Organic Fertilizer the Result of Innovation Egg Shell Waste

Suryadi[1], Dyah Erlina Sulistyaningrum[2], Agus Suryanto[3], Takim Mulyanto [4], Tri Rahayuningsih[5], Rijono Eko Muharijanto[6], Rofiqul Fadilah[7]

[1,2,4,5,6,7]Universitas Merdeka Malang, PDKU Ponorogo, [3]Universitas Soerya Ngawi
e-mail: suryadi@unmer.ac.id

*Suryadi

ABSTRACT

The background to the use of egg shells as organic fertilizer includes several important aspects that explain the relevance and urgency of using this material in the context of sustainable agriculture. The following are several main points that can be part of this background. First is the problem of using chemical fertilizers. Environmental Degradation. Excessive use of chemical fertilizers causes soil and water pollution, and reduces soil quality. This has a negative impact on ecosystems and human health. Farmer Dependency. Many farmers depend on chemical fertilizers to increase crop yields, which often increases production costs and reduces profits.

The public needs to be given an understanding of how to process and use egg shells. Socialization and training activities are needed to change traditional agricultural mindsets and practices. Farmer Empowerment: With new knowledge and skills, farmers can reduce dependence on chemical fertilizers, reduce costs, and increase crop yields naturally. By considering the factors above, the use of egg shells as organic fertilizer not only contributes to reducing waste, but also provides a solution to increase soil fertility and support more sustainable agriculture. This becomes a strong foundation for implementing community service programs in order to educate and empower the community.

The aim of this service activity is to increase public awareness about the use of egg shells as organic fertilizer. Teaching techniques for processing egg shells to be used as fertilizer. Support sustainable and environmentally friendly agricultural practices. The method used in this service is socialization through interactive discussions and field practice. Socialization is the main focus to raise awareness of the importance of managing waste wisely. After socialization, field practice is carried out.

Keywords: Product Innovation, Organic Fertilizer, Egg Shell Waste

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I. Introduction

Sustainable agriculture is the key to meeting people's food needs without damaging the environment. Excessive use of chemical fertilizers has caused soil degradation, pollution and reduced quality of agricultural products. Therefore, a more environmentally friendly fertilizer alternative is needed. Egg shells, which are often considered waste, have great potential as organic fertilizer. Egg shells contain about 95% calcium carbonate, as well as other important minerals such as magnesium and phosphorus. Using egg shells not only helps reduce waste, but can also increase soil fertility (Ministry of Agriculture of the Republic of Indonesia, 2021).

Egg shell waste is abundant due to several factors. The first factor is food production. Worldwide, the chicken farming industry produces billions of eggs every year. Every egg has a shell, and every time an egg is processed or consumed, the shell becomes waste. Household consumers also consume large amounts of eggs, and egg shells are often discarded after being used in cooking. The second factor is that eggshell waste is abundant due to several factors, namely that there is no special processing. Many people don't realize that egg shells can be used as organic fertilizer. As a result, egg shells are often simply thrown away without further processing. In some communities, there are no facilities or systems that support the collection and processing of eggshell waste (Arifin, M. 2020).

Another factor is increasing consumption patterns. With increasing consumption patterns of animal products, including eggs, egg shell waste also increases. People who prefer animal protein-based foods contribute to this amount of waste. Eggshells can last a long time without decomposing, so the accumulation of eggshell waste can continue to increase over time. A further factor is the lack of recycling initiatives. Even though egg shells have many benefits, the lack of initiative to recycle or utilize these shells as organic fertilizer results in a lot of waste being wasted. The nature of egg shells has a high calcium content. Eggshells consist of about 95% calcium carbonate, which has many benefits for soil and plants. However, without the knowledge or technology to process them, many egg shells are simply thrown away (Rini, S. 2019).

With all these factors, eggshell waste has become very abundant. However, with increasing awareness about sustainability and waste management, there is great potential to efficiently utilize eggshells, which can help reduce waste while providing benefits to agriculture. There are several reasons why people are not able or are not interested in processing egg shell waste (Nurdin, A. 2022). The first reason is lack of knowledge and education. Lack of Information. Many people do not know that egg shells have value as organic fertilizer. Without this knowledge, they tend to view it as waste that must be thrown away. Limited education. The lack of education or

outreach programs regarding how to process egg shells means that people do not have the necessary skills or information.

