Ikwan, M. Sylvia. Leap Community Engagement "Utilization of Imperfect Fruits into Cold Pressed Juice as Empowerment "Kampung Kue Rungkut", *Surabaya. J DKV Adiwarna, Univ Kristen Petra*, vol. 1, no. 18, pp. 1–6. 2021.

[9] Langkat Regency Government. Profile of Karang Gading Village Secanggang District Langkat Regency. 2022. (In Bahasa)

[10] Nida S. 15 The benefits of guava water for health, boost the immune system. briliofood. 2020. [Online] Available from: https://www.briliofood.net/foodpedia/15-manfaat-jambu-air-untuk-kesehatan-meningkatkan-sistem-imun- 2009236.html. [Accessed: Feb 10, 2022].
[11] E. Kamsiati. "Opportunities for development of fruit chips processing technology using vacuum fryers," *J Penelit dan Pengemb Pertan*, vol. 29, no. 2, pp. 73–77. 2010.
[12] R. Firyanto, E. Fatarina, N.D. Agagis. "Making guava fruit chips using vacuum frying equipment with temperature and time variables," *In: Proceedings Seminar Nasional Teknik Kimia "Kejuangan*." p. 1–7. 2018.
[13] D. D. Novita, L. Marlina, S. Asmara. "Fruit Chips Business Development for Women Farmer Groups in Rajabasa Jaya Village, Bandar Lampung City. Sakai Sambayan," *J Pengabdi Kpd Masy*, vol. 2, no. 3, pp. 125–30. 2018.
[14] M. Basri, M. Insani, R. Hermawan, W. Saputri, M. Karuniawati, R. Rahayu, N. A. Dewi, W. As'ari RA, Pradani, A. P. Ramadhani. "Fruit chips business development for women farmer groups in Rajabasa jaya village, Bandar Lampung city," *BUGUH J Pengabdi Kpd Masy*, vol. 1, no. 1, pp. 10–6. 2021.
[15] T. P. Sekararum. "Making watermelon skin chips using vacuum frying method," *CHEMTAG J Chem Eng*, vol. 2, no. 1, pp. 7–13. 2021.
[16] M. Mardin, A. Arif, F. Ahmad. "Processing of dragon fruit by bulo group (lorong business entity) "Teratai Putih," *CARADDE J Pengabdi Kpd Masy*, vol. 2, no. 1, pp. 105–12. 2019.
[17] P. Trulline. "MSME Product Marketing through Social Media and E-Commerce," *Jurnal Manajemen Komunikasi*, vol. 5, no. 2, pp. 266. 2021.