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Administration of Maggot Flour (Hermetia Illucens) from Layer Chicken Manure as a Substitution of Fish Meal in Rations for Quality Growth and Quail Digestion

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ABSTRACT

This study aims to determine the effect of maggot flour (Hertmetia illucens) from laying hens' manure on the growth and digestibility of quail. This study used a completely randomized design (CRD) with 5 treatments and 4 replications. The highest average body weight gain (g) was in treatment P0, which was 113.92 grams, while the lowest average body weight gain was in treatment P3, which was 112.90 grams and showed results that were not significantly different (P>0.05). The best ration conversion average during the study was in P1 and P2 which was 4.30 while the worst ration conversion average during the study was in P3 which was 4.42 and showed very significantly different results (P<0.01). The lowest protein digestibility of P3 was 33.68%. The highest fat digestibility was at P4 88.60% which was very significantly different (P<0.01) from the lowest fat digestibility at P3 82.00%. The highest energy digestibility was found at P2 75.70% which was not significantly different (P>0.05) with the lowest energy digestibility at P1 73.06%.

Keywords: *Maggot flour, quail, ration consumption, protein digestibility, fat digestibility, energy digestibility.*

INTRODUCTION

Quail farming is a superior type of livestock raising business because the time required is relatively short, however, its maintenance requires quite high costs, especially in providing rations. rations are the largest component of production costs which can reach 60-70% of the total production costs. the provision of adequate rations in quality and quantity is highly desirable in increasing the productivity of quail growth. Good productivity requires proper, balanced and efficient rations. Along with the high and high cost of feed production, it is necessary to take the initiative to prepare their own rations. but for that, efforts are needed to find alternative sources of feed ingredients by utilizing non-conventional ration ingredients that are cheap, of good quality, and easy to find around livestock areas such as magots/maggots.

Maggot/maggot is an alternative feed ingredient that has a fairly high protein content, which is around 42%. one form of utilization is by processing it into flour as a protein source to replace fish meal as a quail feed formula, because the cost required to obtain maggot meal is relatively cheap when compared to the cost of buying fish meal. This is expected to reduce production costs.

Provision of maggot flour from laying hen manure as a substitute for fish meal in the ration on quail growth to determine body weight gain, ration consumption, and ration conversion of quail which was given maggot flour as a protein source to replace fish meal.

Fish meal is a protein source of feed ingredients in poultry rations and almost all feed formulas use fish meal as a protein source. According to Rambet et al,. (2016) stated that farmers often obtain erratic fishmeal quality as a result of being processed from various sources and its availability is limited, affecting the quality and price of rations.

Maggot flour is the right solution for farmers from an economic point of view, considering the high price of commercial feed. The use of maggot larvae flour is carried out by breeding BSF larvae in media that are around breeders such as fruit and vegetable waste and quail droppings which are then processed into maggot flour. The price of fish meal is more expensive when compared to the price of processing maggot maggots/larvae into maggot flour and has a positive effect on quail (Siregar et al., 2022).

One of the efforts to overcome this problem is by looking for alternative ration ingredients that are almost the same quality as fish meal. Available feed ingredients that have not been fully utilized in rations, especially poultry rations, namely maggots or Maggot (Hermetia illucens) can be used as an option for providing protein source feed. Maggot flour from laying hen manure can be used as a source of protein feed, seeing the large number of maggots in livestock manure that are not utilized is the background of this research.

METHOD

This research was conducted in the Abadi Hamlet, Tandem Hilir II Village, Hamparan Perak District, Deli Serdang Regency, North Sumatra Province. This research was conducted from February to April 2020.

This study used 100 DOQ tails. The feed given consisted of corn, fine bran, soybean meal, fish meal, maggot meal, ddgs, premix, oil. The tools used during this study were feed and drink containers, buckets, filters, lights, scales, plastic knives, tarpaulins, oven, blender, quail and stationery for quail growth.

