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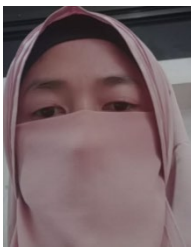

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Processing Coffee Grounds Waste as a Planting Media in the Use of Organic Fertilizer in Pabedilan Wetan Village, Cirebon Regency

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Abstract. So far, the increase in coffee bean utilization is not directly proportional to its environmental impact. The benefits of coffee beans for health should align with how coffee waste is also valuable in strengthening the community's economy. Educational steps are needed for coffee cafes as waste producers. As university personnel, we should mediate this gap. Community service activities are carried out at QQ café as part of a coffee waste program to be used by farmer groups (POKTAN) Mrengkel I, Pabedilan District, Cirebon Regency. This community service activity aims to educate the public how coffee waste produced routinely by QQ café as much as 4-5 kg in a week, can be absorbed by the Mrengkel I group, Pabedilan District, Cirebon Regency as a party who needs coffee waste as an alternative to organic fertilizer. Service activities are carried out for four months. The results showed that waste management started with sorting techniques on the part of coffee waste producers for four months, continued at the fermentation step of waste that was successfully collected in a particular vessel, and then ended with waste being handed over to the farming community along with a book on the use of coffee grounds to be used as an alternative to organic fertilizer at least succeeded in educating and mediating one party to the other. That way, the community service activities that we carry out are a form of dissemination of our research results in educating the public while developing science and technology.

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Keywords: waste, coffee, education, producer, fertilizer

INTRODUCTION

Coffee plants come from Ethiopia; Europeans brought the coffee seeds to their colonies, including Indonesia, and then cultivated them because, in Europe, the climate was not suitable for coffee cultivation. Indonesia's tropical climate makes coffee grow luxuriantly, and such geographical conditions make Indonesia a coffee-exporting country ranked fourth in the world in 2015 (Afriliana, 2018). Several types of coffee are widely cultivated in Indonesia, namely: (a) types of arabica coffee (*Coffe Arabica*) and Robusta (*Coffe Canephora*) and types of coffee that are the result of dissemination of robusta coffee types, namely *Coffea Liberika* and *Coffea Congensis* (Aldani, 2019).

Coffee has a distinctive taste, making it a drink many people love. The taste of coffee that has a unique acidity makes many people make this drink a favorite beverage, especially among millennial children who like to gather with their friends in various interests but with a relaxed atmosphere. Of course, they need drinks like coffee that make their minds more relaxed and calm.

The caffeine content contained in coffee relieves drowsiness, increasing in mental awareness mind, focus, and response (Solikatun et al., 2018). The statement expressed by Solikatun et al. provides proof that the caffeine content in coffee can give birth to a thought, idea, new idea, and even a creative solution that can trigger one's creativity. Caffeine makes our minds focus so that the ideas that arise are not lost. Many ways can be done to bring out creativity; in addition to drinks, there are other factors that are no less important to have a role in realizing it all, namely the atmosphere of the place to drink coffee. Millennial children use cafes as a place to discuss, with their friends. As revealed by (Hendrata et al., 2019), spaces such as cafes, coffee shops, and the like contribute to stimulating stimuli so that sensations occur that produce perception with cognition involved in it. Thus, coffee drinks and cafes are correlated with each other in the process of creating creativity. The statement: Making coffee shops grow moldy in urban areas eventually leaves a new problem in the form of waste on coffee grounds.

Against the background of the same problem, the same author owns a café that includes the QQ label; the café provides several types of coffee, both from arabica and robusta coffee. This café has eight types of arabica coffee, namely: (a) Papua Wamena, (b) aceh gayo, (c) in thong, (d) band hailing, (e) Toraja, (f) Bali Kintamani and (g) tubular and one type of robusta damp it coffee (Malang). This café is visited by many visitors who like coffee every day, so this café produces coffee grounds that waste as much as ±700 grams to 1 kg in a week, as much as 4-5kg. If thrown away, this large amount of coffee ground waste will produce problems in environmental pollution. Coffee grounds waste contains residual organic compounds that can increase organic content, especially Nitrogen, so the soil becomes more fertile. Seeing the content of coffee grounds waste can benefit the environment; it is unfortunate if it is thrown away.