Another reason why people are not able or are not interested in processing egg shell waste is the negative perception of waste. Waste Stigma. Some people consider eggshell waste to be dirty or unfit for use. This perception may prevent them from trying to cultivate it. Not understanding the benefits of waste is also the reason why people are not able or are not interested in processing egg shell waste. Without a clear understanding of the benefits of egg shells, people may not feel compelled to cultivate them.

Lack of facilities and infrastructure. In some areas, there may be no facilities or equipment to support eggshell processing. Without access to adequate equipment, it is difficult for communities to start the processing process. The lack of support from the government in the form of policies or programs that promote waste management can hamper community initiatives (Siti, R. 2023).

Many people are accustomed to throwing away waste without considering better processing methods. These habits are difficult to change without a systematic and sustainable approach. Existing farming traditions and practices may not include the use of new materials such as eggshells, so eggshell processing is not considered important. Some people may feel that the cost of processing egg shells (although it may be low) is not worth the benefits obtained. In some cases, farmers may focus more on using familiar chemical fertilizers, so they do not feel the need to switch to organic fertilizers. Lack of Incentives for recycling: Without adequate incentives from the government or other organizations, communities may not feel motivated to switch to better waste management practices (Mustika, D. 2020).

By understanding these reasons, efforts to increase public awareness and knowledge about processing eggshell waste can be carried out through education, training and information campaigns. With the right approach, communities can be empowered to utilize this waste effectively, which in turn can support sustainable agriculture and reduce waste.

The background to the use of egg shells as organic fertilizer includes several important aspects that explain the relevance and urgency of using this material in the context of sustainable agriculture. The following are several main points that can be part of this background. First is the problem of using chemical fertilizers. Environmental Degradation. Excessive use of chemical fertilizers causes soil and water pollution, and reduces soil quality. This has a negative impact on ecosystems and human health. Farmer Dependency. Many farmers depend on chemical fertilizers to increase crop yields, which often increases production costs and reduces profits.

Abundant waste sources are also a major point that can be part of the background. In many households, egg shells are often thrown away as waste. Every year, billions of egg shells are produced by the food industry, making them an

abundant but overlooked resource. With proper processing, egg shells can be used as organic fertilizer, reducing waste and increasing sustainability.

Egg shells are composed of about 95% calcium carbonate and contain other minerals such as magnesium and phosphorus, which are important for plant growth. Calcium functions to strengthen cell walls and help root growth. Organic fertilizer from egg shells can increase soil fertility, improve soil structure, and support the life of beneficial microorganisms. Sustainable Agriculture Concept. There is increasing awareness about the importance of environmentally friendly agricultural practices. People are increasingly looking for alternatives that can maintain ecosystem sustainability. Using egg shells as organic fertilizer is in line with the global trend towards sustainable agriculture, where waste is utilized to support better agricultural production.

The public needs to be given an understanding of how to process and use egg shells. Socialization and training activities are needed to change traditional agricultural mindsets and practices. Farmer Empowerment: With new knowledge and skills, farmers can reduce dependence on chemical fertilizers, reduce costs, and increase crop yields naturally. By considering the factors above, the use of egg shells as organic fertilizer not only contributes to reducing waste, but also provides a solution to increase soil fertility and support more sustainable agriculture. This becomes a strong foundation for implementing community service programs in order to educate and empower the community.

Purpose of Service

The objectives of this service activity include:

1. Increase public awareness about the use of egg shells as organic fertilizer.
2. Teach techniques for processing egg shells to be used as fertilizer.
3. Support sustainable and environmentally friendly agricultural practices.

Socialization

Socialization is carried out through several activities, such as providing material to PKM partners, mentoring with modules and group discussions. This activity aims to provide understanding to the public about (Sulistyaningrum, 2023):

- The importance of sustainable agriculture.
- Benefits of egg shells as organic fertilizer.
- How to process egg shells for use in agriculture.

Interactive discussions are the main focus to raise awareness of the importance of managing waste wisely.

