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INCREASING UMKM INCOME WITH POC INNOVATION FROM FISHERY WASTEWATER IN KEDUNGREJO BANYUWANGI

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Abstract

Kedungrejo Village has great fishery potential and has become an icon in Banyuwangi Regency, so there are many industries that manage fish into products that have selling value. However, the development of the industry is not matched by the management of residual production materials called waste. Therefore, the waste problem that occurs in industrial areas, especially in Kedungrejo Village, is still ongoing and of course has a significant impact on local residents so that further management is needed. The problem factors that cause the obstruction of waste treatment in Kedungrejo Village can be formulated as solution activities. The various activities that can be carried out are by socializing the importance of utilizing fish oil waste, making several products from waste management, and conducting training in making liquid organic fertilizer (POC) which later this product becomes an innovation from our Muncar Promahadesa Team students in managing waste into a product with economic value. From these efforts, it is hoped that it will be able to overcome the problem of fertilizer scarcity which is getting higher in price and can reduce the problem of prolonged waste management and the creation of creativity of the surrounding community in utilizing existing opportunities.

Keyword: Fishing Industry, Fish Waste, Liquid Organic Fertilizer (POC)

INTRODUCTION

Kedungrejo Village, Muncar District, Banyuwangi Regency is located on the coast of the Bali Strait and has considerable fisheries potential. This area is one of the industrial centers in Muncar city, namely industries related to fishing products, including the fish canning industry, animal feed industry, fish oil industry, fish flour industry, coolstorage and others. Muncar Harbor, located near this village, is one of the largest fish producers in Indonesia (T. Nur et al., 2018). Fishermen in Muncar, Banyuwangi, often experience overfishing seasons. This causes fish prices to be cheap due to the abundant supply. However, this condition also has an impact on the welfare of fishermen because they cannot sell their fish at a fair price. In addition, the fish processing industry in Muncar also produces quite a lot of waste. However, waste from the fish processing industry is still a significant environmental problem in Muncar (T. Nur et al.,

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2018).

Fish caught in Kedungrejo Village, Muncar Subdistrict are sent directly to large factories for processing. In the processing process, waste or fish parts such as heads, bones, and fish that cannot be processed are used to create economically valuable products such as fishmeal and oil. The environment around Kedungrejo Village, Muncar Sub-district itself has been contaminated by waste from the fish industry, so to reduce the impact of this pollution, fish waste must be reused and processed into an economic resource. Usually, liquid waste from the fish processing industry in Kedungrejo Village, Muncar, Banyuwangi is used as fish oil and fish sauce (I. M. Nur, 2021). Nevertheless, liquid waste from the fish processing industry still has a negative impact on the surrounding environment. Liquid waste can damage the ecosystem of the waterways through which it passes, whether sewers, rivers, or the sea. Damage to the marine ecosystem due to liquid waste causes marine products in Muncar to decrease, so that the lean season occurs gradually (Hikamah Siti & Mubarok, 2012). In addition, liquid waste also causes an unpleasant odor. Although there are some people who utilize liquid waste into new products and contribute to increasing the income of the people who process it, liquid waste from the fish processing industry is still a significant environmental problem in Muncar.

From the large amount of waste from the fishing industry in Kedungrejo Village, we see the potential for this waste to be used as liquid organic fertilizer. Organic fertilizers have several advantages, namely improving physical and chemical properties marked by an increase in C-organic, reducing the use of inorganic fertilizers, increasing the diversity and population of soil organisms, safe to use and not damaging the environment (Nasir et al., 2020). The Student Community Service Program (Promahadesa) is a program organized by the Institute for Research and Community Service (LP2M) of the University of Jember. This program has a goal that is in line with the Real Work Lecture (KKN), which is to serve the community. The focus of Promahadesa is to make a real contribution to the development and improvement of the welfare of the village that is the place of service. Seeing the potential of Kedungrejo Village, we chose this village to run the berdesa program so that we can help the community in utilizing the available waste into liquid organic fertilizer to increase the economic value of the waste from the fishing industry.

IMPLEMENTATION METHOD

The targets of this Promahadesa activity are the community and UMKM of Kedungrejo Village. This Promahadesa activity was carried out starting on June 17 to August 28 2023. The Program Mahasiswa Berdesa (Promahadesa) implemented by the Muncar Promahadesa Team uses 4 methods including: a) Socialization; b) Training; c) Mentoring; and d) Marketing. The following is an explanation of each method. training and mentoring of the intended community groups as partners. Training and socialization were conducted to improve the knowledge and skills of the community on product processing. Before conducting socialization, a trial and error stage was carried out to determine the ratio of the most optimal ingredients for making Liquid Organic Fertilizer.

Contents Community service activities by the Berdesa Student Service Program team were carried out in Kedungrejo Village, Banyuwangi Regency. This activity aims to reduce

fishing industry waste by providing education in the form of socialization to selected partners regarding the procedures for making Liquid Organic Fertilizer (POC) and forming MSMEs that will continue the process of making POC so that it can be sold and improve welfare for the village. There are several activities carried out in Kedungrejo village, namely Trial and Error Making POC Products, POC Effectiveness Tests on Plants, Sampling for Content Tests, Socialization and Training on Making Liquid Organic Fertilizer (POC) from Fishery Waste, Content Test Results and POC Packaging for Marketplace, and Evaluation.

