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Training on the Production of Organic Compost Fertilizer from Mushroom Baglog Waste

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Abstract

Purpose: Organic waste from oyster mushroom cultivation bags in Gayungan Village, RW 03, has long been underutilized. The purpose of making compost from oyster mushroom cultivation bag waste is to improve the community's knowledge and skills in sustainable waste management.

Method: The training was conducted through socialization, question and answer sessions, and mentoring, involving 25 participants. The approach used was as follows: quantitative data was collected through pre- and post-training evaluations, while qualitative insights were obtained from interviews and field observations. The data was analyzed using descriptive statistics and thematic analysis.

Practical Applications: This training effectively improves participants' knowledge and skills in processing mushroom baglog waste into organic fertilizer. This raises public awareness, reduces waste accumulation, and encourages environmentally friendly agricultural practices. Some residents have implemented composting techniques independently, demonstrating the potential for small-scale economic development. This program supports sustainable waste management and community empowerment.

Conclusion: This program demonstrates that targeted environmental education combined with hands-on practice can foster behavioral change, promote circular economy principles, and enhance community resilience through sustainable agriculture.

Introduction

The urban farming program in the city of Surabaya is one of the manifestations of the Surabaya City Government's policy to achieve food security. Urban farming, which utilizes vacant land, has been implemented by the Surabaya City Government since 2017 (Athariyanto, 2015). Broadly defined, urban farming is an activity program that involves not only agriculture, but also livestock farming, aquaculture, agroforestry, and horticulture (Wijaya et al., 2020) One of the urban villages in Surabaya that implements urban farming is Gayungan Village. Gayungan Village has several sectors within its urban farming initiatives, such as: a vanilla garden, a tabulampot (potted fruit plant) garden, maggot cultivation, a wastewater treatment facility, and oyster mushroom cultivation.

The growing trend of urban farming and oyster mushroom cultivation in Gayungan Village often leads to new problems. Oyster mushroom cultivation can produce waste in the form of used baglogs that have already been harvested and are no longer active in producing mushrooms. Several mushroom farmers face limitations in land and facilities to manage these used baglogs. The accumulated waste not only causes unpleasant odors and attracts pests, but is also often discarded carelessly due to a lack of understanding about its recycling potential. In some cases, a single harvest cycle of oyster mushroom cultivation can produce up to 6 tons of baglog waste (Jumar et al., 2021).

The community of Gayungan sub-district cultivates oyster mushrooms in a designated area located in RW 03. This site includes one mushroom house (kumbung) with a capacity of 5,000 baglog units. In a single harvesting cycle, the waste generated from these baglogs can reach approximately 1 ton. This baglog waste—consisting of old and contaminated baglogs refers to the spent growing medium that is no longer productive (Aris Priyanto, 2013). Without proper management, the accumulation of this waste may lead to environmental issues, such as air pollution and soil quality degradation in the disposal area. Therefore, sustainable waste treatment efforts are essential to minimize the negative environmental impacts (Susilowati et al., 2022).

The baglog waste still contains several essential nutrients required by plants and has the potential to improve soil nutrient content. The nutrient composition of baglog waste includes phosphorus (P) at 0.7%, potassium (K) at 0.02%, total nitrogen (N) at 0.6%, and a high organic carbon (C-organic) content, reaching up to 49.00%. These contents make baglog waste a valuable organic material for enhancing soil fertility and quality (Hunaepi et al., 2018). Due to this nutrient content, spent mushroom substrate holds significant potential to be processed into organic fertilizer. Mushroom cultivation waste can be utilized through composting to produce organic compost fertilizer, which improves soil quality and supports plant growth.

In addition, Stated that one of the alternative methods for waste management is utilizing spent mushroom baglog as a raw material for organic fertilizer production through the composting process. Similarly, (Juniartini, 2018) that composting not only serves as a waste management strategy but also has the potential to reduce air pollution caused by waste incineration and to suppress methane gas emissions from decaying organic waste at disposal sites, due to the activity of methanogenic bacteria. Moreover, the use of compost is also known to improve soil structure and characteristics (Bria et al., 2025).

The conversion of baglog waste into organic fertilizer not only supports efforts to reduce environmental pollution but also utilizes its natural properties as an organic material that has already undergone partial decomposition. As a result, the composting process is relatively faster compared to other organic materials. While the general production of organic fertilizer typically requires 2 to 3 months (Arum, 2017), the processing of mushroom waste into organic fertilizer takes approximately only 1 month (Alam et al., 2024).

Method

The implementation of the training program on the processing of oyster mushroom baglog waste into organic fertilizer in Kelurahan Gayungan began with a needs assessment conducted through surveys of local residents. This assessment aimed to evaluate the community's knowledge, skills, and interest in utilizing baglog waste as raw material for organic fertilizer. The findings served as the foundation for designing a training curriculum that was relevant and tailored to the characteristics and needs of the community. The curriculum encompassed theoretical aspects such as the physicochemical properties and nutrient content of baglog waste, the basic principles of composting, and the concepts of sustainable agriculture (Rastono et al., 2023).To enhance participants' understanding, the program also incorporated practical sessions.