The ration used was self-made ration with ingredients used in the preparation of the ration, namely maggot flour, yellow corn, fine bran, soybean meal, fish meal, destillers dried grains with solubles (DDGS), premix, oil. The tools used in this study were quail cages, such as brooms, feeders, drinkers, scales, incandescent lamps, and egg trays. Other equipment such as quail scales, digital scales for rations, and stationery for quail digestion.

RESULTS AND DISCUSSION

The results of statistical analysis of variance show

Table 1. Average Data of Ration Consumption Recapitulation, Body Weight Growth and Ration Conversion in Quail Growth Period 0 – 42 days, with Maggot Flour (Hermetia Illucens) from laying hen manure as a substitute for fish meal in the ration.

Treatment	Ration Consumption (gr)	PBB (gr)	Ration Convertion (gr)
P0	499,55^{B}	113,92^{tn}	4,39^{AB}
P1	486,05^{A}	113,13^{tn}	4,30^{A}
P2	488,55^{A}	113,68^{tn}	4,30^{A}
P3	499,45^{B}	112,90^{tn}	4,42^{B}
P4	488,00^{A}	112,98^{tn}	4,35^{A}

Note: Different superscript letters in the column show different results at the level (P>0.01) and tn (not significantly different).

Ration Consumption

The results of the BNJ test showed that giving maggot flour (Hermetia Illucens) at P0 without giving maggot flour in quail rations had a very significantly different effect from treatments P1, P2, and P4. This was due to the higher energy content levels in the treatment rations P1, P2, and P4, which resulted in lower feed consumption than P0 (control). This opinion is supported by Setiawan's statement (2006) that quails consume feed to meet their energy and other nutritional needs, so that when energy needs are met, quail will stop eating. but P0 gave

no significant different effect (P>0.05) with treatment P3. This is due to the finer shape/particles of corn at P3 so that the digestion rate is faster to pass through the digestive tract and tends to cause high ration consumption. This is supported by the opinion of Wahyu (2004) that ration consumption is influenced by the shape, smell, color, and palatability of the ration.

Body weight gain

The results of the analysis of variance in the administration of maggot flour to substitution of fish meal in the ration had no significant (P>0.05) effect on quail body weight gain. the low body weight gain in quails is caused by the low consumption of rations, which slows down the growth of the skeleton or bones. This agrees with Fadilah (2005) that one of the things that influences the size of body weight gain is feed consumption, so feed consumption should have a positive correlation with body weight gain. Likewise according to Wahyu (2004) that body weight gain will be hampered by several factors including cage density, disease, temperature, feed, and maintenance procedures.

Ration conversion

The average consumption of quail rations for treatment P0, P1, P2, P3 and P4 were 4.39; 4.30: 4.30; 4.42; and 4.35. The best ration conversion values were found in treatments P1 and P2 with a value of 4.30. This figure was better when compared to research by Rahmadani Ansyari (2012) which stated that quail ration consumption aged 0-42 days with the addition of maggot flour 6.47% in the ration was 4.65. while the average ration conversion value in the P4 treatment (addition of 12% maggot flour) was 4.35 which is also still better when compared to the results of research by Rahmadani Ansyari (2012) which stated that quail ration consumption aged 0 - 42 days with the addition of maggot flour was 12.94 % in the ration is 4.43. In Putri's opinion (2009) that the better the feed quality, the lower the feed conversion. Meanwhile, according to Leeson and Summer (2005) there are several factors that influence ration conversion, namely body weight, ration nutritional content, egg weight and environmental conditions (temperature and humidity). concurred with what was stated by (Sujana, 2012) Ration conversion is influenced by genetic conditions, quality, age, nation, food, environment, and livestock. The ration conversion value determines the efficiency value of ration utilization, where the lower the ration conversion value, the ration efficiency value increases and is more economical (Setyaningrum and Siregar, 2015).

Table 2. Recapitulation of Protein Digestibility, Fat Digestibility and Energy Digestibility by Administration of Maggot Meal (Hermetia illucens) From Laying Hen Manure as a Substitute for Fish Meal in Ration.

