Indonesian Journal of Nutritional Epidemiology and Reproductive
ISSN: 2620-8261 (Online)
DOI : 10.30994/ijner.v5i3.190
Vol. 5 No. 3 September 2022, pp 93-97

Analysis of Black Soldier Fly (BSF) Larva as an Effort For Organic Waste Description in Traditional Markets, Jombang Regency

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ABSTRACT

The high population density makes people's consumption high, so that the accumulation of waste increases. The waste generated in Jombang Regency is high (417,838 m3/day in 2010). 50% organic waste comes from market waste because traders sell vegetables where vegetables can be sold when they are still fresh, then each vegetable has a different period and some can still be sold for a few days. The purpose of this study was to determine the ability of Black Soldier Fly (BSF) larvae as an effort to decompose organic waste in traditional markets in Jombang Regency. This study uses an experimental quantitative research design. The population is organic waste obtained from traditional markets in Jombang Regency. The sample is organic waste with 8 different treatments and using repetition. The independent variable is the Black Soldier Fly (BSF) larvae, while the dependent variable is the feeding treatment. Data analysis uses the one-way ANOVA test. The results of this study found that there were differences in the speed of decomposition of organic waste using Black Soldier Fly (BSF) larvae and without treatment. Judging from the output of the one-way ANOVA statistical test in the Homogeneous Subsets table, the control column does not have an equation for the speed of decomposition with treatment 1 to treatment 8. There is an effect of feeding on the speed of decomposition of organic waste, with the one-way ANOVA statistical test, a sig value of 0.000 < 0.05.

Keywords : Black Soldier Fly (BSF) Larvae, Decomposition, Organic Garbage

INTRODUCTION

The problem of waste is still a problem for people in urban and rural areas. The high population density makes people's consumption high, so that the accumulation of waste increases. According to Law No. 18 of 2008 waste is the remains of all human activities in solid form. Garbage can cause contaminants that will cause environmental pollution and can also have a direct influence on health, safety and living comfort (Salman et al, 2020).

Based on data from the Ministry of Environment and Forestry (KLHK), the composition of waste is dominated by organic waste, which reaches 60% of the total waste. Plastic waste occupies the second position with 14%, followed by 9% paper waste and 5.5% rubber (Monita et al, 2017). Other waste consists of metal, cloth, glass, and other types of waste. Organic waste is dominated by food waste (animal and vegetable products), vegetables, fruits, fish waste, agricultural and plantation waste, wood waste, leaves, twigs, and animal and human waste. If not handled properly, organic waste can be a source of disease, a source of pollution and can cause a bad smell.

In general, organic waste can be processed into compost, animal feed and biogas. One alternative to other organic waste decomposition is the use of maggot larvae from army flies or Black Soldier Fly (BSF) larvae which can convert waste into protein and fat, and reduce

waste mass by 50% to 60% so that it can be used as a solution to reduce waste pollution. organic. Organic waste has low nutritional content, namely: Crude protein by 1-15% and crude fiber by 5-38%. However, this organic waste will be more valuable if it is used as feed through processing (Wisnawan, et al 2017).

METHODS

The research method used is quantitative research with experimental study design, is a research method used to find the effect of decomposition of organic waste using Black Soldier Fly (BSF) larvae macroorganisms and differences in the speed of decomposition of organic waste using Black Soldier Fly (BSF) larvae and without using larvae. Black Soldier Fly (BSF).

RESULTS

A. Differences in the Speed of Decomposition of Organic Waste Using Black Soldier Fly (BSF) Larvae And Without Using Black Soldier Fly (BSF) Larvae.

Table 4.1 Homogeneous Subsets Test Results Differences in organic waste reduction

Perlakuan	N	Subset for alpha = 0.05				
		1	2	3	4	5
Kontrol	3	,1033				
Pemberian pakan sampah organik 400 gram pada larva bsf 200 ekor	3		,5000			
Pemberian pakan sampah organik 300 gram pada larva bsf 200 ekor	3		,6667	,6667		
Pemberian pakan sampah organik 400 gram pada larva bsf 300 ekor	3		,6833	,6833	,6833	
Pemberian pakan sampah organik 250 gram pada larva bsf 200 ekor	3			,7533	,7533	,7533
Pemberian pakan sampah organik 300 gram pada larva bsf 300 ekor	3				,8897	,8897
Pemberian pakan sampah organik 200 gram	3				,8917	,8917

pada larva bsf 300 ekor						
Pemberian pakan sampah organik 200 gram pada larva bsf 200 ekor	3					,9300
Pemberian pakan sampah organik 250 gram pada larva bsf 300 ekor	3					,9333
Sig.		1,000	,156	,896	,076	,171

Based on table 4.1, it shows that the control column does not show any reduction equation with treatment 1 to treatment 8. So it can be concluded that there is a difference in the reduction of organic waste decomposition using Black Soldier Fly (BSF) larvae.