The outreach and training activities were carried out in Kelurahan Gayungan, Gayungan Sub-district, Surabaya City, East Java Province, involving active participation from the community, particularly oyster mushroom cultivators. Baglog waste, which had previously been discarded without further processing, actually contains high levels of organic matter and can be utilized effectively if properly managed. Therefore, the program commenced with a socialization phase to raise awareness about the untapped potential of baglog waste.

Following the socialization, technical training sessions were conducted, emphasizing practical and applicable approaches. The training covered the stages of organic fertilizer production, including material collection, ingredient mixing, fermentation, and evaluation of compost maturity. Participants were taught to use dry leaves and banana peels as additional materials to accelerate the decomposition process (Salman et al., 2024).These materials, along with baglog waste, were mixed in plastic containers and stirred until homogeneous. Subsequently, a solution of EM4, molasses, and water was added in appropriate amounts and stirred again to ensure thorough mixing. The containers were then sealed tightly to create optimal fermentation conditions. During the fermentation process, the mixture was stirred every 3 to 5 days to maintain aeration and support the activity of decomposing microorganismse (Matheus & Kantur, 2025).

Through this initiative, participants not only gained theoretical insights but also acquired practical skills that could be independently applied in their local environments. It is expected that the community will be empowered to manage oyster mushroom cultivation waste into useful and environmentally friendly products, thereby contributing to environmental quality improvement and the advancement of sustainable urban agriculture (Subekti et al., 2024)

Result

The training program on organic fertilizer production from oyster mushroom baglog waste in Gayungan Village demonstrates comprehensive assistance through a series of structured activities. These activities include community outreach, participatory training, and hands-on composting practice. Technically, the program begins with an awareness-raising phase to highlight the hidden potential of mushroom cultivation waste, followed by practical sessions where participants are trained in mixing materials, fermentation processes, and harvesting mature compost. The direct application of these skills is evident, as some participants successfully processed mushroom bag waste into organic fertilizer used for household-scale farming and community-based agricultural activities.

This program effectively improves waste management practices by transforming previously discarded baglog waste into valuable organic fertilizer. This transformation contributes to reducing dependence on chemical fertilizers and promotes environmentally friendly agriculture, positively impacting local soil health, micro-ecosystem balance, and overall environmental quality. The integration of composting activities into urban agriculture and edutourism initiatives also expands the relevance and appeal of sustainable practices among the community.

From a socio-cultural perspective, this training encourages the emergence of young people in the community as agents of change, who begin to informally share this knowledge and practice with other residents. This indicates the beginning of behavioral change toward sustainable organic waste management. The knowledge imparted will be managed by the youth group, which will disseminate information about compost production and composting groups within the community. This program shows the initial signs of the formation of a community mindset oriented toward resilience, environmental awareness, and economic opportunities.

Economically, the conversion of baglog waste into organic fertilizer has the potential to reduce production costs for local agriculture and may evolve into a marketable product (Bellapama, 2015). The program's influence on livelihood diversification—particularly within the environmental and agricultural sectors—indicates a trajectory toward broader socio-economic transformation. While these impacts are promising, future work should more clearly articulate the sustainability mechanisms developed post-training and their implications for long-term community empowerment.

Discussion

The training program successfully provided participants with a solid foundation in organic waste processing, particularly in transforming mushroom baglog waste into organic compost fertilizer. Through a combination of theoretical sessions and hands-on practice, participants gained comprehensive insights into the decomposition of organic materials, effective composting techniques, and the application of compost in promoting sustainable agriculture and environmental greening. Beyond mere knowledge transfer, the program also focused on community empowerment and capacity building, encouraging residents of RW 03, Gayungan Subdistrict, to actively engage in independently managing organic waste. As their confidence grew, participants were motivated to implement and promote composting practices within their neighborhoods, fostering self-reliance and a sense of ownership over environmental conservation efforts.

Community involvement and active participation were key elements of the program. A preliminary needs assessment ensured that the training materials were tailored to the local context and potential of the community. Direct engagement in activities such as waste chopping, compost material mixing, and fermentation monitoring fostered a sense of shared responsibility and collaboration among participants. This engagement is essential to ensure the long-term success and sustainability of composting practices within the community. the program made a tangible contribution to reducing waste and environmental pollution. By converting mushroom baglog waste into compost, the community not only prevented waste accumulation and open burning but also produced a valuable product for agricultural and greening initiatives. This approach aligns with circular economy principles and supports the Sustainable Development Goals (SDGs), particularly Goal 11 (Sustainable Cities and Communities) and Goal 12 (Responsible Consumption and Production). From an economic perspective, utilizing mushroom baglog waste for compost production offers cost-saving benefits and potential additional income (Azizah et al., 2024).Residents can reduce reliance on chemical fertilizers and explore micro-business opportunities centered on organic products. Furthermore, such activities may attract interest from eco-conscious communities and urban farming practitioners, opening up opportunities for collaboration and environmentally friendly product markets.

