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RESEARCH ARTICLE

THE GROWTH PERFORMANCE OF NATIVE CHICKEN AT STARTER PERIOD AFFECTED BY BLACK SOLDIER FLY LARVAE FROM HOUSEHOLD WASTE MEDIA

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Abstract

This study was to evaluate the growth performance of native chicken at starter period affected by black soldier fly larvae (BSFL) from household waste. This study was used 120 DOC of native chicken, black soldier larvae from household waste and basal diet (EM 3000 kcal/kg and CP 19%). This study was used completely randomized designed contain 6 treatments with 4 replicates. The treatment at this study consists of P0 = control (commercial feed), P1 = basal diet, P2 = basal diet + BSFL and its media 5%, P3 = basal diet + BSFL and its media 10%, P4 = basal diet + BSFL and its media 15%, and P5 = basal diet + BSFL and its media 20%. The parameters of this study were feed intake, body weight gain and feed conversion. The results of this study showed that treatment of BSFL and its media had not significant effect on feed intake, body weight gain and feed conversion. Conclusion in this study was the BSFL and its media had positive effect at native chicken at starter period.

Introduction:-

The demand for the native chicken meat was increase, along with the increase in population and community income. This was because native chicken meat has a distinctive taste and texture, so that it was liked by the Indonesian people and can even be said to have its own market segment. Native chicken farming basically can provide maximum income, if intensively reared. However, during this time the system of raising native chickens was still extensive, so that the growth of native chicken was very slow. Therefore, the farmers were change the system of raising native chickens from extensive to intensive system. With the intensive reared the native chickens can be grow faster and harvested in a relatively short time compared to the native chickens that was reared extensively. The problem in this system was the feed. The feed was the biggest production component in raising of native chickens.

Various ways have been done to reduce the feed costs. The introduction of the high-quality feed has shown an increase in the productivity of native chickens in rural areas. Many farmers use the commercial feed which combined with the various of feed ingredients in the around of farmers. Most of the farmers use of commercial feed which used for broiler chicken for the fulfillment native chicken requirement. Even though the nutrient requirement of native chickens was basically different with broilers.

Therefore, it is necessary to find alternative local feed ingredients that can be used to replace of commercial feeds, one of which was black soldier fly (*Hermetia illucens*) which from household waste media. Black soldier fly (BSF) had a high protein content between 38.98% - 44.9%, crude fat of 29.1% and crude fiber of 16.4% [1,2].

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Furthermore, BSF also had the better amino acids than soybean meal. The previous study by [3] showed that the use of BSF up to 15% has the potential as a protein source for quail. [4] stated that the use of BSF up to 15% increased live weight and feed intake of broiler chickens in the starter period. Based on this, the use of BSF in native chicken feed expected can be increased the growth of native chickens in the starter period. The objective of this study was to evaluate the growth performance of native chicken at starter period affected by black soldier fly larvae (BSFL) from household waste.

Material and Methods:-

Black soldier fly larvae (BSFL) flour preparation

Preparation of BSFL flour conducted by hatch of 30 grams of BSF eggs at fermented rice bran media at 3 days. After that BSF baby was transferred to household waste media with had been mixed tofu waste as BSF feed and the BSF can be harvested at 10 d of the age. Then the BSF and its media was dried in an oven with temperature of 60 ^{0}C and grind into flour. BSFL flour ready to mixed in feed according by each treatment.

Animals and treatments

One hundred and twenty of DOC native chicken was used in this study. Basal diet in this study contain of 3000 kcal/kg of metabolizable energy and 19% of crude protein (Table 1). The treatment at this study consists of P0 = control (commercial feed), P1 = basal diet, P2 = basal diet + BSFL and its media 5%, P3 = basal diet + BSFL and its media 10%, P4 = basal diet + BSFL and its media 15%, and P5 = basal diet + BSFL and its media 20%. The parameters of this study were feed intake, body weight gain and feed conversion.

Table 1:- Chemical composition of diet.

Chemical composition of diet	Treatments					
	P0	P1	P2	P3	P4	P5
ME (kcal/kg)	3169.22	3074.22	3035.58	3046.48	3054.78	3062.62
Crude protein (%)	19.97	19.17	19.05	19.36	19.54	19.70
Crude fiber (%)	3.94	5.02	5.40	5.31	5.27	5.18
Crude fat (%)	5.32	6.54	6.36	6.42	6.50	6.55

The treatment was conducted at native chicken 0-6 weeks old. The 120 birds of native chicken were placed into 24 experimental cages and randomly divided into 6 treatments with 4 replications. The each of replication consisted of 5 birds of native chicken. The treatment of BSFL and its media was given when the native chickens were 0-6 weeks old according to each treatment. Feed intake, body weight gain and feed conversion data collected weekly and calculate based on accumulation during study.