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Figure 1. QQ Cave, Pabedilan Wetan, Cirebon Regency

Coffee grounds waste processing, in addition to saving the environment from pollution, is another advantage obtained. The benefits in the agricultural sector are that coffee grounds waste processing is a planting medium for making organic fertilizer. These results are evidenced by research conducted with the use of coffee grounds waste on the growth of watercress plants by Cruz et al. (2012), showing that coffee grounds waste can increase the amount of xanthophyll, β-carotene, and chlorophyll in lettuce leaves, and their is a slight increase in the amount of their biomass. Nimas et al. (2017) added the results of their research on the benefits of coffee grounds waste on the growth of salad plants, namely solid and liquid coffee grounds waste affects increasing the number of leaves, plant height, plant dry weight, root length, root wet weight, and root dry weight in salad plants. The excellent growth of salada plants due to coffee grounds waste shows that coffee grounds waste is a suitable planting medium and improves soil nutrients. This reference is reinforced by research conducted by Siahaan et al (2019), which states the use of coffee grounds as compost with a dose treatment of 150% or 30 t ha -1 (P3) and a dose of 200% or 40 t ha -1 (P4) on Andisol Ngabab soil affects the increase in pH, C-organic content, total N, P-available, K-dd and Na-dd as well as CEC values (4, 6 and 8 MSI) land of Andisol Ngabab. Based on this research, the writing team took further action to process this large amount of coffee grounds waste as a planting medium for organic fertilizer on onion plants, which was recorded in the form of a guidebook so that it could be given to farmer groups, especially onion farmers.

IMPLEMENTATION METHOD

Tools and Materials

Some of the tools and materials needed in processing coffee grounds waste utilize used tools found at home that are no longer used, namely:

1. Coffee Grounds Waste
2. Used small shovels
3. Used small paces
4. Rubber gloves
5. Used small measuring cups
6. Used buckets
7. Used basin
8. Used plastic cups

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9. Used refrigerator as a coffee casgot shelter
10. The bucket is suitable to use as a reservoir for coffee waste that is better
11. Used spray bottles

How it Works

Steps to Process Coffee Grounds Waste into Castots

1. The first step is to prepare a vessel that can hold coffee grounds, complete with a lid on top. Vessels are the main capital in waste treatment.
2. If needed, E4 liquid or an auxiliary fluid of the waste fermentation process. Even if it doesn't, it's okay. Indeed, every biotic waste will automatically undergo a natural fermentation phase. It's just that some are fast and some are slow; this is influenced by the biotic material element itself. The function of E4 liquid as an adjuvant accelerates the fermentation phase for waste.
3. We pour Coffee waste that has been sorted into vessels prepared as a container, with a humidity of not more than 75%. The condition of the coffee waste is recommended to be clean.
4. Close the vessel tightly with coffee waste in it so that the natural fermentation process and decay phase are perfect for the next 5 to 6 weeks.
5. We can look at the coffee waste that we have closed in the fifth or sixth week to ensure that the fermentation process has brought magot (BSF larval microorganisms).
6. Through the mechanism of life and magot enzymes, this bioconversion process dramatically helps process coffee grounds waste. The waste problem, which peaks in the second to sixth week, can be solved only by separating it from other waste so that coffee grounds waste can be maximized in the fermentation phase.
7. At least we allocate a place, land, and time of at least two to three months for the waste treatment period.
8. When coffee waste reaches two to three months of age, it will turn into a castgot. Kasgot is waste that has gone through the magot phase, which is waste under conditions where this material has turned into organic material rich in nitrogen, phosphorus, potassium, sulfur, and calcium.
9. Kasgots with organic material content have characteristics in a soft, moist texture and have a blackish color. Kasgots have benefits as a growing medium what we can use in a variety of food crop activities.
10. Kasgot is ready to be distributed into polybag bags

