CATRA RESEARCH INSTITUTE
• ISSN 2720 - 9644 (print)
• ISSN 2721 - 0871 (online)
IJESSS
INTERNATIONAL JOURNAL OF ENVIRONMENTAL, SUSTAINABILITY AND SOCIAL SCIENCE
Indexed By : GARUDA Google doi Crossref ROAD INDEX COPERNICUS OneSearch ISJD EBSCO Clarivate Analytics WEB OF SCIENCE DOAJ

EFFECT OF USING CHICKEN MANURE, STARFRUIT WASTE, AND ICE CREAM WASTE AS FOOD MEDIA ON THE PRODUCTION PERFORMANCE OF MAGGOT BLACK SOLDIER FLY

Volume: 4
Number: 2
Page: 552 - 556

Anang WIDIGDYO[1], Rani Arifah NORMAWATI[2]
[1]Department of Poultry Processing, AKN Putra Sang Fajar Blitar
[2]Department of Digital Office Operational, AKN Putra Sang Fajar Blitar
Corresponding author: Anang Widigdyo
E-mail: anangwidigdyo@akb.ac.id

Article History:
Received: 2022-01-15
Revised: 2023-02-22
Accepted: 2023-03-17

Abstract:
BSF maggots have anti-fungal and anti-microbial compounds that positively impact livestock. Maggot BSF can decompose organic waste, one of which is manure This study aims to determine the effect of the use of chicken manure, starfruit waste and ice cream waste as a food medium on the production performance of Maggot BSF. The method used in this study was experimental by applying a Complete Randomized Design. The results showed that the combined use of chicken manure waste and organic waste with treatment variations did not have a significant effect on weight gain and the specific daily growth rate of BSF maggots. The highest weight gain results were obtained at the P4 treatment of 622 grams and the lowest in the P3 treatment of 560 grams. BSF maggots' specific daily growth rate was highest in the P4 treatment at 11.22% and the lowest in the P3 treatment at 10.53%. This study could use a combination of chicken manure and ice cream waste with a ratio of 50%: 50% providing weight gain and a specific daily growth rate of Black Soldier Fly maggots.

Keywords: Cooperative, Trader, Traditional markets, Capital
Cite this as: WIDIGDYO. A & NORMAWATI, R.A. (2023). "Effect of Using Chicken Manure, Starfruit Waste, and Ice Cream Waste as Food Media on The Production Performance of Maggot Black Soldier Fly" International Journal of Environmental, Sustainability, and Social Sciences, 4 (2), 552 - 556.

INTRODUCTION

The Black Soldier Fly (BSF) is a type of Insecta with several uses for other living things. Rizki (2017) stated that BSF flies are a type of strationmydae family fly found in grass and leaves. BSF maggots have chewy texture characteristics and can produce enzymes naturally (Fajri and Kartika, 2014). Some of the advantages possessed by BSF maggots are high animal protein content, which has the potential to be used as animal feed ingredients. Aziz et al.(2017) stated that BSF maggots are a type of Insecta with a protein content of 30-45%. Indrawan (2014), in addition to having a high protein content, BSF maggots have anti-fungal and anti-microbial compounds that positively impact livestock.

The quality of BSF maggots is determined by the nutrition of the food media consumed. Maulana (2021) stated that different growing media would produce different nutritional content of BSF maggots. BSF maggot cultivation can be done using waste-based organic matter and agricultural and livestock by-products (Herlinane et al., 2021). Maggot BSF can decompose organic waste, one of which is manure (Wardana, 2016).

Chicken manure is one of the organic wastes that can be used as a maggot food medium. Some of the disadvantages that chicken manure has as a medium for growing maggots are its high composition of nutrients and organic matter. Fajri et al. (2014) that chicken manure carried out the fermentation process can improve the production performance of Maggot BSF. Raharjo (2016) stated that 50% of laying hen manure and 50% cow dung produce the best BSF maggots. To produce optimal growth of BSF maggots, adding other organic waste, such as star fruit waste and ice cream

CATRA RESEARCH INSTITUTE
• ISSN 2720 - 9644 (print)
• ISSN 2721 - 0871 (online)
IJESSS
INTERNATIONAL JOURNAL OF ENVIRONMENTAL, SUSTAINABILITY AND SOCIAL SCIENCE
Indexed By :

waste, is necessary. This study aims to determine the effect of the use of chicken manure media, starfruit waste and ice cream waste as food media on the performance of the Maggot Black Soldier Fly.