Treatment	Parameter Average		
	Protein Digestibility (%)	Fat Digestibility (%)	Energy Digestibility (%)
P0	$62,43^{C}$	$86,63^{C}$	$73,81^{tn}$
P1	$44,42^{AB}$	$86,28^{BC}$	$73,06^{tn}$
P2	$56,13^{B}$	$85,46^{AB}$	$75,70^{tn}$
P3	$33,68^{A}$	$82,00^{A}$	$75,13^{tn}$
P4	$37,29^{A}$	$88,60^{CD}$	$74,35^{tn}$

Note: Different superscript letters in the column show different results at the level (P<0.01) and tn (not significantly different).

Protein Digestibility

The results of protein digestibility research on quail obtained 33.68% - 56.13%, these results were lower than the study by Meina et al., (2015) adding red dragon fruit liquid additives to quail protein digestibility with an average of 69.60%. The results of the study were also much lower than the results of a study by Rambet et al. (2016) using maggot flour (Hermetia illucens) as a substitute for fish meal for protein digestibility in broiler chickens, namely

64.59% - 75.32%. This was due to the different protein content between treatments, with ration protein levels ranging from 18.9% - 21.45%, thus making the protein requirement in the ration insufficient for quail protein requirements. According to Listyowati and Roospitasari (2000) quails in the grower period require as much as 20% protein in feed.

Fat Digestibility

The higher the fat content, the less the ration consumed by livestock. Fat content that is too high in the ration will reduce the level of palatability or animal preference for the ration, in addition, rations that contain too much fat cause the ration to go rancid because the fat is easily oxidized (Mursito et al., 2016). This is not in accordance with the results of research conducted that the level of fat digestibility also depends on the fat content in the ration, the higher the fat content, the higher the consumption of fat in these livestock. High fat consumption causes high fat digestibility. This is because the consumption of fat is balanced with the amount of bile salts to emulsify and absorb fat in the digestive tract. According to Djulardi et al., (2006), fat digestion requires bile salts which function to emulsify fat in the indentation of the duodenum. Fat in the form of an emulsion is broken down by the enzyme lipase from the pancreas into fatty acids and glycerol as the end result of fat digestion.

Energy Digestibility

The results showed that the addition of maggot flour (Hermetia illucens) from laying hen manure could replace fish meal, but with a balanced amount of fish meal. The high digestibility was due to the relatively high energy consumption in the P2 treatment compared to between treatments, and the high or low metabolic energy values were also influenced by the crude fiber content contained in the treatment rations. According to Prabowo et al., (2002) differences in metabolic energy were caused by differences in crude fiber content between treatments. The lower the crude fiber, the higher the metabolic energy. Conversely, the higher the crude fiber, the lower the metabolic energy. In line with Elvina (2008), states that the high content of crude fiber can have a negative impact on energy metabolism. If the polysaccharides in crude fiber cannot be digested, it will reduce the availability of energy in the ration, whereas if the polysaccharides in crude fiber can be digested, it will increase the availability of energy in the ration and increase metabolic energy.

CONCLUSION

1. The lowest ration consumption was found in treatment P1 of 486.05 g/head, very significantly different from P0 and P3 but not significantly different from P2 and P4. The highest body weight gain was found in treatment P0 of 113.92 g/head and was not significantly different from P1, P2, P3 and P4.
2. The lowest ration conversion value was found in treatment P1, P2 was 4.30, very significantly different from P0 was 4.39 and P3 was 4.42. The best research results from giving maggot flour rations were found in treatment (P1) with a level of 3% maggot flour in the composition of quail rations.
3. Protein digestibility of quail was very significantly different, with the highest protein digestibility in treatment (P0) of 62.43% and the lowest in treatment (P3) of 33.68%. Digestibility of quail fat was very significantly different, with the highest fat digestibility in treatment (P4) of 88.60% and the lowest in treatment (P3) of 82.00%.
4. The energy digestibility of quail was not significantly different, with the highest energy digestibility in treatment (P2) of 75.70% and the lowest in treatment (P1) of 73.06%. The best

treatment of maggot flour was found in treatment (P2) with a level of 6% maggot flour.

Declaration by Authors
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