Trial of making Liquid Organic Fertilizer :

In this trial and error stage, POC samples were made with different composition ratio variations. This was done in order to get the most suitable ratio by applying the product directly to the plants and monitoring the growth of the plants. Plant growth was measured and compared so that the most optimal composition ratio could be seen. Furthermore, from the product with the appropriate composition ratio, laboratory testing was carried out to determine the content of Nitrogen (N), Phosphor (P), Potassium (K), and C-organic in the finished product. This test was carried out to determine the quality and determine the quality of the POC product that had been made.

Socialization and training on making Liquid Organic Fertilizer (POC) :

The socialization and training was held on July 25, 2023 at Gajah Mada Hall, Kedungrejo Village Hall, Muncar, Banyuwangi. In the activity, participants were trained to make liquid organic fertilizer which included the provision of materials and equipment, processing methods, and success indicators. Participants were also given knowledge about the product, potential, and advantages of the product made. liquid organic guided by the mentor. At the end of the event, participants were given a quiz to determine the increase in participants' understanding after being given knowledge about the products that had been made.

RESULTS AND DISCUSSION

Trial and Error Making POC Products and Planting Plants to Test POC Effectiveness :

After carrying out trial and error in making Liquid Organic Fertilizer (POC) with three variations of EM4, namely 150 ml, 200 ml, and 250 ml, respectively. In order for the fermentation process to be maximized, it takes at least 8-15 days and is stirred once a week. EM4 was chosen as the material to be varied because the process of making liquid organic fertilizer by varying the addition of EM4 volume is effective in increasing the content of N, P, and C (T. Nur et al., 2018).

After the POC has been fermented for approximately 2 weeks, it's time for filtering. In the fermentation stage, for 1 week, a stirring process is also carried out for even fermentation and removal of carbon dioxide gas from the POC. A sign that the POC has fermented well is that a white layer appears on the surface as shown in Figure 1, this layer is formed from microorganisms that break down waste and emit a pungent aroma. POC products have a dark brownish color. After the stirring process, the following week is checking the POC product whether it has fermented completely or not.

Figure 1. POC has been fermented
Source: Promahadesa Muncar Team Documentation

The Promahadesa Muncar team planted seedlings, namely mustard greens and kale, as test plants. The two plants were chosen because mustard greens and kale can live in various places, both in the highlands and in the lowlands, but mustard greens are mostly cultivated in the lowlands with an altitude of between 5 and 1200 meters above sea level, both in rice fields, fields, and yards. Mustard is a weather-resistant plant, in the rainy season it is resistant to rain, while in the dry season it is also resistant to the heat of the weather, as long as it is accompanied by regular watering. Mustard cultivation is not too difficult, because the process is almost the same as the process of cultivating other plants that are still in one family (Eka & Ariati, 2017).

POC Effectiveness Test on Plants and Sampling for Content Tests :

After the product is fully fermented, it is marked with white powder on the surface of the POC liquid and the color of the liquid is yellow brown in accordance with research conducted by Wardati Sari & Alfianita, (2019) which states that the results of good liquid organic fertilizer can be seen from the color produced by the fermentation results. The beginning of the base material can also affect the color of the greenish yellow base material and with a rough texture it will be decomposed by microorganisms derived from bioactivators so that it becomes soluble and brown and until it is blackish brown or dark in color through the fermentation process.

The POC product in the bucket is filtered and put into a plastic bottle for lab test sampling later. Then, the remaining fermented products were tested on several mustard and kale plants by pouring POC to see the effectiveness of POC products. In its application, POC requires water as a mixer with the ratio between fertilizer and water in this experiment is 1:10, 2:10, 3:10, 4:10. 10 ml of POC was mixed with 100 ml of water. We were looking for a sufficient variation in application because if the dosage is excessive, it can increase the pH of the soil so that the soil becomes more acidic, and can cause plants to wilt and eventually die. This comparison is also applied to all variations that we have made (EM4 content of 150 ml, 200 ml, and 250 ml).

For effectiveness in using this liquid organic fertilizer, it can be used every week on a regular basis. We use parameters with an estimated time of 2 weeks. Watering the fertilizer once a week aims to ensure that the fertilizer can be absorbed properly. In the first week, the development of mustard greens and kale will be seen first, then in the second week it will be measured again by spraying fertilizer in the first week. After the watering process, the difference in plant height is measured to later compare the growth process between plants

treated with fertilizer and plants that are only watered with plain water. After applying to the plants, the difference between the initial measurement before the fertilizer is applied and the final measurement after the fertilizer is applied is in the form of data table 1.