Statistical analysis

Completely randomized design (CRD) was used in this study with 6 treatments and 4 replications. ANOVA was used to analyzed the data and if were significant effect of treatments continued by test of Duncan's multiple.

Result:-

Data average of feed intake, body weight gain and feed conversion showed at Table 2. This study showed the supplementation of BSFL at feed did not significant difference ($p>0.05$) on feed intake, body weight gain and feed conversion of native chickens.

Table 2:- Average of feed intake, body weight gain and feed conversion of native chicken.

Treatments	Parameters		
	Feed intake (g)	Body weight gain	Feed conversion
P0	2036.04	463.73	4.39
P1	2050.58	406.30	5.05
P2	2057.93	405.70	5.08
P3	2032.30	408.90	4.98
P4	2065.30	420.45	4.93

P5	2213.38	453.43	4.90

Discussion:-

Feed Intake

This study showed that supplementation of BSF and its media on the feed did not significant difference ($p>0.05$) on feed intake of native chicken at starter period. The increasing of supplementation level BSF and its media on the feed of native chicken influence of increase of the feed intake. That was indicated that the BSF had high palatability at native chicken. [4] reported that reported that the increase of level HI tend on increase palatability of broiler chicken. This study similar with the research of [5] reported that the feed intake of broiler chicken was not different with the replacement of soy bean meal and fish meal with BSF at the feed. [3], supplementation of BSF as source of protein at quail also no significant effect on feed intake.

The average of feed intake in this study were P0 2036.04 g, P1 2050.58 g, P2 2057.97, P3 2032.30 g, P4 2065.30 g and P5 2213.38 g. Based on the study, the feed intake did not difference between the treatments. That it showed, the supplementation of BSF and its media up to 20% had positive effect on feed intake of native chicken. This was because the diet of the treatments was arranged with the same of nutrition content, so the feed intake at the treatments also similar. BSF had antibacterial activity in form AMP (antimicrobial peptide) was able inhibit the growth of pathogenic bacteria in the gastrointestinal tract (GIT) so the digestion and absorption of nutrients. As a result, feed intake in the treatment with BSF and its media was no different from commercial feeds or basal diet. In line with [6,7], maggot can improve the intestinal health so increases the digestion and absorption of nutrients.

Body weight gain

BSF and its media supplementation at the feed did not significant effect ($p>0,05$) on body weight gain of native chicken. This was in line with data of feed intake also was not significant effect the treatments. In line with [8], the provision of BSF-based amino acids in the feed also did not significantly effect on the body weight gain of the superior native chickens of Balitnak (KUB). Similarly, [4] supplementation of BSF up to 15% also had no significant effect on live weight of broiler chicken.

The study showed that the supplementation of BSF and its media on the feed up to 20% did not difference on body weight gain compare than the treatment of commercial feed and basal diet. The average of body weight gain of native chicken at P0, P1, P2, P3, P4 and P5 respectively were 463.73 g, 406.30g, 405.70 g, 408.90 g, 420.45 g and 453.43 g. The results of study indicated that the chitin at BSF did not influence of digestibility of nutrient, so did not influence of body weight gain of native chicken. In this study, BSF used of 10 days age, so the chitin still low and this not inhibit of nutrient digestibility as a result the body weight gain also better. Chitin had negative impact on nutrient digestibility especially of digestibility of protein. [9] stated that exoskeleton influence of chitin content which ultimately strongly influence on protein digestibility. BSF had chitin content up to 9% which that the higher of level chitin so the protein digestibility will be decreased [10], and it will be affected on growth performance.

Feed Conversion

The data of feed conversion in this study respectively were P0 4.39, P1 5.05, P2 5.08, P3 4.98, P4 4.93 and P5 4.90. Based on the data of feed conversion showed that the increasing of supplementation of BSF and its media at the feed so the feed conversion it was decreased. Supplementation of BSF and its media on the feed did not have significant effect ($p>0.05$) on feed conversion. This data linear with the data of feed intake and body weight gain. That its indicated that BSF on the feed able to improve the performance of native chicken. [11] stated that the BSF had the complete nutrient such as fat, protein and mineral. BSF also had the active compound of AMP that can be increase of intestinal morphology by the increasing of villi surface area and also had potential to antibacterial to inhibit the growth of pathogenic bacteria and improve the growth of beneficial bacteria in the intestine [12]. The increasing of villi height strongly influences of absorption nutrient and it will be increasing the nutrient digestibility and growth performance [13].

Conclusion:-

Conclusion in this study was the BSFL and its media had positive effect at native chicken at starter period.

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