


# Increasing Knowledge And Attitudes Towards Organic Waste Processing Through Demonstration Of BSF (Black Soldier Fly) Maggot Cultivation Practices At Darul Fikri Islamic Boarding School, Sungai Belidak

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Article Info	ABSTRACT
<b>Keywords:</b> Maggots, Organic waste, Demonstration, Knowledge, Attitude, Islamic boarding school.	Darul Fikri Islamic Boarding School, as an Islamic educational institution and religious tourism destination, produces a large amount of organic waste, improper management of organic waste can have a negative impact on the environment. BSF maggot cultivation offers a potential solution to overcome the problem of organic waste, this study aims to measure the effectiveness of BSF maggot cultivation practices in improving students' knowledge and attitudes towards organic waste management at Darul Fikri Islamic Boarding School, this study used a quasi-experimental one-group pretest-posttest design, A total of 30 students became respondents and were given questionnaires before and after participating in the BSF maggot cultivation practice. Data were analyzed using a paired t-test to test the difference in scores between the pretest and posttest. The results showed a very significant increase (p value <0.05) in the knowledge and attitudes of students after participating in the BSF maggot cultivation practice, this indicates that the demonstration method is an effective approach in increasing students' awareness and skills in managing organic waste. The practice of BSF maggot cultivation has proven effective in improving students' knowledge and attitudes towards organic waste management. This approach can be a model that can be applied in other educational institutions to encourage environmentally friendly behavior.
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## INTRODUCTION

Darul Fikri Islamic Boarding School is a private Islamic educational institution located on Jalan Sungai Belidak, Gang H. Jelai, Sungai Belidak Village, Sungai Kakap District, Kubu Raya Regency, West Kalimantan. In addition to being an Islamic educational institution, Darul Fikri Islamic Boarding School is also a religious tourism destination known as Kampung Wahsawah. Economic development efforts in Islamic boarding schools are a strategic initiative to maximize local economic potential, implement Islamic values, and contribute to improving community welfare (Syardani et al., 2022). A cooking activities to meet the needs

of students and religious tourism visitors at Islamic boarding schools produce a lot of organic waste. Without proper processing of the organic waste produced, it can cause environmental pollution (Shafa Zahirah et al., 2024).

According to data from the National Waste Management Information System (SIPSN) of the Ministry of Environment and Forestry (KLHK) in 2023, the results of input from 290 districts/cities in Indonesia stated that the amount of national waste accumulation reached 31.9 million tons. Most of the The composition of waste in Indonesia, namely (57%) is organic waste. The rest consists of plastic (16%), paper (10%), and other materials such as metal and glass (17%). Although easily decomposed and considered environmentally friendly, organic waste that is not managed properly can also cause environmental pollution and become a breeding ground for animals/vectors carrying diseases. Waste management is an important aspect in maintaining environmental sustainability and public health (Sukma Yuliawati et al., 2024). Organic waste processing can be done using several methods such as the eco-enzyme method (liquid extract produced from the fermentation of vegetable and fruit waste with brown sugar or molasses substrate)(Muslim Women, 2024), composting method (Sagara et al., 2024), and the method of using Black Soldier maggots/larvae Fly (Yulianto et al., 2024).

Maggot BSF (Black Soldier Fly) is a larva of the black soldier fly. Maggots are able to eat all rotting organic materials such as food scraps, leaves, vegetables and fruits. Maggots are not dangerous insects because they do not transmit diseases. Maggots also have promising potential as an alternative animal feed and can solve the problem of organic waste (Supartini et al., 2022). Organic waste processing with the BSF Maggot method does not take a long time. The Bioconversion process using BSF Maggots lasts for 4 to 27 days (Putri et al., 2023). Maggots have an extraordinary ability to process organic waste, with daily consumption reaching 2-5 times their body weight. In addition, maggots contain 40-50% protein and 24-30% fat and have antimicrobial content (Amandanisa & Suryadarma., 2020). The rich and balanced nutritional content of maggots, especially high animal protein, makes it an ideal feed source to support optimal growth, as well as increase livestock productivity, this rich nutrition makes it an excellent feed for livestock and fish (Afkar et al., 2024). In addition to playing a role in organic waste management, maggot cultivation also offers promising business opportunities. Kasgot (former maggots) is the end result of the maggot cultivation process, which is a high-quality organic fertilizer that can be sold and provides economic benefits for farmers (Rudolf Johannes Hasoloan1, 2024).