Table 1. Difference in measurement after and before POC application

Water Spinach			
EM4 Variation (ml)	EM4 Sample		
	150	200	250
10	7 cm	9 cm	3.5 cm
20	9 cm	10 cm	6.5 cm
30	9 cm	7.5 cm	7 cm
40	9.5 cm	8 cm	7 cm
Non EM4	8 cm	12.5 cm	6.5

Mustard			
EM4 Variation (ml)	EM4 Sample		
	150	200	250
10	1.5 cm	Mati	0.5 cm
20	3 cm	1.5 cm	2 cm
30	1 cm	1 cm	Mati
40	1 cm	Mati	1.5 cm
Non EM4	3.5 cm	1 cm	2 cm

Source: Promahadesa Team Observation

It can be concluded that after applying POC fertilizer to several variations of EM4 use to plants and from the three EM4 samples experienced a rapid increase. Judging from the difference data, the use of POC has a very significant impact on plant growth rather than non-use of POC. These results can be used as a reference for samples that will be tested for content later. From the above data, it can be concluded that the most effective sample to use is the 150 ml EM4 sample with a variation of 20 ml of product (fermentation results) to the 2:10 ratio plant because the ratio of water content dissolved more and more, the content of lamtoro leaf POC in solute will be smaller. This is thought to be the cause of the higher dose level given, the ratio of water greatly affects the quality of the resulting POC (Dewi et al., 2022). While plants that tend to die in the 200 ml EM4 sample are due to pests around the plant, namely caterpillars from teak trees that fall and eat mustard plants. The 150 ml EM4 sample which is declared the best sample will be tested to determine the nitrogen, potassium, phosphorus, and c-organic content of the POC product. In addition, the results of this content test are also supporting data for selling products to consumers.

Socialization and Training on Making Liquid Organic Fertilizer (POC) from Fishery Waste :

Socialization was held in the Gajah Mada hall of Kedungrejo village hall and attended by representatives of village organizations (Village Head, PKK, Karang Taruna, Eco Enzyme, Gapoktan,), Supervising Lecturers, and local community. The initial stage conducted a pre-test aimed at determining the understanding of invited guests regarding waste management in figure 1.

Figure 1. Pre-test

Source: Promahadesa Muncar Team Documentation

Then we moved on to the main event, which was the socialization and training on making POC as seen in Figure 2. The presentation was conducted by several team members followed by a discussion and Q&A session. The invited guests were very enthusiastic about participating in this event. This was evidenced by several guests asking about alternative materials to EM4 and coconut water as well as comparisons when making POC in small quantities. Additionally, to facilitate the invited guests in the training on making POC, the Promahadesa team provided a handbook. This book could serve as a reference if the invited guests wanted to make POC themselves at home. Then the Q&A session was made more interactive with the distribution of trial and error products, the best samples from effectiveness testing data on plants. Finally, the last event was the presentation of souvenirs as mementos from the Promahadesa team.

Figure 2. Socialization and practice of making POC

Source: Promahadesa Muncar Team Documentation

Results of Content Testing and Packaging of POC for the Marketplace :

After the organic fertilizer production is completed, the next step is to examine the nutrient content contained in liquid organic fertilizer according to the standard quality requirements for nutrient content in organic fertilizers with organic fertilizer quality standards. The nutrients in fertilizers are basically N, P, K elements as the basis for macro-nutrients in fertilizers (Derianto et al., 2021). This testing was carried out at the CDAST Laboratory of the University of Jember using the LK 2.7.2.2 method for N, P, and K elements, while organic C was measured using the Photometry method. The results obtained from the nutrient testing process for nitrogen, phosphorus, potassium, and organic C compounds contained in liquid organic fertilizers are presented in Table 2.

Table 2. Testing results

Parameters	Result	Test Method
N	0.4964	IK 2.7.2.0
P	1.277	IK 2.7.2.1
K	0.269	IK 2.7.2.2
C-organic	4.76	Photometry

Source: Laboratory Testing at C-DAST University of Jember

Then, after obtaining the content of N, P, K, and Organic C from POC, we designed packaging for the product that will be turned into a product that will be sold on all Promahadesa Muncar team marketplace accounts and will be continued by UMKM Desa Kedungrejo. The product is labeled V-Fish, which stands for Vegetables Fish, or liquid organic fertilizer made from fish waste and other supporting materials such as vegetables or organic waste. The packaging for this POC product has 2 variations, namely 1 liter and 500 ml as shown in Figure 3.

Figure 3. Packaging bottle of POC product by Promahadesa Muncar Team

Source: Promahadesa Muncar Team Documentation

CONCLUSION

Based on the results of community service through the Village Student Program (PROMAHADESA) in 2023, the innovation of Liquid Organic Fertilizer (POC) product from Fisheries Waste shows concrete evidence of the efforts by the Promahadesa Muncar team for the community of Kedungrejo Village, Muncar District, Banyuwangi Regency. Liquid Organic Fertilizer (POC) from Fisheries Waste is one of the innovative products that utilize the potential available in Kedungrejo Village. Additionally, the POC product from Fisheries Waste also highlights Kedungrejo Village as the village with the highest fish production in Banyuwangi Regency. The Promahadesa Muncar team hopes that this endeavor, namely the POC product from Fisheries Waste labeled "V-Fish," can be successful as a continuation of the program and provide real benefits to the community of Kedungrejo Village. This is expected to be a significant milestone in the development of UMKM and the entrepreneurial spirit of the community in Kedungrejo Village.

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