JOURNAL OF COMMUNITY SERVICE IN SCIENCE AND ENGINEERING

P-ISSN: 2962-1003 E-ISSN: 2962-0767

Homepage jurnal: http://jurnal.untirta.ac.id/index.php/JoCSE/

Counseling on the handling of tofu and tempe industrial waste in Bangkinang Kota District, Kampar Regency

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ARTICLE INFO

Article history:
Submitted 8 March 2023
Reviewed 15 March 2023
Received 20 March 2023
Accepted 30 March 2023
Available online on 1 April 2023

Keywords:
Tofu and tempe industry, waste, organic liquid fertilizer.

Kata kunci:
Industri tahu dan tempe, limbah, pupuk cair organik.

ABSTRACT

The development of the tofu and tempe industrial business in Bangkinang Kota District, Kampar Regency, is mainly carried out on a small and medium scale business, so in production and management, it experiences several limitations such as limited production equipment, production processes carried out traditionally, and limited knowledge in terms of management and treatment of waste. This community service activity aims to carry out activities to assist soybean grinding machine equipment and diesel motors in the Tofu-Tempe Industry Mrs. Helma and Mr. Ayusman to assist partners in the production process so that production activities can be carried out more effectively and economically with maximum results. In addition, this activity aims to provide information and training to the two partners on the handling and processing the resulting waste, which can be processed into organic liquid fertilizer. The results of this dedication show that the two tofu-tempe industry partners feel very useful with the activities that have been carried out because of the assistance of production equipment in the form of soybean milling machines and diesel motors as well as training on handling and processing the resulting waste into organic liquid fertilizer. It is hoped that this activity will create a positive synergy between tofu and tempe businesses and agricultural businesses around the tofu and tempe industry.

ABSTRAK

Perkembangan usaha industri tahu dan tempe di Kecamatan Bangkinang Kota, Kabupaten Kampar banyak dilakukan dalam skala usaha kecil dan menengah sehingga dalam produksi dan pengelolaannya mengalami beberapa keterbatasan seperti keterbatasan peralatan produksi, proses produksi dikerjakan secara tradisional, serta keterbatasan pengetahuan dalam hal pengelolaan dan pengolahan terhadap limbah yang dihasilkan. Kegiatan pengabdian kepada masyarakat (PkM) ini bertujuan untuk melakukan kegiatan bantuan peralatan mesin giling kedelai dan motor diesel di Industri Tahu-Tempe Bu Helma dan Pak Ayusman untuk membantu mitra dalam proses produksi sehingga kegiatan produksi bisa dilaksanakan lebih efektif dan ekonomis dengan hasil yang maksimal. Selain itu, kegiatan ini bertujuan untuk memberikan informasi dan pelatihan kepada kedua mitra tentang penanganan dan pengolahan limbah yang dihasilkan yang dapat diproses menjadi pupuk cair organik. Hasil pengabdian ini menunjukkan kedua mitra industri tahu-tempe merasa sangat bermanfaat dengan kegiatan yang telah dilaksanakan karena adanya bantuan peralatan produksi berupa mesin giling kedelai dan motor diesel serta adanya pelatihan tentang penanganan dan pengolahan limbah yang dihasilkan menjadi pupuk cair organik. Kegiatan ini diharapkan munculnya suatu sinergi positif antara usaha tahu-tempe dengan usaha pertanian di sekitar industri tahu dan tempe.

Available online at http://dx.doi.org/10.36055/jocse.v2i1.19402.

1. Introduction

Soybean is one of the most popular sources of protein used as food by the community to meet daily nutritional needs. Therefore, efforts are needed to improve and develop the soybean processing industry so that the community can enjoy the products produced as daily food. The tofu and tempe industry is one of the centers of the soybean processing industry, widely used in small and medium-scale businesses or home industries. According to [1], tofu and

tempe industries are very close to a residential community. The tofu and tempe industries are essential because both staple food products made from soybeans, which Indonesians often consume.

Mrs. Helma's tofu and tempe industry is small and medium-scale. Production capacity ranges from 200-250 kg/day each day with the assistance of 3 employees. This business has been implemented since 2000. The community service team has conducted surveys and communicated with partner locations for discussions to ask about the state of the industrial business. Mrs. Helma, the owner of the tofu and tempe industry, provided information on the state of the business she manages. At the beginning of the business, no residential areas were around the tofu and tempe industries. After six years of running the business, the environment around the industry has started a lot of residential areas and offices. Mrs. Helma hopes that her business will not have a negative impact on the surrounding environment.