Darul Fikri Islamic Boarding School currently still applies a simple method in managing household organic waste, namely by directly giving leftover food to the ducks that are kept and some of the organic waste is also thrown away and left. Although this method can reduce the volume of waste, this method is still not optimal in maximizing the nutritional value of organic waste and has the potential to cause environmental problems if not managed properly. Piles of waste that are not managed properly can be a source of various diseases, as well as reduce the beauty and comfort of the surrounding environment due to unpleasant odors, dirty views, and other potential hazards (Rapii et al., 2021). To overcome this problem, high awareness of organic waste processing is needed. Increasing public awareness of the

importance of waste management can encourage active participation in efforts to reduce waste volume and increase its economic value (Syahputra et al., 2021). In addition to studying religious knowledge, students need to be equipped with a deep understanding of the environment. This is an obligation for every human being, including students, to protect and care for the earth as a mandate given by God (Kania Aprilia et al., 2021). One way to increase students' awareness of the importance of protecting the environment is by providing knowledge about waste management and seeing changes in students' attitudes towards environmental problems faced. Increasing knowledge is very important to do, such as the theory presented by Lawrence Green, the knowledge factor is included in the factors that can influence a person's health behavior.

## METHODS

Using a quasi-experimental one-group pretest-posttest design, this study measured the effectiveness of BSF maggot cultivation practices in improving students' knowledge and attitudes towards organic waste processing. The initial stage of the study was to administer a pretest questionnaire to 30 respondents from the student population at the Darul Fikri Islamic Boarding School, Sungai Belidak, who were selected using a purposive sampling method. After participating in the BSF maggot cultivation practice program directly, respondents were given a posttest questionnaire. Organic waste processing became the dependent variable in this study, while knowledge and attitudes became the independent variables. The data were analyzed using univariate and bivariate analysis, the difference in scores between the pretest and posttest was analyzed using a paired sample t-test to test the significance of changes in the students' knowledge and attitudes.

## RESULTS AND DISCUSSION

Based on the data in Table 1, the study population consisting of 30 students at the Darul Fikri Islamic Boarding School, Sungai Belidak, was dominated by women (63.3%). In addition, the age range of respondents was concentrated in the early adolescent group, with the majority (70.0%) aged 11-14 years.

**Table 1.** Respondent Characteristics

Variables	n	%
Gender		
- Man	11	36.7
- Woman	19	63.3
Age		
- 11-14	21	70.0
- 15-20	9	30.0

Source: Primary Data, 2024

**Table 2.** Pre-Test Knowledge Item Analysis

Question	Correct		Wrong	
	N	%	N	%
Easily Decomposed Waste	14	46.7	16	53.3
Origin of Organic Waste	15	50.0	15	50.0
Benefits of Organic Waste Processing	13	43.3	17	56.7
Organic Waste Pollution	17	56.7	13	43.3
Vectors Found in Organic Waste	17	56.7	13	43.3
Diseases Caused by Direct Contact with Garbage	18	60.0	12	40.0
How to Process Organic Waste	12	40.0	18	60.0
Understanding Maggots	12	40.0	18	60.0
Benefits of Maggots	13	43.3	17	56.7
Waste That Cannot Be Decomposed by Maggots	14	46.7	16	53.3
Advantages of Waste Processing with Maggots	18	60.0	12	40.0
Maggot Benefits	18	60.0	12	40.0
Maggot Life Cycle	12	40.0	18	60.0
The Amount of Waste That Maggots Can Consume	5	16.7	25	83.3
Kasgot Function	21	70.0	9	30.0

