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Original Article

White Kupang Flour (*Corbula faba hinds*), Fish Meal and Coconut Oil Usage on the Broilers Carcass Percentage and Abdominal Fat

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ABSTRACT

This study was conducted to determine the effect of using white mussel flour fish flour and coconut oil on carcass percentage and abdominal fat percentage in broilers. This study used a completely randomized design consist 4 treatments and 5 replications. The study used DOC (Day Old Chick) with the strain Lohman MB 202 Platinum for 20 animals . The treatment in this study was ration without using white mussel flour (P0), ration using 10% white mussel flour (P1), ration using 12.5% white mussel flour (P2), ration using 15% white mussel flour (P3). Variables observed were carcass percentage and abdominal fat percentage. Data were analyzed by Analysis of Variance (ANOVA) if there is a significant effect then proceed with Duncan's Multiple range test significance level of 5%. The results of the analysis showed that P3 showed a significant difference with the control treatment (P0) and treatment P1 ($p<0.05$). The best broiler carcass percentage was in treatment P3 (76.02%) and P2 (74.7%) while the lowest was in treatment P0 (71.20%). The results of Duncan's test on the percentage of abdominal fat showed that the control treatment (P0), treatment P1, treatment P2, and treatment P3 were not significantly different ($p> 0.05$). Conclusion of this study was white mussel flour, fish flour, and coconut oil could increase the percentage of carcass, but it could not decrease the abdominal fat percentage.

Keywords: Broilers, white mussel flour, carcass percentage, abdominal fat percentage

Introduction

Livestock is an important sector within the agricultural sector in meeting animal protein needs (Wanapat *et al*., 2015). The public's need for livestock products such as meat, milk and eggs always increases every year (Erdaw, 2023). People know the important role of food and nutrients needed by the body. In meeting these needs, the majority choose eggs and chicken for consumption to fulfill animal protein (Réhault-Godbert *et al*., 2019). Broiler chickens are one type of poultry that is highly developed in East Java. Based on data from the East Java Province Livestock Service, it is stated that the population of broiler chickens increases every year. The increase in per capita consumption of purebred chicken meat in 2016 was 5,110 kg and in 2017 it was 5,683 kg, an increase of 11.22% from consumption in 2018.

Broiler chickens are a source of animal protein that is in demand by Indonesian people, besides that the price is affordable for all levels of society and has high nutritional value (Dewantari *et al*., 2023). Broiler chickens are the main choice in meeting the animal protein needs of the community (Ravindran and Abdollahi, 2021). Broiler chickens are very efficient in the process of digesting feed to make meat. Feed is the main thing in increasing chicken weight and good carcass percentage if given proper and correct nutrition (Bromfield *et al*., 2021). The nutritional content that is important for chicken growth includes protein, energy (carbohydrates and fat), vitamins, minerals and water (Beski *et al*., 2015).

Carcass percentage is an important factor in assessing livestock production (Yusuf *et al*., 2014). Production is interrelated with the live weight of the livestock itself, the higher the live weight, the higher the carcass production (Prihandini *et al*., 2020). The high or low quality of broilers is determined by the amount of fat in the chicken meat (Mir *et al*., 2017). The majority of fat is found in the abdominal part of the broiler (Fouad and El-Senousey, 2014).

Protein is needed for growth processes, tissue formation and meat products which are related to carcass weight (Aquilani *et al*., 2019). Protein is a very expensive nutritional content but really needed by broilers, therefore adequate protein intake in broilers needs to be maintained by increasing the absorption of protein contained in feed (Beski *et al*., 2015). Food substances to meet the needs of broilers can use white mussels as a source of protein which contains 9.054% (Jönsson *et al*., 2010).

Erniati *et al*. (2023) states that the protein content of mussels is 9-10%, the water content is 75.70%, the ash content is 3.09%, and the carbohydrate content is 1.02%. Widjaya *et al*. (2022) believes that kupang has quite high nutritional value and is a source of high quality and cheap protein. White kupang has the potential to be a cheap feed, namely Rp. 1500 per kg. The use of white mussels as poultry feed is still rarely done in Indonesia. It is hoped that white kupang flour can be used as additional feed for broilers, so research has been carried out to determine the effect of using white kupang flour, fish meal and coconut oil on carcass percentage and abdominal fat percentage in broilers.

Materials and Methods

Research design

This research was carried out for 35 days starting in May 2020 until June 2020. The research was carried out in a private cage in Karanggayam 2 Hamlet, Srengat District, Blitar Regency. The experimental animals used in this research were 20 male Day Old Chick broiler strains Lohman MB 202 platinum produced by PT. Japfa Comfeed Indonesia Tbk. Based on Federer's formula, a minimum of 5 repetitions were obtained for 4 treatments. Each treatment used 5 replications, so there were a minimum of 5 broilers for each treatment so that a total of 20 broilers were needed.