Based on Table 4.1 Treatment 6 with an average (0.9333) is a reduction using effective Black Soldier Fly (BSF) larvae. Due to the small amount of waste, BSF larvae are favored so that it does not require a long time for waste reduction.

B. Effect of decomposition of organic waste using Black Soldier Fly (BSF) larval macroorganisms.

Table 4.2 Analysis Results of One Way Anova Test of Black Soldier Fly (BSF) larvae as an effort to decompose organic waste with the SPSS test as follows:

		Sum of Squares	df	Mean Square	F	Sig.
Sisa_pakan	*Between Groups*	137001,333	8	17125,167	437,032	,000
	Within Groups	705,333	18	39,185		
	Total	137706,667	26			
Reduksi	*Between Groups*	1,740	8	,218	36,058	,000
	Within Groups	,109	18	,006		
	Total	1,849	26			

Based on Table 4.2 ANOVA test results obtained a significance value (sig.) of 0.000 or <0.05. So it can be concluded that there is an effect of feeding on the rest of the feed and reducing the decomposition of organic waste.

DISCUSSION

A. Differences in the Speed of Decomposition of Organic Waste Using Black Soldier Fly (BSF) Larvae And Without Using Black Soldier Fly (BSF) Larvae.

The results of the study concluded that there was a difference in the speed of

decomposition of organic waste using Black Soldier Fly (BSF) larvae and without using Black Soldier Fly (BSF) larvae. Judging from the results of the one-way ANOVA statistical test output in the Homogeneous Subsets table, it shows that the control column does not have an equation for the speed of decomposition with treatment 1 to treatment 8.

This is because the Black Soldier Fly (BSF) larvae have a better decomposition ability than other organisms and microorganisms. In addition, Black Soldier Fly (BSF) larvae store fat and protein reserves until they are sufficient for them to pupate into flies, then find a partner, mate, and lay eggs (for females) before finally dying. Therefore, this larval stage is the stage of high feed consumption so that it affects the speed of decomposition of organic waste.

Meanwhile, the decomposition of organic waste without Black Soldier Fly (BSF) larvae or natural decomposition is influenced by temperature, pH, color, odor, texture and volume decrease so that it requires a long decomposition time, which is about 1 week - 1 month.

B. Effect of decomposition of organic waste using Black Soldier Fly (BSF) larval macroorganisms.

The results of the study concluded that there was an effect of decomposition of waste using Black Soldier Fly (BSF) larval macroorganisms. Judging from the results of the one-way ANOVA statistical test output in the ANOVA table, it shows a significance value (sig.) of 0.000 or <0.05. So it can be concluded that there is an effect of feeding on the rest of the feed and the speed of decomposition of organic waste.

This is because the small amount of feed causes the efficiency of the larvae in eating garbage or waste to be high. The more the amount of feed, the lower the efficiency of feed consumption. The small amount of waste is very favored by BSF larvae because it does not take a long time to finish it. In addition, the efficiency of large feed consumption can reduce the occurrence of waste decomposition which can result in high water content for the given waste. The large amount of waste will make it difficult for larvae to reduce it.

If the amount of given waste is higher, then the value of waste reduction tends to be low. This is because the larvae are no longer able to consume the feed given because the feed is too much, so the percentage value of the feed consumed to the total feed is lower.

CONCLUSION

1. There is a difference in the reduction of organic waste decomposition using Black Soldier Fly (BSF) larvae and without treatment. Judging from the results of the one way ANOVA statistical test output in the Homogeneous Subsets table, it shows that the control column does not have a decomposition reduction equation with treatment 1 to treatment 8.
2. There is an effect of feeding on the reduction of the decomposition of organic waste. With the statistical test of the one way ANOVA test, the sig value of 0.000 < 0.05 was obtained. Because if the amount of waste given is higher, then the value of waste reduction tends to be low. This is because the larvae are no longer able to consume the feed given because the feed is too much, so the percentage value of the feed consumed to the total feed is lower.
3. Black Soldier Fly (BSF) larvae are an effective way to decompose organic waste.

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