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Optimizing Rejected Oranges into Multipurpose Products in Seribu Jandi Village

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Abstract. One of the programs in the 8th Sustainable Development Goals (SDGs) is "Supporting inclusive and sustainable economic growth, full and productive employment, and decent work for all", with the target of achieving higher levels of economic productivity through certification, technological quality improvement, and innovation. Seribu Jandi Village, located in Simalungun Regency, is a center for orange producers. However, some of the oranges produced are categorized as rejected oranges. The main problems faced by orange farming communities in this village are the high volume of rejected oranges and their lack of understanding of processing rejected oranges. As a result, the rejected oranges are only thrown away which pollute the environment. Therefore, it is necessary to take corrective actions by processing rejected oranges into multipurpose products, such as biocatalysts, biodisinfectants, and floor cleaning fluids. Biocatalysts can be used to optimize the absorption of soil elements by orange plants, which certainly will maximize the use of fertilizers. Biodisinfectants are more recommended to be used than chemical disinfectants because chemical disinfectants have side effects that can cause irritation to human skin. Cleaning liquid can be used instead of chemical cleaning fluid, which also has an impact on the environment. In relation to this problem, it is necessary to carry out a series of activities that will greatly help the orange farming community in Seribu Jandi Village. The activities to be carried out are conducting training and counseling on the utilization of rejected oranges into multipurpose products.

Keyword: Biodisinfectants, Biocatalysts, Floor Cleaning Liquid, Rejected Orange, Counseling

Abstrak. *Salah satu program dalam Pembangunan Berkelanjutan (Sustainable Development Goals/SDGs) ke-8 adalah "Mendukung pertumbuhan ekonomi yang inklusif dan berkelanjutan, kesempatan kerja yang penuh dan produktif, serta pekerjaan yang layak untuk semua", dengan target pencapaian tingkat produktivitas ekonomi yang lebih tinggi melalui sertifikasi, peningkatan kualitas teknologi , dan inovasi. Desa Seribu Jandi yang terletak di Kabupaten Simalungun merupakan sentra penghasil jeruk. Namun, beberapa jeruk yang dihasilkan dikategorikan sebagai jeruk afkir. Masalah utama yang dihadapi oleh masyarakat petani jeruk di desa ini adalah tingginya volume jeruk afkir dan kurangnya pemahaman*

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mereka tentang pengolahan jeruk afkir. Akibatnya, jeruk yang ditolak tersebut hanya dibuang begitu saja sehingga mencemari lingkungan. Oleh karena itu, perlu dilakukan tindakan korektif dengan mengolah jeruk afkir menjadi produk multiguna, seperti biokatalis, biodisinfektan, dan cairan pembersih lantai. Biokatalis dapat digunakan untuk mengoptimalkan penyerapan unsur tanah oleh tanaman jeruk, yang tentunya akan memaksimalkan penggunaan pupuk. Biodisinfektan lebih direkomendasikan untuk digunakan daripada disinfektan kimia karena disinfektan kimia memiliki efek samping yang dapat menyebabkan iritasi pada kulit manusia. Cairan pembersih dapat digunakan sebagai pengganti cairan pembersih kimia, yang juga berdampak pada lingkungan. Sehubungan dengan permasalahan tersebut, perlu dilakukan serangkaian kegiatan yang sangat membantu masyarakat petani jeruk di Desa Seribu Jandi. Kegiatan yang akan dilakukan adalah melakukan pelatihan dan penyuluhan pemanfaatan jeruk afkir menjadi produk multiguna.

Kata Kunci: *Biodisinfektan, Biokatalis, Cairan Pembersih Lantai, Jeruk Tolak, Penyuluhan*

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1 Introduction

Seribu Jandi Village is located on the border of Karo Regency and Simalungun Regency. Administratively, this village is included in the Simalungun Regency area. But historically and culturally, this village is inhabited by the majority of the Karo tribe. The entrance to this village is also from Karo Regency. Although there is an access road to this village from Simalungun Regency, the access is still not optimal. This village is one of the orange producing centers in North Sumatra Province [1]. This is related to the high planting area, plant maintenance, and good soil quality. In addition, in contrast to orange plants in Karo Regency which are heavily attacked by fruit flies, the orange plants in this village are relatively safe.