BSF Maggot Food Production. The production of BSF maggots in the initial phase (age 1-10 days) uses a combination of pollard and rice bran food with a volume of 500 grams for each treatment. To determine the influence of variations in the combination of maggot foods, food production is carried out with five treatments, each as much as 10 Kg, which is explained as follows:

P1 = chicken manure 50% + starfruit waste 30 % + ice cream waste 20 %
P2 = chicken manure 50% + starfruit waste 25 % + ice cream waste 25 %
P3 = chicken manure 50% + starfruit waste 20 % + ice cream waste 30 %
P4 = chicken manure 50% + ice cream waste 50%

BSF maggot food has been made and fermented in each treatment using 100 ml of EM4 starter and 250 ml of molasses mixed with 3000 ml of water. The BSF maggot food fermentation process is carried out for four days anaerobically.

Maggot BSF Production. The production of BSF maggots is carried out from the age of 10 days to the age of 20 days. Maggot BSF maintenance uses a biopon size of 40 x 60 x 25 cm and as many as eight seeds. At the beginning of maintenance, each biopon is in the contents of a BSF maggot weighing 300 grams. Feeding is carried out daily with a volume of 500 grams on the biopon. BSF maggots were maintained for ten days using 10 Kg in each treatment.

BSF Maggot Growth Calculation. The growth of BSF maggots observed in this study was the weight of maggots and the daily growth rate of BSF maggots. The weight of the maggot is calculated using the method of the weight of the final maggot (age 20 days) subtracted by the weight of the initial maggot of maintenance. The daily growth rate of BSF maggots is calculated by the percentage of weight reduction of the maggot biomass at the end, with the weight of the initial maggot biomass divided by the duration of maintenance. The calculation formula for the daily growth rate is explained as follows.

Based on the description above, the authors chose the study's title, "Effect of Using Chicken Manure, Starfruit Waste, and Ice Cream Waste as Food Media on the Production Performance of Maggot Black Soldier Fly".

METHODS

The method used in this study was experimental by applying a Complete Randomized Design. The study's data analysis employs ANOVA one-way statistics were used to analyze the data from the observations of maggot weight and daily growth rate of maggots BSF. If there is a significant difference, the calculated F value is greater than the F table. The Duncan statistical test will be carried out.

RESULT AND DISCUSSION

Maggot Weight Gain. The results of observations on the production of BSF maggots using chicken manure food media, star fruit waste and ice cream waste are explained in the table as follows:

Table 1. Observational Data on Weight Growth of BSF Maggots Aged 20 Days

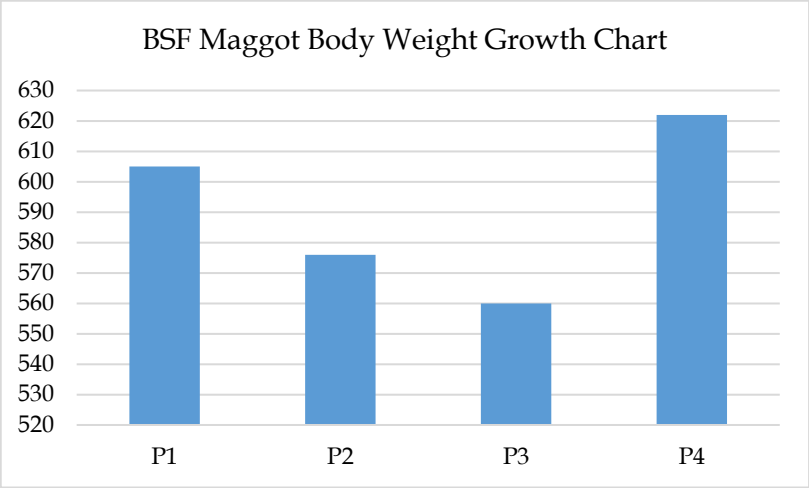
Treatment	Maggot Weight Gain (grams)

CATRA RESEARCH INSTITUTE
ISSN 2720 - 9644 (print)
ISSN 2721 - 0871 (online)
IJESSS
INTERNATIONAL JOURNAL OF ENVIRONMENTAL, SUSTAINABILITY AND SOCIAL SCIENCE
Indexed By : GARUDA Google doi Crossref ROAD INDEX COPERNICUS OneSearch ISJD EBSCO Clarivate Analytics WEB OF SCIENCE DOAJ