The PkM team asked about the conditions of the production process from start to finish regarding product marketing and other matters. The business of tofu and tempe is well known to the public. In the process of tofu and tempe production, Mrs. Helma complained about the difficulty in adding a soybean grinding machine which could also function as a soybean epidermis peeler. In the final process of processing tofu and tempe, it produces solid waste and liquid waste. The solid waste produced has begun to be used by breeders as an additive to animal feed. The condition of the tofu liquid waste produced in Mrs. Helma's tofu business can be seen in Figure 1.

Figure 1. Liquid waste is discharged directly into the environment.

Another partner is the tofu and tempe industry, owned by Mr. Ayusman. The business was started in 1997. The business location has moved three times, and the current location is expected to be the last place for business or a permanent place. Tofu and tempe production capacity range from 150-200 kg of soybeans/day by employing two employees. The business was carried out with sufficient capital and could survive until now. Due to limited business capital, since April 2016, Mr. Ayusman has only implemented a production system using cement vessels with a steam system. Mr. Ayusman, as one of the PkM partners, experienced difficulties providing soybean milling machines with diesel motors. Using a soybean mill machine with a diesel motor will help partners in the operational process so that the production process can run faster with the more economical engine fuel. The industrial process of tofu and tempe produces solid waste and liquid waste. Solid waste can already be used as animal feed and is a source of animal feed fiber [2].

The liquid waste from the tofu and tempe industry that is produced every day is quite large, which is around 800 L. The amount of waste will increase as the production of tofu and tempe increases because the demand for tofu and tempe will increase as the population increases. The condition will undoubtedly be a problem for the tofu and tempe industry entrepreneurs because the entrepreneurs do not want the business being carried out to have a negative impact on the environment. However, entrepreneurs need to learn to manage and process the liquid waste produced. Seeing these conditions, the team provided information about tofu and tempe liquid waste which can be used as essential ingredients for organic liquid fertilizer. Mr. Ayusman was very interested and enthusiastic about the offer from the team. The environment around the tofu and tempe factories, with a radius of several kilometers, contains many agricultural areas managed by the community on a small and medium scale. The location supports the plan to use tofu and tempe liquid waste as organic fertilizer.

The location of the tofu and tempe industry is quite far from residential areas. The reason for choosing this place is so that residents feel free of the impact of the waste generated by the industry. The impact is like the stench from tofu industrial waste from the degradation of protein residues that have turned into ammonia. Although the location of the tofu and tempe industry is far from residential areas, over time and with population development, it will bring them closer to residential areas. Besides that, the stench from industrial tofu and tempe waste can spread up to a radius of several kilometers, and wastewater that seeps into the ground can contaminate water sources [3].

The problems with Mrs. Helma's tofu and tempe business are the same as those that occurred in Mr. Ayusman's tofu business, namely regarding the handling of liquid tofu waste that is produced, which is still disposed of directly into the environment and the need for assistance in procuring a soybean grinding machine. Mr. Ayusman and Mrs. Helma, as entrepreneurs for the two partners, strongly support the plan for this community service activity so that there will be tofu liquid waste processing activities that are produced every day from the business unit they own to be processed into organic liquid fertilizer. The sizeable agricultural land around the tofu and tempe business also supports the plan. With good synergy between the two types of businesses, it is expected to create a healthy environment while increasing income turnover.

Making tofu at each stage uses quite a lot of water, producing quite a lot of liquid waste, which is as much as 1.5-2 m^3/day. The organic compounds in tofu liquid waste are fat (10%), carbohydrates (25-50%), and protein (40-60%). The content of organic compounds that are quite a lot causes this waste to have the potential to provide nutrients for plants that can be used as organic liquid fertilizer products [4]. Using tofu and tempe industrial waste as organic fertilizer is hoped to become an alternative fertilizer to increase soil fertility and crop production [5-10].

This community service activity aims to carry out activities to implement soybean grinding machine equipment and diesel motors for the tofu-tempe industry, Mrs. Helma and Mr. Ayusman. This service is carried out to assist partners in the production process so that production activities can be carried out more effectively with maximum results. In addition, this activity aims to provide information and training to the two partners regarding handling and processing tofu-tempe industrial waste produced into organic liquid fertilizer.

2. Method

The stages carried out in community service activities to solve problems faced by tofu and tempe industrial partners Mr. Ayusman and Mrs. Helma go through seven stages. The first stage was to survey the location of the tofu and tempe industry, Mr. Ayusman and Mrs. Helma, in Kec. Bangkinang Kota, Kab. Kampar. The survey aims to discover the various problems the two business groups face. From the survey results, information was obtained that the partners still needed to gain knowledge and skills in handling the liquid waste produced. The tofu-tempe industry, Mrs. Helma, complained about the

difficulty in purchasing a soybean epidermis peeling machine, while the tofu-tempe industry, Pak Ayusman, is experiencing difficulties in providing a soybean grinding machine with a diesel motor.

