Prosiding Seminar Nasional Ke 7 LPPM UPN "Veteran" Yogyakarta
"Pemberdayaan Masyarakat Pada Masa Pandemi sebagai Implementasi Bela Negara"
Yogyakarta, 27 Oktober 2021
ISBN: 978-623-389-064-9

INFORMATION SYSTEM MANAGEMENT AND WASTE TREATMENT ON TOFU AS BUSINESS CONTINUITY EFFORTS AFFECTED BY COVID-19

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Abstract
This study aims to provide a solution to the pollution of liquid waste produced by the Mbah Sipon Tofu industry. This solution is also one of the development components of the Management Control System, namely post-production technology. This research was carried out using interviews and field observations. The results showed that (1) there was poor literacy related to the environment in the Mbah Sipon Tofu industry, (2) improved appropriate technology to convert liquid waste into plant fertilizer, (3) provided additional income by selling fertilizer derived from tofu waste. Improvements to the management control system and additional income are an effort to maintain business in the midst of the Covid-19 pandemic.
Keywords: *management control system, waste, tofu*

Abstrak
Tujuan penelitian ini adalah memberikan solusi dari pencemaran limbah cair yang dihasilkan oleh industry Tahu Mbah Sipon. Solusi ini juga merupakan salah satu pengembangan komponen Management Control System yakni technology pasca produksi. Penelitian ini dilaksanakan dengan metode wawancara dan observasi lapangan. Hasil penelitian menunjukkan bahwa (1) terdapat literasi yang buruk terkait dampak pencemaran lingkungan di industry Tahu Mbah Sipon, (2) peningkatan teknologi tepat guna untuk mengubah limbah cair menjadi pupuk tanaman, (3) memberikan income tambahan dengan adanya penjualan pupuk yang berasal dari limbah tahu. Perbaikan management control system dan tambahan income adalah sebagai upaya mempertahankan usaha di tengah pandemic Covid-19
Kata kunci: sistem pengendalian manajemen, limbah, tahu

INTRODUCTION

The Central Bureau of Statistics of Klaten Regency noted 6 groups of tofu industries with 98 business units and a total workforce of 397 people. This shows that many tofu manufacturing sectors in Klaten still do not yet have good product manufacturing standards. Know Mbah Sipon is one of them. Considering that in the 2020 period, the tofu production business is only for survival, then in the 2021 period, it is planned to be oriented to profit again. Based on this, by implementing a management information system, Tahu Mbah Sipon can maximize its products.

Mbah Sipon's tofu is one of the SMEs that does not yet have a good operational system starting from managing the selection of raw materials, production, and sales so that the quality of the results cannot be stable. Information is any form of communication that can increase understanding and knowledge useful for the recipient of the information. Information is like the blood that flows in the body of an organization. The source of information is data which is a fact that describes real events in a data unit that can be studied and analyzed together for personal and organizational interests. Data is a raw form that cannot tell much, so it needs to be processed further, and the data is processed in a model that produces the required information system.

The development of tofu production is an operational activity starting from the selection process of soybean raw materials, the production process, to sales. One of the problems in the tofu production process is tofu wastewater. That is the residual water of tofu clumping produced during the process of making tofu. The liquid waste contains suspended or dissolved solids which will undergo physical, chemical and biological changes that will produce toxic substances or create a medium for the growth of micro-organisms which can be in the form of disease-causing pathogens or pathogenic materials that damage the quality of tofu or poison the human body that consumes it. (Handayani, 2018).

The tofu liquid waste is also the residue from the washing, soaking, clumping, and printing processes during tofu making (Marian and Tuhuteru, 2019). In the agglutination or precipitation process, not all substances contained in tofu raw materials settle. However, there are still protein residues and other substances

ISBN: 978-623-389-064-9

that do not clot and dissolve in water, which will later contain in tofu liquid waste. Tofu liquid waste contains more organic matter than inorganic material. The protein content of tofu liquid waste reaches 40%-60%, carbohydrates 25%-50%, and fat 10% (Sugiharto, 1987). Organic matter affects the high phosphorus, nitrogen, and sulfur in tofu water (Hikmah, 2016). The content of BOD (Biological Oxygen Demand) is 5000-10,000 mg/L, and COD (Chemical Oxygen Demand) is 7000 - 12,000 mg/L, and the acidity level (pH) is deficient at 4-5. The temperature of tofu waste can reach 40oC - 46oC, affecting biological processes, the solubility of oxygen and other gases, water density, viscosity, and surface tension.

