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Evaluating of The Addition Coconut Pulp *(Cocos Nucifera L)* Fermentation in Feed and The Effect on Percentage of Carcass Broiler Chicken

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Abstract

Broilers are chickens with high meat production. The productivity of broiler is seen from the percentage of carcass and abdominal fat. This study aims to determine the effect of giving fermented coconut pulp (*Cocos nucifera L*) on the percentage of carcass and abdominal fat of broilers. This study used a completely randomized design experimental method (CRD) consisting of 6 treatments and 6 replications so that the total observations were 36 units of observation. Each treatment had P1: 100% commercial feed without fermented coconut dregs, P2: 90% commercial feed + 10% fermented coconut dregs, P3: 80% commercial feed + 20% fermented coconut dregs, P4: 70% commercial feed + 30 % fermented coconut dregs, P5: 60% commercial feed + 40% fermented coconut dregs, P6 : 50% commercial feed + 50% fermented coconut dregs. The data were analyzed using the analysis of variance which was preceded by the battle test, followed by the Tukey test using the SPSS program. The analysis of variance showed significantly different results ($P<0.05$) on the percentage of carcass and abdominal fat of the broiler. Tukey's follow-up test on the carcass showed a significant difference ($P<0.05$) and there was no significant difference in fat ($P>0.05$). It can be concluded that the supplementary feed of fermented coconut pulp can be used 40% as additional feed to increase the carcass percentage but not reduce the broiler abdominal fat percentage.

Keywords: Broiler, coconut dregs, percentage of the carcass, abdominal fat.

Background

Broiler chicken is a term for chicken breeds whose growth rate and meat production are high, and have a short maintenance time (Agri, 2011). Broiler chickens for now have a fairly high-fat content (carcasses fat content to reach 18%).so, this issue is a special concern for consumers and livestock producers. Abdominal fat is high in positive correlation to carcass fat content which is a reflection of excessive fat accumulation in broiler chickens (Sanz *et al.*, 2000). In broiler chickens, fat accumulation is considered a result of participation and scattering of ration energy, also causing a decrease in the weight of carcasses that can be consumed (Mairizal, 2000; Ahmat *et al.*, 2006).

The carcass is a part of the poultry's body after halal slaughter, without feather, innards, head, neck, and legs (Nuraini *et al.*, 2018). The percentage of carcasses produced is a reference to the productivity of broiler chickens as cut livestock. The weight of the carcass can affect abdominal fat, when abdominal fat increases then the carcass fat will also increase (Haroen, 2003; Al-Taleb, 2003). The high quality of broiler carcasses is determined by the weight of the carcass and the amount of abdominal fat. Good carcasses should contain a lot of meat with low-fat content (Attia *et al.*, 2002; Herlina *et al.*, 2015). To get a high carcass in broilers, quality feed is one of the important factors (Massolo *et al*., 2016).

A quality feed can be obtained by utilizing agricultural waste, and this is also one way of solving the problem of high costs of feed (Havenstein *et al.*, 2005; Kestaria and Malik, 2016). One of the agricultural wastes that are available and in large quantities but have not been utilized optimally as raw materials for making poultry feed is coconut pulp. Coconut pulp has the potential to be used as poultry feed and coconut pulp is not difficult to find

behind agricultural waste (Kurniawan *et al*., 2016; Biyatmoko *et al*., 2018). In addition, this coconut pulp waste can provide maximum benefits for farmers (Widiastuti *et al.,* 2015). The use of coconut pulp as a feed mixture is still low, this is due to the fat and coarse fiber content that is difficult for broiler chickens to digest. One way to make coconut pulp easily digestible is to do the fermentation process on coconut pulp (Yamin, 2008; Hutapea and Saragih, 2020).

Fermentation is the process of breaking down organic compounds into simple compounds involving the activity of microorganisms. Microorganisms in the fermentation process will break down coarse fibers into products that can be digested by livestock and can increase crude protein levels (Ananto *et al*., 2015). The material is high in coarse fiber when fermented, then the coarse fiber can be degraded so that the nutrients contained in the material can be utilized by livestock. One of the indicators of such feed can be utilized by livestock, namely by looking at the percentage results of carcass and abdominal fat (Mangisah *et al*., 2009; Winarata *et al.,* 2013).

The results of Hutapea dan Saragih's (2020) research, stated that the influence of fermented coconut pulp on carcasses with a giving level of 3%, 6%, and 9% was obtained a percentage of carcasses with an average of 54.35-73.58%. The average percentage of the weight of broiler chicken carcasses aged 5 weeks is 59-63% of the live weight (Suprayitno and Indraji, 2007; Sumarni, 2015). Supported by Salam *et al.* (2013), states that the percentage of carcasses of broiler chicken body parts is affected by the final body weight and carcass weight. Based on the description above, research is needed to examine the influence of fermented coconut amps on the weight of carcasses and abdominal fat of broiler chickens. This study aims to find out the effect of the addition of coconut pulp *(Cocos nucifera l)* fermentation on the percentage of carcass and abdominal fat of broiler chickens. This study is expected to provide information related to the utilization of fermented coconut pulp *(Cocos nucifera l)* used as additional feed to increase the percentage of carcasses and lower the abdominal fat of broiler chickens.