Field Practice

After socialization, field practice is carried out with the following steps:

1. Processing Demonstration: Teaches how to clean, dry and grind egg shells until they become a fine powder. This is done to ensure participants understand each stage of processing.

   Making egg shell waste into organic fertilizer is a fairly simple and useful process. Here are the steps:

   Required Materials:

   1. Egg shells
   2. Container for storing shells
   3. Grinder, pounder or blender
   4. Compost or other organic material (such as vegetable waste, dry leaves, etc.)

   Steps:

   1. Collecting Egg Shells: Collect egg shells that have been cleaned from egg remains. Wash until there is no slime and clean. Let the shell dry in the open air for several days.

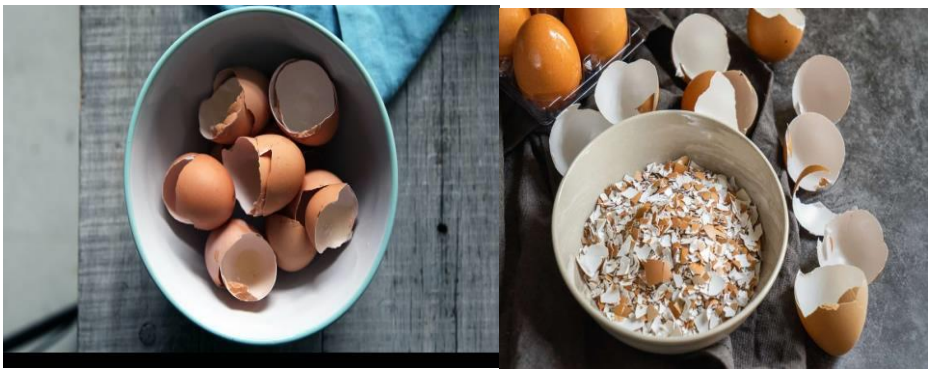

Figure 1. The main ingredient is egg shell waste

2. Grinding: Once dry, crush the egg shells into a fine powder. You can use a blender or grinder. The finer it is, the better for the decomposition process.

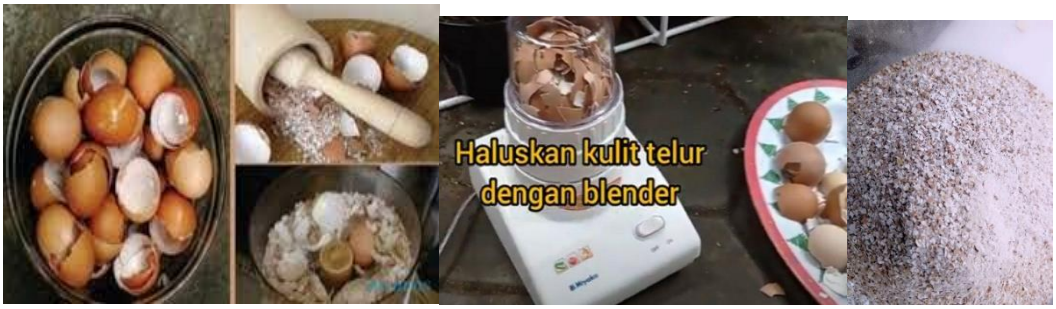

Figure 2. Smoothing egg shells

3. Mix with Organic Ingredients:

   Mix eggshell powder with other organic ingredients, such as vegetable scraps or dried leaves. A good ratio is 1 part eggshell to 3 parts other organic materials. There's no need to blend leftover vegetables and dried leaves, but chopping them

into smaller pieces can help speed up the decomposition process. This allows microorganisms to more easily break down these materials. If you wish, simply chop the remaining vegetables and shred the dried leaves before mixing them with the crushed egg shells. This will make the composting process more effective.