P1	605 ± 7,071
P2	576 ± 103,237
P3	560 ± 14,142
P4	622 ± 49,497

Source: Primary data processed (2022)

The highest weight gain of BSF maggots was obtained at the P4 treatment (chicken manure 50% + ice cream waste 50%), which was 622 grams; then P1 605 grams; P2 576 grams; and P3 560 grams. The BSF maggot weight gain chart is explained as follows:



Source: Data Author

Figure 1. BSF Maggot Body Weight Growth Chart

The results of the variety analysis showed that the use of chicken manure food media, star food waste, and ice cream waste had no significant effect (P>0.05) on the growth of BSF maggot weights. The growth of the weight of the BSF maggot is influenced by the nutritional content of the food consumed. The combination of chicken manure food media, star food waste and ice cream waste did not significantly affect maggot growth in each treatment. This is because the nutritional value of the food media mixture in each treatment is similar. Katayane (2014) states that the growth of maggot weight is influenced by the nutritional quality of the food used. The nutritional content of the BSf maggot body at every stage of its instar is influenced by the quality and quantity of food media nutrients (Makker et al. l., 2014). The content of organic matter in food media affects the body weight of BSF maggots (cicilia and Susila, 2018).

Specific Daily Growth Rate (SGR) of Maggot BSF. The daily growth rate of the maggot is calculated using the method of reducing the logarithm of the standard (LN) of the final weight of the maggot with the LN of the initial weight of the maggot divided by the length of maintenance multiplied by 100%. The results of the specific daily growth rate of BSF maggots are shown in the table as follows:

Table 2. Specific Daily Growth Rate (SGR) of Maggot BSF

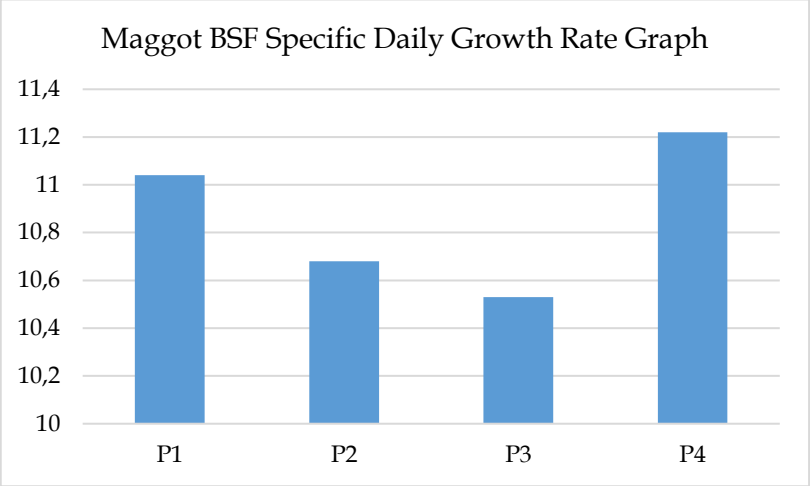
Treatment	Daily Growth Rate (%)
P1	11,04 ± 0,078
P2	10,68 ± 1,181
P3	10,53 ± 0,164

CATRA RESEARCH INSTITUTE
ISSN 2720 - 9644 (print)
ISSN 2721 - 0871 (online)
IJESSS
INTERNATIONAL JOURNAL OF ENVIRONMENTAL, SUSTAINABILITY AND SOCIAL SCIENCE
Indexed By :

P4	11,22 ± 0,537

Source: Primary Data Processed 2022

The value of the specific daily growth rate of maggots using food media mixed with chicken manure, starfruits waste and the highest ice cream waste was obtained at the P4 treatment, which was 11.22%; further P1 11.04%; P2 10.68 %; and P3 10.53 %. The composition of the maggot food medium mixture affects the specific daily growth rate of maggot BSF. The graph of the specific daily growth rate of maggots in each treatment is shown as follows:



Source: Data Author

Figure 2. Maggot BSF Specific Daily Growth Rate Graph

The one-way ANOVA statistical test results showed that the use of chicken manure food media, starfruit waste, and ice cream waste with variations in several treatments did not significantly affect the value of the specific daily growth rate of BSF maggots. The final weight of the maggot BSF influences the value of the specific daily growth rate of the maggot. Food type and nutritional content affect the quality and quantity of maggots produced. Cicilia et al. (2018) stated that the adequacy of food nutrients consumed by maggots would affect the growth of maggots during maintenance. BSF maggots' specific daily growth rate value has no significant effect because each treatment has almost the same nutrient content. So, the specific daily growth rate range of BSF maggots with the treatment of variations in food mixtures is similar.