Materials and Method

Before fermented coconut pulp is given, fermented coconut pulp is first mashed so that broiler chickens are easy to digest. The composition of the treatment rations is as follows: P1: 100% Commercial Feed, No fermented coconut pulp, P2:90% Commercial Feed + 10% Fermented coconut pulp, P3:80% Commercial Feed + 20% Fermented coconut pulp, P4:70% Commercial Feed + 30% Fermented coconut pulp, P5:60% Commercial Feed + 40% Fermented Coconut Pulp, P6:50% Commercial Feed + 50% Fermented Coconut Pulp.

The study used a complete random design (RAL) consisting of 6 treatments and 6 repetitions so that the total observations were 36 units of observation units.

Research Procedures

Manufacture of Fermented Coconut Pulp

Coconut pulp is fermented by steaming for 30 minutes and then cooled and inoculated with prima yeast with a ratio of coconut pulp 1kg: 2 g of prima yeast and then stirred until the pulp and yeast are mixed well. After mixing well coconut pulp and yeast are put in a plastic bag and the plastic bag is hollowed out with a needle and then the plastic end is closed by burning the end. Coconut pulp is then incubated for 48 hours at room temperature.

The result of fermentation of good coconut pulp is characterized by white threads as found in tempeh. After successfully the coconut pulp is removed from the plastic and blended directly without using water. After blending coconut pulp in the oven for 20 minutes, coconut pulp is stored in a jar or sealed container and the pulp can already be used as a chicken feed mixture.

Percentage of Carcasses (%)

The percentage of carcasses is obtained by comparing the weight of chickens without feathers, blood, head, neck, legs, and internal organs (grams) with live weight (grams) multiplied by 100%.

Percentage of Abdominal Fat (%)

Measurement of abdominal fat weight is done by weighing the fat obtained from the fat that is around the gizzard and the layer that sticks between the abdominal muscles and intestines and is then weighed. Abdominal fat percentage is obtained by comparing abdominal fat weight with live weight (gram) multiplied by 100%.

Data Analysis

The data obtained in this study have been analyzed with the analysis of variety preceded by Bartlett's test.

Results

Percentage of Carcasses

The carcass is a part of the chicken's body after halal slaughter, feather removal, and offal discharge, without the head of the neck, legs, lungs, and kidneys. The average percentage of carcasses for each treatment can be seen in Table 1.

Table 1. Average Percentage of Broiler Chicken Carcasses.

Sample	Percentage of Carcasses
P1 (100% Commercial Feed + No Fermented Coconut Pulp)	44,66±6,31[a]
P2 (90% Commercial Feed + 10% Fermented Coconut Pulp)	48,50±4,59[ab]
P3 (80% Commercial Feed + 20% Fermented Coconut Pulp)	48,33±7,76[ab]
P4 (70% Commercial Feed + 30% Fermented Coconut Pulp)	48,83±4,70[ab]
P5 (60% Commercial Feed + 40% Fermented Coconut Pulp)	57,50±5,43[b]
P6 (50% Commercial Feed + 50% Fermented Coconut Pulp)	55,16±9,36[ab]

[a,b,c] The description of different letters in the same column shows a noticeable difference (P<0.05).

The average percentage of broiler chicken carcasses presented in table 1 shows that the first broiler chicken (P1) has a carcass percentage of 44.66%, the second broiler chicken (P2) has a carcass percentage of 48.50%, the third broiler chicken (P3) has a carcass percentage of 48.33%, the fourth broiler chicken (P4) has a carcass percentage of 48.83%, the fifth broiler chicken (P5) has a carcass percentage of 57.50%, and the sixth broiler chicken (P6) has a carcass percentage of 55.16. The highest percentage increase in carcass was found in the fifth treatment (P5) and the lowest in the first treatment (P1). The percentage of normal carcasses for broilers ranges from 65.35-66.56% of live weight (Daud *et al.*, 2007. The average percentage of broiler chickens aged 5 weeks ranges from 66 to 70%, then it does not show a difference that the value is too large with the difference in the age of slaughter broiler chickens (Farizaldi, 2016). Normal broiler carcass percentage ranges from 65-75% of live weight, the heavier the chicken cut, the higher the carcass (Filawati, 2008). However, the results of this study are too low with the results of Subekti *et al.* (2012) that the percentage of broiler chicken carcasses ranges from 72-76%. From the above description, it can be seen that the higher the level of giving fermented coconut pulp in the ratio leads to an increase in the percentage of broiler chicken carcasses to a level of 10%. However, there was a decrease in the percentage of carcasses at the level of 20% and again increased at the level of 40%. This is due to the influence during the carcass cutting process where there are inaccuracies in the position of cutting and sorting the carcass part, thus causing measurements on the weight of the carcass to change and can affect the quality of the carcass percentage measurement.