As a center for orange production, farmers in this village still encounter various obstacles, one of which is high production costs. The prices of fertilizers and pesticides are increasingly high, and the labor costs are also relatively high. Besides the high costs, the farmers are also troubled by the selling prices. Sometimes the selling price of the oranges is too low at harvest time, so they decide to hold the fruit while waiting for a higher selling price. Moreover, great or major harvests cause another problem, i.e., the selling price of the oranges becomes lower because of a great number of oranges produced [2], and this problem also makes the farmers hold the oranges until the selling price gradually increases. As a result, many fruits that are too ripe fall and rot. In addition to unstable selling prices, the farmers also encounter another problem, i.e., a large number of rejected oranges. This problem arises when the quality of the oranges does not meet the market demand.

The volume of rejected oranges in this village may reach tens of tons almost at every major harvest, whose disposal requires additional labor and transportation costs. The rejected oranges are carried out to the edge of the village for disposal. This causes piles of foul-smelling garbage, which is detrimental to the local people's health and the environment. The lack of organic waste management tools in processing rejected oranges, ignorance of the community about organic

waste management, and the lack of special attention from local village officials are the problems faced by the orange farming community in Seribu Jandi Village [3].

Based on the analysis of the situation through discussion with orange farmers in Seribu Jandi Village, several problems have been identified, including [4]:

1. At each harvest time, the farmers complain about the large volume of rejected oranges that cannot be sold.

2. These rejected oranges are thrown away by farmers around the village or at the edge of the village, causing piles of foul-smelling garbage that are detrimental to the local people's health and the environment.

3. The high volume of rejected oranges, either due to rot or poor quality, causes additional production costs for farmers. These additional production costs are in the form of transportation costs and labor costs to dispose the rejected oranges from the field to the disposal place. At every major harvest, the volume of rejected oranges even reaches tens of tons.

These problems certainly need close attention and fast solution, and the solutions offered are as follows [5]:

1. Conducting training to optimize the utilization of rejected oranges into multipurpose products that will be useful for the local people, such as biocatalysts, biodisinfectants, and floor cleaning liquid. These products have economic value. The technology being trained is fermentation.

2. Encouraging the local community to be aware of the possible impacts of throwing oranges around the village or at the edge of the village on the environment and their health.

3. Teaching the community how to harvest the fermented products and how to pack them.

2 Methods

In accordance with the problems faced by the orange farmers in Seribu Jandi Village, regarding solutions that can be taken based on the discussions with farmers, several approaches were carried out continuously and simultaneously.

1. Participatory Rural Appraisal. In this approach, the group members were actively involved. The local community was the subject, while the university was the facilitator.

2. Comprehensive Approach. In this approach, all the community service activities related to human resources in the village were carried out simultaneously through counseling and assistance.

Furthermore, the above approaches were implemented in 3 (three) stages, namely [6-7]:

1. Observations or surveys were conducted to find out the actual conditions in the field by exploring the problems faced by the orange farmers.

2. Questions and answers or interviews were conducted with the orange farmers to find out their potential and enthusiasm in the community service program.

3. The activity of introducing the community service program for orange farmers was carried out. At this stage, the agreement on the time and schedule of the activities were set in detail. The agreement also included the delivery or presentation of the materials, training, and monitoring.

4. The training was carried out in the form of lectures in the meeting hall of Seribu Jandi Village.

3 Results and Discussion

The training was carried out in the meeting hall of Seribu Jandi Village on July 27, 2022. The training was particularly addressed to orange farmers in the village. The training was repeated as well as monitored on August 27, 2022. These activities involved ten students from Faculty of Cultural Sciences of USU in the context of implementing one of the USU's programs, i.e., Freedom to Learn - Independent Campus (or known as MBKM). In other words, this community service project benefits the local people and USU.

The training was opened by the Head of Seribu Jandi Village, who was also asked to give a welcome speech. This speech is very important to motivate the local people in the village to participate seriously in this community service program. The other welcome speech was delivered by the head of the community service program. This speech is important to explain to the local people about the activities the community service team would carry out and how they would be involved in the activities. After the welcoming speeches, the training materials were delivered by one of the community service team members. The materials were related to the advantages of rejected oranges and the way to process them into multipurpose products. The farmers were explained that rejected oranges should not be regarded as a problem, but they actually have economic value if the farmers know how to utilize them. After the materials had been delivered, the participants were allowed to ask questions concerning the processing of rejected oranges.

After the question and answer session, the community service team gave a model of processing the rejected oranges into multipurpose products [8].

The technology used in processing rejected oranges is 100 days fermentation. The materials used in this community service project follow the fruit fermentation process suggested by [9]. The materials are sugar, oranges, and water, with a ratio of 1:3:10, as shown in Figure 1.