Another significant aspect of the training is its potential for replication and scalability. The documented methods, curriculum, and field experiences can serve as valuable references for other communities facing organic waste management challenges. By sharing these best practices, the program’s impact can extend further to build environmentally aware and economically empowered communities. In conclusion, the organic compost production training program using mushroom baglog waste in RW 03, Gayungan Subdistrict, has successfully

equipped the local community with the knowledge and skills for sustainable organic waste management. The program has contributed to environmental conservation, community empowerment, and the strengthening of the local economy. By adopting effective composting practices, the community can become a pioneer in creating a cleaner, healthier, and more productive environment.

The arrival of the community service team that initiated this training aimed to enhance residents' knowledge regarding the utilization of organic waste into useful products, while simultaneously supporting the achievement of local-level sustainable development goals.

Figure 1. Team the KKN UPNVJT Arrived At Gayungan Village

Source: Private Documentation, 2025.

Figure 2 illustrates the UPN “Veteran” Jawa Timur team conducting training on the production of organic compost fertilizer from spent mushroom substrate (baglog waste). This figure presumably depicts the efforts and initiatives undertaken by the team to educate and train individuals or local communities on the techniques and benefits of transforming mushroom cultivation waste into high-value organic fertilizer. Training on Organic Compost Production from Mushroom Baglog Waste. This training program aims to equip participants with practical knowledge and technical skills in organic waste management, particularly focusing on the composting of mushroom baglog waste. The content includes theoretical instruction and hands-on activities involving the decomposition process, compost mixing techniques, and application of compost to support sustainable agriculture and environmental greening efforts. The program also emphasizes the environmental and economic benefits of waste-to-resource practices. It highlights how such training supports the circular economy by reducing organic waste, minimizing pollution, and providing communities with alternative sources of income through the production and possible commercialization of organic fertilizer.

Figure 2 visually captures the UPN team’s initiatives in community education and empowerment, illustrating their composting demonstrations, community involvement, and the interactive learning environment.

Figure 2. Team UPNVJT Training On Making Organic Fertilizer From Mushroom Baglog Waste

Source: Private Documentation, 2025.

Figure 3 illustrates the high enthusiasm of residents in RW 03, Gayungan Subdistrict, in observing the outcomes of the training on the production of organic fertilizer made from spent mushroom substrate (baglog waste), along with its application in the local environment. This visual represents the active involvement of the community in utilizing the results of the training, reflecting an increased awareness of the importance of sustainable organic waste management. The residents' participation is evident through direct application activities of the compost fertilizer, such as fertilizing green open spaces, home garden plants, and small-scale agricultural land. This indicates the community's readiness and willingness to apply the acquired knowledge in their daily lives as a tangible contribution to environmental preservation efforts.

Furthermore, the image also reflects the community's understanding of the strategic benefits of using organic fertilizer, including improved soil quality and fertility, reduced dependence on synthetic chemical fertilizers, and more environmentally friendly waste management. Therefore, Figure 3 illustrates the active participation and enthusiasm of the community in implementing the training outcomes as a concrete step toward sustainable agricultural practices and the development of a greener environment.

Figure 3. Residents of Gayungan Subdistrict Are Enthusiastic to Participate in Training for Making Organic Fertilizer from Mushroom Baglog Waste

Source: Private Documentation, 2025.

Conclusion

The training program on producing organic fertilizer from mushroom baglog waste held in RW 03, Gayungan Subdistrict has demonstrated significant success, marked by various positive impacts across social, environmental, and economic sectors. This initiative aimed to enhance the community's capacity in managing organic waste effectively, while simultaneously promoting environmentally friendly agricultural practices based on local resources. Through a participatory approach, the program successfully empowered the community with technical knowledge and skills related to the conversion of baglog waste into compost fertilizer. The training materials included the fundamental principles of sustainable agriculture, the agronomic benefits of organic fertilizer, and practical techniques for design, decomposition processes, and quality maintenance of the compost. The knowledge gained not only improved the individual competencies of participants but also encouraged their transformation into change agents within their communities.

The success of the program was further supported by the active engagement of community members throughout the training process, which was contextually tailored to local needs. This collaborative approach fostered a sense of ownership and shared responsibility, which is essential for ensuring the long-term sustainability of the organic waste management initiative. From an environmental perspective, the application of organic fertilizer derived from baglog waste has significantly contributed to reducing dependency on synthetic chemical fertilizers, improving soil quality and structure, and minimizing pollution caused by unmanaged

waste disposal. Additionally, the use of organic fertilizer in home gardens, public green spaces, and small-scale farms has supported naturally enhanced agricultural productivity in an environmentally sound manner.

The success of this program suggests that community-based training models can be replicated in other regions facing similar challenges in organic waste management. The training methodology, curriculum, and implementation approach can be adapted to expand the adoption of composting technologies based on local waste resources. Overall, this program has made a tangible contribution to community capacity building, environmental conservation, local economic empowerment, and the promotion of sustainable agricultural practices. With these achievements, RW 03, Gayungan Subdistrict has the potential to serve as a pilot model for community-based waste management solutions in support of sustainable development.

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