The second stage is planning a soybean peeling and grinding machine implemented by partners. This machine planning is carried out based on surveys and communications in the field with the target business group of the service team. The third stage is applying and transferring technology to make organic liquid fertilizer from tofu and tempe liquid waste. The process of making liquid organic fertilizer can be done by mixing 70 liters of tofu and tempe liquid waste with 2 liters of decomposer, nutrients for decomposers such as a mixture of 30 liters of coconut water, 1 liter of 70% alcohol, 4 kg of Curcuma, and 1 kg of lemongrass. After that, the mixture can stand for 4-10 days for fermentation. After fermentation, liquid organic fertilizer has been completed and is ready to be used.

The fourth stage is making soybean grinding machines for the two partners. The fifth stage is discussing with partners so that this service activity can be carried out correctly. The sixth stage is counseling and training. The team plans counseling and training methods through discussion and practice activities to be carried out at partner locations. Both of these methods are used to increase partners' understanding and skills of the material the team will deliver. This activity also involved other tofu and tempe industry entrepreneurs and entrepreneurs in the agricultural sector, especially those around the tofu and tempe industry. With activities on handling and producing organic liquid fertilizer from tofu-tempe liquid waste, it is hoped that there will be a positive synergy between tofu and tempe businesses and agricultural businesses. The final stage is evaluating the implementation of community service activities in the tofu and tempe industry. The components to be evaluated in implementing this activity are production and management.

3. Results and Discussion

3.1. Product and service

Community service activities that have been carried out include the application of soybean milling machine technology and diesel motors at PkM partners, namely the Tofu and Tempe Industries owned by Pak Ayusman and Mrs. Helma, located in Bangkinang Kota District, Kampar Regency.

Figure 3. Soybean grinding machines given to partners.

Applying soybean grinding machine technology to partners is carried out according to partners' needs. Mr. Ayusman and Mrs. Helma, as partners in this service activity, are very grateful for the procurement of this equipment. They hope that procuring this equipment will further increase the productivity of their business in the tofu and tempe industry.

3.2. Increasing understanding and skills and increasing the health of partners and the community around partners

The team has carried out counseling and training methods on using tofu and tempe industrial waste as essential ingredients for organic fertilizer. The activity was carried out as discussion and practice activities at the location of the two partners, respectively. With activities regarding handling and producing organic liquid fertilizer from tofu and tempe liquid waste, a positive synergy has occurred between the tofu and tempe and agricultural businesses. Before conducting training and discussion activities at the two partner locations, the team conducted preliminary experiments at the Palm Oil Processing Engineering Study Program Laboratory, Politeknik Kampar, as a simulation activity for the production process of organic liquid fertilizer using waste from the tofu and tempe industries.

Figure 4. Organic liquid fertilizer from tofu and tempe industrial waste resulting from simulation activities at the Laboratory, Politeknik Kampar.

This training activity also received support from residents from various professions, such as oil palm farmers and cattle breeders. In the training and discussion activities that have been carried out, partners and residents around the partners are given knowledge about the potential of tofu and tempe industrial waste as organic liquid fertilizer with added cow urine. The organic liquid fertilizer products produced can be used by farmers who live around the tofu and tempe industrial SMEs.

3.3. Monitoring and evaluation of community service activities

Monitoring and evaluation activities determine community service activities' success rate. The success of the socialization and training that has been provided is evaluated by distributing questionnaires to partners regarding the partners' responses or attitudes regarding the application of the milling

machine carried out by the team as well as the technology for making organic fertilizer based on tofu and tempe industrial waste that has been provided. One of the criteria in the evaluation activity was partner satisfaction with the application of the soybean grinding machine equipment that the team had held.

4. Conclusion

This community service activity has been carried out in the tofu and tempe industry in Bangkinang Kota District, Kampar Regency. Partners benefit from applying soybean milling machine technology and diesel motors because they can carry out the production process effectively and economically and produce maximum productivity. In addition, partners and residents responded positively to outreach and training activities on processing tofu and tempe industrial waste into organic liquid fertilizer.

Acknowledgement

We thank the Ministry of Education and Culture and the Research and Community Service Directorate for financing this community service activity. We also thank the Center for Research and Community Service (P3M), Politeknik Kampar, for supporting the implementation of this community service activity.

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