Several previous studies have shown that the management control system in Small Medium Enterprises is still lacking. Management Control Systems are usually used in large companies, even though the small business sector also requires a Management Control System. However, it is simpler than those owned by large companies. According to Haseeb et al., (2019) needed to maintain business existence and support innovation. In addition, it is important to increase production capacity and adaptability to changes in the industrial environment (Pešalj, Pavlov and Micheli, 2018)

Management is the set of commitments, decisions, and actions required by an industry to achieve strategic competitiveness and maximize profits. Strategy inputs come from external and internal environmental analysis. In comparison, effective strategic action is required to achieve the desired results for strategic competitiveness and above-average profits. So, strategic management is used to match market conditions and competitive structures that are always changing with the company's resources, capabilities, and competencies (sources of strategic inputs) that are constantly evolving. According to Solihin, (2016) presented an explanation of 3 types of Generic Strategy models. To explain the strategy, Whelen and Hunger use the concept of General Electric. General Electric states that, in principle, generic strategies are divided into three types, namely, the Stability, Expansion and Rent strategies. The following explanation can be seen:

1. Stability

   In principle, this strategy emphasizes not increasing the number of products, markets and other company functions because the company strives to improve efficiency in all areas to improve performance and profits. This strategy is relatively low risk and is usually carried out for products in a mature position.

2. Expansion

   In principle, this strategy emphasizes adding or adding products, markets, and other company functions to increase the company's activities. However, in addition to the profit to be achieved, this strategy also contains a large risk of failure.

3. Rentrencment

   In principle, this strategy is intended to reduce the product produced or reduce the market and functions within the company, especially those with negative cash flow. A strategy that is usually applied to businesses that are in a declining stage (decline). This shrinkage can occur because the resources that need to be contracted are better deployed, for example, to other developing businesses

A product development strategy is a strategy that seeks to increase sales by improving or modifying existing products or services. Product development usually requires enormous expenditure on research and development.

Tofu waste processing in Indonesia, especially in Klaten, is still minimal. There are 2 types of tofu waste, namely solid waste and liquid waste. Solid waste is reprocessed into animal feed or reprocessed into food known as Tempe gembus. However, research and processing related to liquid waste are still minimal. The industry has a low level of understanding related to tofu wastewater pollution in rivers that surround the industry (Faisal, Gani and Mulana, 2016)

The amount of water in the tofu production process that becomes liquid waste is reported to be 43.5 – 45 litres for each kilogram of soybean raw materials (Lisnasari, 1995). The characteristics of liquid waste from tofu processing include: (Sarwono, 2004):

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1. Liquid waste contains dissolved organic substances that tend to decompose if left standing for several days in the open.
2. The average temperature of tofu water ranges from 40-600C. This temperature is higher than the average temperature of environmental water. Direct disposal without a process can endanger environmental sustainability.
3. Tofu wastewater is acidic because the soy juice coagulation process requires an acidic auxiliary material. Acidic waste can kill beneficial micro-organisms.

Based on these properties, tofu liquid waste will pollute the environment and endanger human health if it is discharged into the river without undergoing a processing process (Ruhmawati, Sukandar and Karmini, 2017). The high organic matter in tofu liquid waste can be a raw material for liquid organic fertilizer. The nutrient content in tofu waste also has the potential to be developed as liquid organic fertilizer. Tofu liquid waste can be used as a new alternative used as fertilizer because, in the tofu liquid waste, it has the nutrients needed by plants (Handayani, 2018). The nutrient content of the liquid waste of the tofu industry before and after liquid fertilizer is made must meet the liquid fertilizer standard. The liquid fertilizer quality standard required by the Ministry of Agriculture Number: 28//SR.130/B/2009 so that it can be utilized for organic liquid fertilizer that can be used for fertilization land kale plant (Aliyenah, Napoleon and Yudono, 2015).

METHODS AND IMPLEMENTATION

The target of this community service activity is the Mbah Sipon industry which has 3 employees. During making tofu, two types of waste are produced, namely solid waste and liquid waste. Solid waste in the form of dregs will be processed by one of the employees at his house to make tempeh tofu dregs, commonly called "Tempe gembus". In addition, solid waste is also used as animal feed. Especially for the liquid waste produced by this industry, it has not been processed in any form and is directly discharged into the river. This is indicated to cause pollution in the river.

The service provides an alternative to process the liquid waste into liquid organic fertilizer that can add value to the benefits while preventing river water pollution.
The method of implementing the above activities is as follows:

1. Making quality standards of raw materials required by Mbah Sipon's tofu production process, layout of Mbah Sipon's tofu production, tofu sales plan including product packaging.
2. Management of Mbah Sipon's tofu liquid waste by analyzing its content and trying to carry out the liquid waste management process by turning it into liquid organic fertilizer from Mbah Sipon's tofu waste.