Making white kupang flour

Steps for making white mussel flour, white mussels are washed using running water until clean and then cleaned from other animals. The mussels that have been cleaned are then dried in the sun until dry. The dried mussels are ground until smooth then sieved and the kupang flour is produced.

Preparation of experimental animals

The experimental animals used in this research were 20 male DOC broiler strains Lohman MB 202 platinum produced by PT. Japfa Comfeed Indonesia Tbk. Steiner *et al*. (2011) states that the way to distinguish male and female DOC is first, check the cloacal hole, if there is a small protruding dot on the cloaca, then the DOC is male, if there is no protruding small dot then the DOC is female. Second, the lower wing feathers of female chicks are longer and more abundant than the wing feathers of male chicks.

One week before the DOC arrives, the cage is disinfected using Benzaklin. When the DOC arrives and enters the breeding cage, the DOC is given drinking water mixed with sugar water with the aim of restoring the DOC's stressed condition and the energy lost during the journey. Feed and drinking water were provided ad libitum during DOC maintenance. DOC is given factory feed 511® three times a day, namely morning, afternoon and evening.

During the maintenance process, DOC broilers are given Neobro vitamins and vaccines. Vitamins are given when the weather changes to avoid stress on the chickens. The ND vaccine is given twice to prevent

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ND (Newcastle Disease) during the maintenance process. The first ND vaccination was carried out on 4 day old chickens using the Lasota strain via eye drops and the second ND vaccination using the Lasota strain on 21 day old chickens via drinking water. Gumboro B vaccine is given to 14 day old chickens through drinking water. Broilers that have been placed in a brooding cage for two weeks are then transferred to a battery cage to be given treatment, followed by an adaptation period of one week.

Implementation of research

Experimental animals were divided randomly into four treatment groups, each treatment consisting of five replications. Treatment groups were as follows: P0 (control): Commercial feed without white mussel meal, fish meal and coconut oil

P1: Commercial feed 77% + white mussel meal 10% + fish meal 8% + coconut oil 5%. P2: Commercial feed 72.5% + white mussel meal 12.5% + fish meal 9.5% + coconut oil 5.5%. P3: Chickens are given 68% commercial feed + 15% white mussel meal + 11% fish meal + 6% coconut oil.

This treatment lasts for two weeks, namely chickens from 22 days to 35 days of age, which is preceded by a one week adaptation period to the treatment feed. Feed is given in the morning and evening in the same amount so it must be weighed first. Calculation of carcass percentage and abdominal fat percentage was calculated at the end of the study after obtaining the results of live weight, carcass weight, abdominal fat weight.

Data analysis

The data obtained in this research was analyzed using Anova (Analysis of Variance). If there is a significant difference ($p<0.05$) the statistical test is continued with Duncan's multiple range test with a significance level of 5%.

Result

Carcass Percentage

Table 1. Carcass Percentage (%) of Broiler Chickens

Treatment	Average ± SD
P0	71.20^{a} ± 1.07
P1	72.54^{a} ± 1.32
P2	74.70^{b} ± 0.98
P3	76.02^{b} ± 0.84

Note: Different superscripts (^{a,b}) indicate real differences ($p<0,05$).

The carcass percentage is obtained from the comparison of the carcass weight compared to the final weight of the live chicken expressed as a percentage. The average carcass percentage in each treatment can be seen in table 1. The results of the analysis showed that the use of 10% mussel (*Corbula faba hinds*) flour (P1) was not significantly different from the negative control (P0) ($p>0.05$). The treatment using 12.5% mussel flour (P2) was not significantly different from using 15% mussel flour (P3) ($p>0.05$). The use of 15% mussel flour (P3) showed a significant difference with the control treatment (P0) and 10% mussel flour treatment (P1) ($p<0.05$).

The treatment that showed the best percentage of broiler chicken carcasses was in treatment P3 (76.02%) which was not significantly different from P2 (74.7%) while the lowest was in P0 (71.20%) which was not significantly different. with P2 (72.54%). The higher the carcass percentage value, the higher the meat produced. This shows that the use of white kupang flour (*Corbula faba hinds*), fish meal and coconut oil has an influence on the carcass percentage of broiler chickens. This is proven by the greater the percentage of white kupang flour given, the greater the percentage of broiler chicken carcass weight.