Steps for processing coffee goods that are ready to become organic fertilizer

1. The first step is to prepare the materials needed: (a) the necessary vessels that we can use as planting sites, whether poly bags or if you want to maximize the utilization of waste, then we can maximize used materials, such as buckets that are no longer used, hole the bottom. (b) Soil as a mixture (c) Water (d) Former egg holder, as a stimulating medium for root growth (e) Next three red onion cloves as seedlings as an example of treatment of food plants.
2. In the second step, we make sure to pour 1.5 gr of coffee kasgot into 3 onion plants and then mix it with 1000 gr of soil and 600 ml of water.
3. The third step is to moisten the former place of the egg.
4. The fourth step is to cut 3/4 on each top of the onion clove
5. The fifth step is positioning the former egg holder into the prepared planting medium.

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6. In The sixth step, put the onion on the surface with the eggs we prepared. Ensure the humidity ratio of the egg's place as a place for root growth; in other words, do not allow it to dry out.

RESULTS AND DISCUSSION

Coffee grounds waste generated by QQ Cafe

Kasongo et al. (2011) revealed the content of coffee grounds, namely C-organic (44.87%), pH (5.6%), N (1.69%), P (0.18%), K (2.49%), and Na (0.04%). Application of coffee grounds compost at a dose of 20 t ha -1 was able to increase the pH of sandy soil from 5.11 to 6.17, increase the nutrient Nitrogen from 0.04% to 0.12%, increase C-organic from 0.82% to 1.58%, increase available P from 14 ppm to 19 ppm, increase Potassium from 11.7 ppm to 159.9 ppm, increase CEC from 30.7 me 100 g-1 to 63.8 me 100 g-1 and Sodium from 4.6 ppm to 6.9 ppm in soil 12 months after Incubation.