**Table 3.** Pre-Test Attitude Item Analysis

Question	TP		KK		SR		SL	
	N	%	N	%	N	%	N	%
Sorting Organic Waste	14	46.7	14	46.7	1	3.3	1	3.3
Throwing Garbage in the Right Place	5	16.7	13	43.3	8	26.7	4	13.3
Difficulty in Sorting Waste	8	26.7	13	43.3	9	30.0	0	0
Responsibility for Managing Organic Waste	5	16.7	14	46.7	5	16.7	6	20.0
The Importance of Managing Organic Waste	8	26.7	10	33.3	5	16.7	7	23.3
Participating in the Socialization of Organic Waste Processing	3	10.0	17	56.7	5	16.7	5	16.7
Get Information About Organic Waste Processing	11	36.7	7	23.3	6	20.0	6	20.0
Hearing About Maggots	21	70.0	5	16.7	3	10.0	1	3.3
Knowing Maggots Can Decompose Waste	18	60.0	5	16.7	5	16.7	2	6.7
Knowing the Benefits of Maggots	18	60.0	8	26.7	2	6.7	2	6.7
Interest in Cultivating Maggots	11	36.7	11	36.7	2	6.7	6	20.0
Maggot Belief Can Reduce Waste	8	26.7	9	30.0	10	33.3	3	10.0
Maggot Cultivation Costs Are Not Expensive	15	50.0	8	26.7	1	3.3	6	20.0
Maggot Cultivation Requires Special Knowledge	10	33.3	9	30.0	9	30.0	2	6.7

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Question	TP		KK		SR		SL	
	N	%	N	%	N	%	N	%
Willing to Follow Maggot Cultivation Training	5	16.7	10	33.3	8	26.7	7	23.3

**Table 4.** Post-Test Knowledge Item Analysis

Question	Correct		Wrong	
	N	%	N	%
Easily Decomposed Waste	27	90.0	3	10.0
Origin of Organic Waste	29	96.7	1	3.3
Benefits of Organic Waste Processing	21	70.0	9	30.0
Organic Waste Pollution	28	93.3	2	6.7
Vectors Found in Organic Waste	27	90.0	3	10.0
Diseases Caused by Direct Contact with Garbage	26	86.7	4	13.3
How to Process Organic Waste	24	80.0	6	20.0
Understanding Maggots	22	73.3	8	26.7
Benefits of Maggots	22	73.3	8	26.7
Waste That Cannot Be Decomposed by Maggots	26	86.7	4	13.3
Advantages of Waste Processing with Maggots	23	76.7	7	23.3
Maggot Benefits	25	83.3	5	16.7
Maggot Life Cycle	21	70.0	9	30.0
The Amount of Waste That Maggots Can Consume	20	66.7	10	33.3
Kasgot Function	26	86.7	4	13.3

**Table 5.** Post-Test Attitude Item Analysis

Question	TP		KK		SR		SL	
	N	%	N	%	N	%	N	%
Sorting Organic Waste	7	23.3	10	33.3	11	36.7	2	6.7
Throwing Garbage in the Right Place	2	6.7	7	23.3	12	40.0	9	30.0
Difficulty in Sorting Waste	8	26.7	8	26.7	8	26.7	6	20.0
Responsibility for Managing Organic Waste	2	6.7	10	33.3	8	26.7	10	33.3
The Importance of Managing Organic Waste	2	6.7	4	13.3	13	43.3	11	36.7
Participating in the Socialization of Organic Waste Processing	4	13.3	10	33.3	5	16.7	11	36.7
Get Information About Organic Waste Processing	5	16.7	6	20.0	9	30.0	10	33.3
Hearing About Maggots	4	13.3	13	43.3	8	26.7	5	16.7
Knowing Maggots Can Decompose Waste	3	10.0	7	23.3	8	26.7	12	40.0
Knowing the Benefits of Maggots	7	23.3	10	26.7	4	13.3	9	30.0

Question	TP		KK		SR		SL	
	N	%	N	%	N	%	N	%
Interest in Cultivating Maggots	5	16.7	10	26.7	5	16.7	10	33.3
Maggot Belief Can Reduce Waste	6	20.0	3	10.0	4	13.3	17	56.7
Maggot Cultivation Costs Are Not Expensive	8	16.7	4	13.3	5	16.7	13	43.3
Maggot Cultivation Requires Special Knowledge	8	16.7	9	30.0	4	13.3	9	30.0
Willing to Follow Maggot Cultivation Training	6	20.0	5	16.7	7	23.3	12	40.0

The results of the bivariate analysis obtained the average mean knowledge before the BSF maggot cultivation practice of 7.30 and after 12.23 (delta mean of 4.93). The p value obtained from the paired t test (p value <0.05) showed a very significant increase in knowledge about organic waste processing in respondents between before and after the maggot cultivation practice, with an increase in knowledge of 60%.