Abdominal Fat Percentage

The percentage of abominal fat is obtained from the comparison of the weight of the abdominal fat and the final weight of the live chicken expressed as a percentage. The average percentage of abdominal fat in each treatment can be seen in **table 2.**

Table 2. Abdominal Fat Percentage

Treatment	Average ± SD
P0	2.07 ± 0.43
P1	1.74 ± 0.40
P2	1.75 ± 0.23
P3	2.10 ± 0.15

Duncan test results show control treatment (P0), 10% kupang flour (P1), 12.5% kupang flour (P2), and 15% mussel flour (P3) is not significantly different ($p>0.05$). The percentage of abdominal fat in this study was normal. The percentage of abdominal fat can be seen in table 3. The results of the study show that there is no significant difference in the percentage

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of abdominal fat in all treatments. It can be concluded that the greater the mussel flour given can increase abdominal fat. The percentage of abdominal fat in all treatments was still normal.

Table 3. Abdominal Fat Percentage

Treatment	Abdominal Fat Percentage
P0	2.07
P1	1.74
P2	1.75
P3	2.1

Discussion

Carcass Percentage

Carcass percentage is an important factor for assessing carcass production in livestock, because production is closely related to live weight (Prihandini *et al*., 2020). The average carcass percentage for broiler chickens varies between 65%-75% of live weight (Wahyono and Utami, 2018). Carcass percentage usually increases as live weight increases, and vice versa (Kelly *et al*., 2021).

The results of this research showed that the average percentage of broiler chicken carcasses added with 10% kupang flour (P1), 12.5% (P2), 15% (P3) was 72.54%, 74.70%, and 76.02%. The average carcass percentage in the treatment group without the addition of Kupang flour (P0) was 71.2%. Based on the results of the Duncan test, the treatments that showed significant differences were treatments P1 and P3.

The P3 treatment had the highest carcass percentage of 76.02%. The percentage of carcasses obtained in this study was directly proportional to the average broiler carcass weighing at the end of the study. This is in accordance with the opinion of Kelly *et al*. (2021) where the carcass percentage is directly proportional to body weight.

The protein content in white mussels is 9.054% (Claessens *et al*., 2023). The protein in mussels can be used as a feed additive rather than just being waste. Protein is a food substance with complex molecules consisting of amino acids. Protein functions to form important parts of the animal body (Lv *et al*., 2021). Protein is a factor that greatly influences weight gain, considering the function of protein as an element that forms body tissue, the large amount of feed protein consumed into the body results in body growth/formation (Fappi and Mittendorfer, 2014). Livestock that consume low protein feed can result in low productivity, while high protein consumption will result in rapid growth (Wang *et al*., 2022).

White mussels contain 17 kinds of amino acids. The amino acids contained in mussels consist of 9 essential amino acids and 8 non-essential amino acids (Jamaluddin et al., 2016). Essential amino acids are amino acids that must be met and available in feed because they cannot be produced by the body itself (Church *et al*., 2020). Amino acids in mussels that can influence broiler body weight gain are essential amino acids (threonine, glycine, valine, methionine, phenylalanine, lysine and arginine) (Kralik *et al*., 2018).

Abdominal Fat Percentage

Abdominal fat is fat found around the gizzard, intestines, abdominal muscles, bursa fabricus, and cloaca (Zhang *et al*., 2020). Duncan's test results showed that treatments P0, P1, P2 and P3 were not significantly different ($p>0.05$). The percentage of abdominal fat in this study was also still normal in accordance with the opinion of Imran *et al*. (2021) that the percentage of abdominal fat in broiler carcasses was 0.73% to 3.78%.

The results of proximate analysis of crude protein content in feed in this study were P0 20.16%, P1 20.16%, P2 20.17% and P3 20.16%. There was no significant difference in the results of the Duncan test on the percentage of abdominal fat in this study because the crude protein content in the feed in this study was generally almost the same and the lipogenesis process was influenced by the crude protein content in the feed according to the opinion of Ladeira *et al*. (2016). Therefore, it is very important to fulfill poultry protein needs in order to produce high quality meat with low fat content.

The average percentage of abdominal fat obtained in this study is still in the normal range, namely 1.74% to 2.10%, in accordance with the opinion of Astuti and Suripta (2020) that the percentage of fat in broiler chickens ranges from 0.73% to 3.78%. The results of varying abdominal fat percentages are also influenced by the crude fiber content in different feeds (Attia *et al*., 2020). According to Naumann *et al*. (2020) that crude fiber

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that comes from feed after consumption will bind bile acids when they arrive in the digestive tract, causing the function of bile to help the absorption of fat to be hampered. Furthermore, bile acids that have been bound by crude fiber will be excreted from the body in the form of feces, resulting in a decrease in abdominal fat deposition (Chiang, 2013).

Conclusion

Based on the results of research on the use of white kupang flour, fish meal, and coconut oil on the percentage of carcass and abdominal fat in broiler chickens, it can be concluded that the use of white mussel flour 10%, 12.5%, and 15% can increase the percentage of broiler carcasses while the use of white mussel flour Kupang 10%, 12.5% and 15% cannot reduce the percentage of abdominal fat.

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