RESULT AND DISCUSSION

Result

Based on the implementation method that has been made, the team starts the service by conducting initial observations. The results of the management control system review show that the tool components and layouts are not well organized. The technology used is also very simple. Overview from the point of view of tofu processing techniques, there are also still shortcomings in the processing process, especially in the final process or waste disposal. Solid waste has been treated properly by the owner by selling it as animal feed or reprocessed into tempe gembus, but this is not the case for liquid waste. Mbah Sipon and the team still believe that the waste produced will not pollute the environment because it does not use hazardous chemicals in the processing.

In addition to providing input related to the layout of the factory and the technology used. The team also provides education about liquid waste that has not been managed properly. The owner further agreed to treat this liquid waste so that it does not pollute the environment. In addition, the processing of liquid waste into fertilizer provides added value for the owner because it produces additional turnover.

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Discussion

Based on the procedures listed in Mbah Sipon's tofu waste treatment methodology, the following are the steps that the researcher has taken:

Stage 1: Survey the condition of the tofu factory. The current condition of the tofu factory is still very traditional by relying on simple processing tools. Officers found that this tofu liquid waste was discharged through a water channel that empties into a river. Although the industry owner stated that there was no added preservative for this tofu, the wastewater produced was smelly and not clear.

Picture 1: Survey the condition of the tofu factory

Stage 2: The service team takes tofu wastewater samples and is tested in the laboratory to obtain evidence that the water has been polluted. Lab test results show that there is a difference between pure water and wastewater. These results support the hypothesis that further treatment is required, and the water should not be discharged directly into the river because it will cause environmental pollution.

Picture 2: The service team takes tofu wastewater sample

Stage 3: The service team then processes the wastewater into liquid organic fertilizer with the following mechanism: Wastewater is mixed with active microorganisms and molasses in a ratio of 100: 1: 1. After that, leave it in a tightly closed container for four weeks. Periodically the container is opened briefly to remove the excess gas formed during the process. Furthermore, fruit waste is given to disguise the unpleasant smell of wastewater or fertilizer at the final stage. Fertilizer is ready to use, with a concentration of use of 10%

Picture 3: process the wastewater into liquid organic fertilizer

Stage 4: Packaging, labelling containing the product name, content, and recommendations on using it. Next, look for buyers or reservoirs for ready-made liquid organic fertilizer products. In addition to reducing river water pollution due to the manufacture of tofu waste that is not processed first, liquid organic fertilizer can also increase the economic value and profits for Mbah Sipon.

Picture 4: ready to make label for product

Stage 5: Socialization related to the results of processing tofu waste into fertilizer.

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This socialization was carried out to provide knowledge to business owners to know that the liquid waste produced has economic value. In addition, the service team also educates that throwing liquid tofu waste directly into the river will pollute the river water. Servants have also provided the form of processing business, the place or facility for processing the required liquid waste, and other parties or entrepreneurs who are willing to participate in distributing fertilizer derived from tofu liquid waste.

Picture 5: results of processing tofu waste

Stage 6: Upgrading Management Control System:

Source from (Haseeb et al., 2019)

The Management Control System (MCS) built by the service team is to provide an overview of 3 components in an effective MCS for SME Tahu Mbah Sipon:

1. Technology: Provide machine assistance to separate tofu juice from liquid

tofu waste. This tool is useful to help the tofu business industry maximize its ability to treat liquid waste.

2. Environment: Provide views and knowledge to entrepreneurs in the tofu industry sector to protect the environment. This is important to do to ensure the going concern of a business. In addition, post-production waste treatment can provide added value to the environment and competitors that this industry is different and the industry is included in an environmentally friendly industry.
3. Strategy: The service team also provides a strategy for the continuity of Mbah Sipon's tofu business, providing additional income opportunities. The results of processing tofu liquid waste can increase added value for liquid waste, which has only been disposed of and pollutes the environment.

There are 2 advantages of this processing, namely increasing income and avoiding environmental pollution.

CONCLUSION

There are many tofu industries in Indonesia, especially in Klaten. However, knowledge related to environmental pollution caused by liquid waste disposal is still very lacking. This happens because they think that liquid waste is not dangerous. The Management Control System implemented in the Tahu Mbah Sipon industry is expected to provide added value and support for the industrial business. In addition, one of the post-production stages of tofu, namely the processing of liquid waste, is also expected to provide additional income. This is in line with the goal of service: preventing prolonged environmental pollution and providing solutions for liquid waste disposal that provide added value. Team in the future should provide solutions related to processing liquid waste into something different other than plant fertilizers. Further research can also consider processing tofu solid waste so that it is used as animal feed and can produce added value to make the added value of the waste.

ISBN: 978-623-389-064-9

ACKNOWLEDGEMENT

The authors would like to thank the Institute for Research and Community Service at Universitas Pembangunan Nasional Veteran Yogyakarta, Indonesia, for providing funds for this research.

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