In the attitude variable, the average attitude score before the BSF maggot cultivation practice was 31.17 and after 40.87 (delta mean of 9.70). An increase occurred in the attitude variable of 36.6%, this result was obtained through a paired t-test and obtained a value (p value <0.05) which means that there is a significant difference in attitudes about organic waste processing in respondents between before and after the BSF maggot cultivation practice.

**Table 2.** Paired T-Test Results

Variables	Mean	SD	Delta Mean	p value
Knowledge				
- Before	7.30	3.17	4.93	0,000
- After	12.23	2.53		
Attitude				
- Before	31.17	6.28	9.70	0,000
- After	40.87	10.25		

Source: Primary Data, 2024

Proper processing of organic waste is one of the things in the effort to create a clean and healthy environment. The students at the Darul Fikri Sungai Belidak Islamic Boarding School became respondents in this study focused on the early adolescent group with the majority aged 11-14 years (70%), because there are still many students who do not understand how to process organic waste properly. Research conducted by Wulandari, et al. (2024) shows that most students are not yet aware of the potential of maggots as a profitable solution in managing household organic waste. Although there are a small number who know maggots, their understanding is still very limited, especially regarding the right cultivation



techniques (Wulansari, 2024). This confirms that there are still many students who do not understand how to process organic waste by cultivating BSF Maggots.

Respondents who had good category knowledge in this study before being given organic waste processing practices using BSF Maggots had a percentage of 36.7% and after being given the practice it increased to 96.7% of respondents who had good knowledge. This proves that BSF Maggot cultivation practices have a significant influence on knowledge about organic waste processing. In general, knowledge is a person's understanding or awareness of certain information, including information about organic waste processing and BSF Maggot cultivation. Having good knowledge of organic waste processing is important in maintaining and creating a clean and healthy environment.

In the attitude variable before being given practice, only 36.7% of students had a good category attitude towards organic waste processing. And after being given the practice of organic waste processing by cultivating BSF Maggots, it increased to 73.3%. Attitude is a tendency or individual response in accepting, assessing and acting based on the knowledge they have. A positive attitude towards the importance of organic waste processing through maggot cultivation will encourage students to maintain the cleanliness of the Islamic boarding school environment.

The results of the bivariate analysis obtained from this study showed a very significant increase in the knowledge variable, increasing by (60%) and attitudes increasing by (36.6%) after participating in the BSF maggot cultivation practice. This finding indicates that direct practice activities have a positive and effective impact in increasing students' understanding and awareness of the importance of organic waste management. This finding is also in line with research conducted by Martono, et al., which found an increase in respondents from pre-test to post-test. Knowledge about waste and abundance is a sub-material that has experienced a significant increase. Participants are able to distinguish between waste and overflow. Knowledge about BSF flies and their cycles has also increased significantly (Martono et al., 2024).

Research on organic waste processing using BSF Maggots has begun to be widely carried out both in Village and Islamic Boarding School environments with different methods. Most of the research is carried out using devotion, empowerment and direct practice methods (Yuwita et al., 2022; Siswanto et al., 2022). Research using direct practice methods is very effective in improving students' knowledge and attitudes towards organic waste processing. This was also confirmed in a study conducted by Wulansari, et al. (2024) that there was an increase in students' knowledge after participating in activities. In line with the findings of this study which strengthens the direct practice method is very effective in improving respondents' knowledge and attitudes about organic waste processing, especially organic waste processing with BSF Maggot cultivation. Waste processing that is not carried out properly can cause environmental pollution, suboptimal waste management can cause serious problems for the environment, trigger various problems such as soil, water, and air pollution, and disrupt the balance of the ecosystem (Fatmawati et al., 2020).

## CONCLUSION

The research activities conducted at the Darul Fikri Islamic Boarding School, Sungai Belidak have succeeded in increasing the knowledge and attitudes of students towards organic waste management through demonstrations of BSF maggot cultivation practices. A total of 30 students enthusiastically participated in the entire series of activities, from the delivery of materials to direct practice. The results of the pre-test and post-test analysis showed a very significant increase ( $p$  value  $<0.05$ ) in both variables. This proves that the demonstration practice method is an effective approach to fostering students' awareness and skills in managing organic waste. Thus, this activity not only provides theoretical knowledge, but also valuable direct experience for students in implementing the concept of sustainable waste management.

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