Figure 1. The ratio of materials in the fermentation of rejected oranges

The sugar used in this process is liquid molasses. Sugar is a source of carbohydrates for microbes that will develop and produce enzymes and organic acids. All kinds of fruits can be used, but the suggested fruits are those containing a lot of enzymes [9], one of which is oranges which contain pectinase enzyme. This enzyme has the ability to hydrolise the cell wall of bacteria. The enzymes from both the microbes and the fruits enrich the content of fermented extracts. The water used in this process should not contain chlorine because chlorine will kill microbes that will develop in the fermentation process [9].

After 100 days, the enzymes and organic acids produced have been optimal; therefore, filtering is carried out to obtain a fermented extract. Fermented extracts have multiple benefits, as they can be used as biocatalysts, biodisinfectants, and floor cleaning liquids [10]. As a biocatalyst, enzymes from the fermented extract will help plant roots to absorb nutrients from the soil. As a result, farmers do not need as much fertilizer as usual, resulting in savings in fertilizer purchases and reducing the production costs. As a bio-disinfectant, the organic acid content causes the pH of the extract to be very acidic, so it can be diluted up to 1:50 and even up to 1:100. An acidic pH has been examined to have the ability to kill pathogenic bacteria on floors or on hands. Therefore, the fermented extracts can be used for various cleaning purposes, such as cleaning hands or feet, floors, and toilets [11].

Furthermore, the orange fermented dregs can be used as an organic pesticide. It is well known that orange trees are also attacked by pests that cause damage to the orange stems, which is indicated by the melting of the materials which look like brownish yellow sap. The melted part is affixed to the orange fermented dregs. The fermentation dregs with very acidic pH cause damage

to the body wall of the pest, followed by the death of the pest. Thus, such an organic pesticide can be used to keep the orange trees from the pest, and the orange farmers do not need to spend a certain amount of money to buy an organic pesticide [12].

Moreover, the use of orange fermented extracts as cleaning liquids is demonstrated to prove its effectiveness as a cleaning product. During the training, female students (the students of USU involved in this community service program) demonstrated how to use fermented extracts to clean floors (see Figure 2). Thus, it is hoped that the participating mothers will no longer buy commercial floor cleaning materials because they can make their own [13].

Figure 2. Demonstrating using orange fermented extracts in cleaning the floor

The output of this activity turned out to be useful for USU in improving its performance in implementing the Main Performance Indicators (IKU) of a university as announced by the Ministry of Education and Culture of the Republic of Indonesia, particularly in implementing IKU number 2, i.e., students gain off-campus experience. In this community service project, ten students of USU were involved, who took part in helping the community service team in managing and implementing the program. By participating in this program, the students learn how to design work programs, carry out counseling and training, make demonstrations, manage work schedules, implement counseling or training techniques and methods, and apply the knowledge they learn directly in the community. In addition, this community service program also improves IKU number 5, i.e., the lecturer's work results are used by the community. This community service project is carried out using an appropriate technology that has been researched by previous lecturers. One of the results of the research stated in the training is the utilization of rejected fruits, one of which is rejected oranges. Therefore, this community service project is very useful for orange farmers because they can utilize the rejected oranges into multipurpose products.

They no longer need to throw away their rejected oranges, which needs more production costs. Besides, they can save their money on fertilizers, pesticides, and cleaning liquids. In addition, the utilization of rejected oranges helps contribute to create a more conserved environment in Seribu Jandi Village. There will be no more piles of garbage from rejected oranges around the village. This means that they can eliminate one of the factors that can threaten their health. Moreover, there is an opportunity for people who are trained to make hygiene products and make a profit by selling them [14].

4 Conclusion

This community service project provides wide benefits for the local people in Seribu Jandi Village. First, utilizing rejected oranges solves the environmental problem in the village, the problem that is detrimental to the local people's health. Second, the orange farmers can save their money to buy fertilizers or disinfectants which are very important in farming oranges because they can process the rejected oranges to become biocatalysts and biodisinfectants. Third, the local people can also save their money by not buying the cleaning products anymore because the processing of rejected oranges can also become cleaning liquids. Fourth, the local people can make money from the results of processing rejected oranges into multipurpose products mentioned above. In addition, this community service project is also beneficial for the community service team. First, the students gain off-campus experience. Second, the students learn how to design and carry out work programs and how to deal with the community's problems. Third, the lecturers and the students help contribute to the implementation of the university's IKU in USU. This community project only applies to the utilization of rejected oranges, so it is suggested to do other similar community service projects by utilizing other kinds of rejected fruits.

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