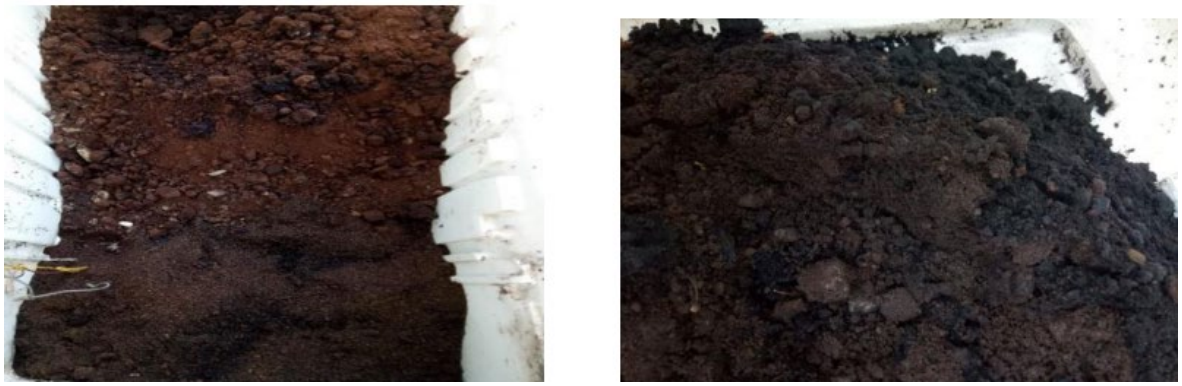

Figure 2. QQ Cave Coffee Dregs Waste

Coffee Grounds Waste Treatment

Referring to waste processing, all types of solid waste maximize the 3 R technique (reduce, reuse, and recycle). Waste, as a source of life, until now, is abundant and still not utilized optimally. On the other hand, biotic solid waste that has undergone natural chemical processes has excellent potential—both from the quantity and quality of protein as a source of life. We can use all biotic waste materials again as raw materials for the next food process. Waste processing with sorting techniques maximizes the stage of organic waste decay as a mechanism for processing waste material to the next form of energy. After the decay period, organic waste undergoes a natural chemical process that will produce maggots. Without being separated from the influence of the magot, after the natural chemical process, the organic waste material turns into organic material, which is very good in its content as a growing medium for food plants. A waste treatment technology approach is needed to solve the problem of café restaurant waste. Unlike waste materials in general, coffee 8 is a food ingredient from the type of grain that has amino acid levels of up to 12 percent.

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Coffee bean pulp is nothing but energy that has undergone changes in form and levels of substances; it will bring problems if we do not manage it because, after all, energy or natural resources will continue to exist on earth, as in the statement of the law of conservation of energy II that energy will never be used up. We must agree with each other that energy requires severe and consistent handling. That way, the waste of this biotic compound requires post-use treatment. Waste requires integrated and consistent treatment steps. This is a logical consequence of the characteristics of natural resources with energy content in them. Waste, with decreased conditions and energy levels, must get special treatment through the sorting stage at the beginning. Solely creating the perfect decay phase opportunity for waste. The decay phase is the stage of cell nucleus regeneration in biotic energy. The period of the rotten interval of this biotic material becomes the age range of other microorganisms. The living space of BSF maggots or larvae is in the age range of such decay. That way bioconversion becomes the most appropriate choice for processing coffee grounds. It takes at least two to 3 months to process this coffee waste so that we can use it in a planting medium with nitrogen, phosphorus, potassium, sulfur, and calcium content.

Figure 3. Storage of onions in coffee casgot growing media

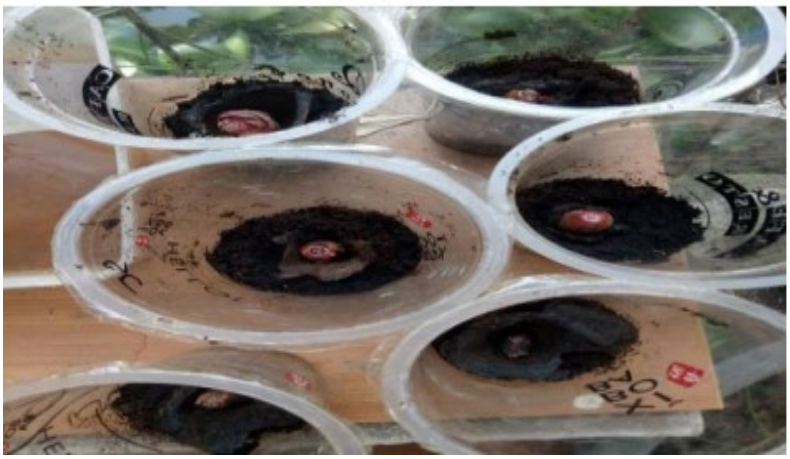

Figure 4. Presentation of Coffee Kasgot that has been filled with onion plants on Poly Bag

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This step of processing coffee waste is one of the handling of waste from so many biotic wastes, which, on the one hand, is so abundant, on the other hand, has not been optimally handled. Handling this waste is also a form of our responsibility as a scientific stakeholder to prioritize solutive efforts in creating natural balance; in addition to our efforts, this is like a swab of environmental gaps from the impacts presented by some waste that has not been seriously handled.

CONCLUSION

This step of processing coffee waste is one of the handling of waste from so many biotic wastes, which, on the one hand, is so abundant, on the other hand, has not been optimally handled. Handling this waste is also a form of our responsibility as a scientific stakeholder to prioritize solutive efforts in creating natural balance; in addition to our efforts, this is like a swab of environmental gaps from the impacts presented by some waste that has not been seriously handled.

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