The graph above shows that the highest maggot-specific daily growth rate is the same as the treatment of a mixture of chicken manure and ice cream waste. The protein and energy content in chicken manure and ice cream waste can increase the growth of BSF maggots. Yuwono and Mentari (2018) stated that foodstuffs with high protein and carbohydrate content could increase the growth of BSF maggots. Another factor that causes the growth rate of maggots to increase is the humidity conditions of the maintenance environment. Maggot BSF likes moist food media and high organic matter content to carry out its life activities (Raharjo et al., 2016).

CONCLUSION

The usage of feeding media made from chicken manure, blimbing waste, and ice cream has no negative impact on maggot growth. Combining chicken manure with organic waste (blimbing and ice cream waste) can produce in maximum maggot growth of the Black Soldier Fly.

CATRA RESEARCH INSTITUTE
ISSN 2720 - 9644 (print)
ISSN 2721 - 0871 (online)
IJESSS
INTERNATIONAL JOURNAL OF ENVIRONMENTAL, SUSTAINABILITY AND SOCIAL SCIENCE
Indexed By : GARUDA Google doi Crossref ROAD INDEX COPERNICUS INTERNATIONAL Indonesia OneSearch ISJD EBSCO Clarivate Analytics WEB OF SCIENCE DOAJ

REFERENCES

Azir, A., Harris, H., & Haris, R. B. K. (2017). Produksi dan kandungan nutrisi maggot (Chrysomya Megacephala) menggunakan komposisi media kultur berbeda. *Jurnal Ilmu-ilmu Perikanan dan Budidaya Perairan*, *12*(1).

Cicilia, A. P., & Susila, N. (2018). Potensi Ampas Tahu Terhadap Produksi Maggot (Hermetia illucens) sebagai Sumber Protein Pakan Ikan: Potential of Tofu Dregs on the Production of Maggot (Hermetia illucens) as a Source of Protein of Fish Feed. *Anterior Jurnal*, *18*(1), 40-47. https://doi.org/10.33084/anterior.v18i1.407

Fajri, N. A., & Kartika, N. M. A. (2021). Produksi Magot Menggunakan Manur Ayam sebagai Pakan Unggas. *AGRIPTEK (Jurnal Agribisnis dan Peternakan)*, *1*(2), 66-71. https://doi.org/10.51673/agriptek.v1i1.609

Fauzi, R. U. A., & Sari, E. R. N. (2018). Analisis usaha budidaya maggot sebagai alternatif pakan lele. *Industria: Jurnal Teknologi dan Manajemen Agroindustri*, *7*(1), 39-46. https://doi.org/10.21776/ub.industria.2018.007.01.5

Herlinae, H., Yemima, Y., & Kadie, L. A. (2021). Respon Berbagai Jenis Kotoran Ternak Sebagai Media Tumbuh Terhadap Densitas Populasi Maggot (Hermetia illucens). *Jurnal Ilmu Hewani Tropika (Journal of Tropical Animal Science)*, *10*(1), 10-15.

Indarmawan. (2014). *Avertebrate Animals As Catfish Feed*. University.Purwokerto: Faculty of Biology, Jenderal Soedirman

Katayane, F. A., Bagau, B., Wolayan, F. R., & Imbar, M. R. (2014). Production and protein content of maggot (Hermetia illucens) using different growing media. *Journal Zootec.*, *34*, 27-36. https://doi.org/10.35792/zot.34.0.2014.4791

Raharjo, E. I., & Arief, M. (2016). Penggunaan ampas tahu dan kotoran ayam untuk meningkatkan produksi maggot (Hermetia illucens). *Jurnal Ruaya: Jurnal Penelitian dan Kajian Ilmu Perikanan dan Kelautan*, *4*(1). https://doi.org/10.29406/rya.v4i1.692

Rizki, S., Hartami, P., & Erlangga, E. (2017). Tingkat densitas populasi maggot pada media tumbuh yang berbeda. *Acta Aquatica: Aquatic Sciences Journal*, *4*(1), 21-25. https://doi.org/10.29103/aa.v4i1.319

Wardhana, A. H. (2016). Black soldier fly (Hermetia illucens) sebagai sumber protein alternatif untuk pakan ternak. *Wartazoa*, *26*(2), 69-78. https://doi.org/10.14334/wartazoa.v26i2.1327