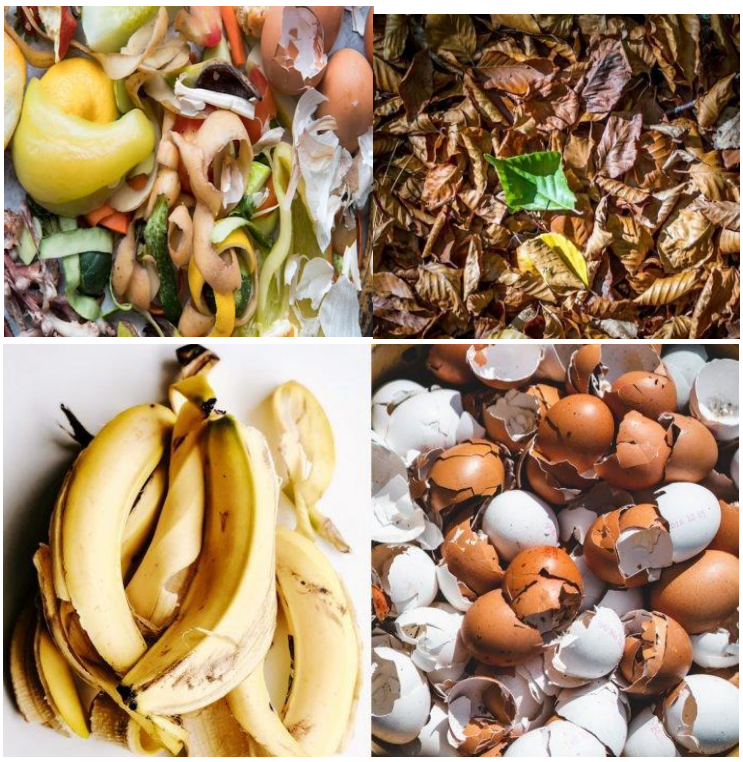

Figure 3. Organic material in the form of vegetable residues, fruit and dry leaves

4. Composting Process: Place the mixture in a compost container. Make sure to turn the mixture periodically to allow air to enter and speed up the decomposition process.
5. Storage: Store compost in a shady and damp place. This process usually takes several weeks to several months, depending on environmental conditions and the materials used.
6. Use: Once the compost is ready, use this organic fertilizer to fertilize plants. Application in Gardens

Once the eggshell powder is ready, participants are guided to mix it into the planting medium. An explanation of the correct proportions and method of watering liquid fertilizer from egg shells was also provided (Sulistyaningrum, 2024).

Figure 4. Application of devotion results to plants

Monitoring

Participants are encouraged to record the development of their plants over a certain period, so they can see the difference between plants using eggshell fertilizer and those using chemical fertilizer. Participants are also encouraged to market organic fertilizer products from egg shells (Suryadi, 2023).

Figure 5. Plants look fertile when applied with egg shell fertilizer

II. Results and Discussion

Outcomes of Socialization

Socialization succeeded in attracting public attention. Many participants actively participated in the discussions, and they showed interest in applying the techniques taught. Knowledge about the benefits of egg shells as organic fertilizer is starting to be understood by the public.

Field Practice Results

Field practice showed that participants were able to process egg shells into organic fertilizer well. The process of grinding and mixing with soil can be done easily. Many participants reported that they felt confident implementing this technique in their gardens.

Discussion

The results obtained show that egg shells not only serve as a substitute for chemical fertilizers, but also increase overall soil fertility. Applying organic fertilizer from egg shells can be the first step towards more sustainable agriculture. Apart from that, public awareness about waste management has also increased, thereby reducing negative impacts on the environment.

III. Conclusion

Utilizing egg shells as organic fertilizer is an effective solution in supporting sustainable agriculture. This service activity has succeeded in increasing public awareness of the importance of using local resources and providing practical knowledge regarding waste management. The results obtained show the potential of egg shells in increasing agricultural yields and protecting the environment.

Some steps that can be taken to continue this program are:

1. Advanced Training: Hold additional training to discuss other organic farming techniques, such as the use of different organic waste.
2. Collaboration with Educational Institutions: Collaborate with schools and universities to develop educational modules on sustainable agriculture.
3. Environmental Campaign: Launch a campaign to increase public awareness about waste management and the benefits of organic fertilizer. These activities can take the form of seminars, workshops and promotions on social media.

With these steps, it is hoped that society can continue to utilize existing resources optimally and sustainably. Through collaboration and education, we can build a better future for agriculture and the environment.

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