The results of the various analysis test on the average value of the treatment group differed markedly (P<0.05) in the percentage of broiler chicken carcasses aged 5 weeks. So that further tests are carried out with the Tukey test, the result is P1 (Control) feed with additional feed P2, P3, P4, P5, and P6 there is a noticeable difference (P<0.05) in P5. But between the additional percentages of fermented coconut pulp, P5 does not differ markedly (P>0.05) from P2, P3, P4, and P6. Carcass percentage is influenced by the final life weight, so a large life weight will also be followed by a percentage of carcasses (Subekti *et al.*, 2012). The Big carcass is influenced by the nation, age, gender, and physical condition of chickens. The average percentage value of carcass weight is 64.55-65.75% (Amrullah, 2004), this is also in line with

the results of the study by Sibarani *et al.*, (2014) which reported that the percentage value of carcasses is in the range between 63.85-66.16% of the live weight. The percentage of the weight of chicken carcasses aged 6 weeks with the provision of rations combined pollard and duckweed is 56.63-58% while at the age of 12 weeks ranges from 66.49-69.35% (Fitasari and Niswi, 2012). The weight of chicken carcasses at the age of 14 weeks with the administration of tetracycline and coffee in rations has a range of 64.17-65.30% (Santoso *et al.*, 2009). Pesti and Bakali (1997) who obtain broiler chicken carcasses ranged from 60.52%-69.91% of life weight and gave the commercial rations obtained 63.79%-67.78% of live weight (Dewianti *et al.*, 2013). The percentage of the weight of broiler chicken carcasses aged 5 weeks is 59-63% of the live weight (Suprayitno and Indraji, 2007). While Sumarni (2015), stated that the average percentage of carcass weight is 69.76-73.39% where the percentage is higher than this study.

Based on table 1, it was found that the P1-P4 treatment study got a low percentage of carcasses, a low percentage of carcasses due to high abdominal fat factors. Factors that affect the percentage of carcasses are the nation, gender, age, food, physical condition, and abdominal fat (Subekti *et al.*, 2012). The low percentage of carcasses is suspected because at the time of slaughter and cutting carcasses, resulting in low carcass weight and making the percentage of carcass meat different (Juniarti *et al.*, 2019). Based on tables 1 P5 and P6 increased, the increase in the percentage of carcasses is likely to occur due to fermented coconut pulp, where coconut pulp after fermentation the protein content increases so that this protein can increase the weight of carcasses. It is supported by Miskiyah *et al*. (2006), which state that coconut pulp after fermentation of coconut pulp protein content increased from 11.35 to 26.09%, decreased fat content by 23.36% to 11.39%, and coarse fiber from 14.97% to 12%. The balance of metabolic energy and protein ratio of broiler chickens according to the age phase used in this study is 2800-3300 kcal/kg and protein is 18-22% (Hasan *et al.*, 2013). Linear relationship between protein, energy, and carcass percentage. The protein and energy contained in the feed will be used to produce meat in the body (Pesti and Bakalli, 1997).

Abdominal Fat Percentage

Abdominal fat is waste in broiler carcasses and its presence is considered a decrease in carcass quality. Data on the average percentage of fat from each treatment can be seen in table 2.

Table 2. Average Abdominal Fat of Broiler Chickens.

Sample	Fat Percentage
P1 (100% Commercial Feed + No Fermented Coconut Pulp)	2,50±0,5
P2 (90% Commercial Feed + 10% Fermented Coconut Pulp)	1,82±1,16
P3 (80% Commercial Feed + 20% Fermented Coconut Pulp)	1,16±0,75
P4 (70% Commercial Feed + 30% Fermented Coconut Pulp)	1,16±0,48
P5 (60% Commercial Feed + 40% Fermented Coconut Pulp)	2,16±0,75
P6 (50% Commercial Feed + 50% Fermented Coconut Pulp)	1,16±0,75

The average percentage of abdominal fat of broiler chickens presented in table 2 shows that the first broiler chicken (P1) has an abdominal fat percentage of 2.50, the second broiler chicken (P2) has a percentage of abdominal fat, of 82, the third broiler chicken (P3) has an abdominal fat percentage of 1.16, the fourth broiler chicken (P4) has an abdominal fat percentage of 1.16, the fifth broiler chicken (P5) has an abdominal fat percentage of 2.16, and the sixth broiler chicken (P6) has an abdominal fat percentage of 1.16. The highest increase in fat percentage was found in the first treatment (P5) and the lowest in the sixth treatment (P6). Santoso *et al.*, (1995) state that microorganisms contained in fermented products contain high nucleic acids and are difficult to digest due to the very hard nature of the cell wall and proteins of fermented products so that growth is reduced or decreased. This is what can cause low cut weight and affect the measurement of carcass weights that are also low. The carcass weight factor is influenced by

chicken breed, ratio, live weight, gender, and age (Iskandar, 2005). This is following the opinion of Soeparno (2009) that the height of the low-weight of carcass weight is strongly influenced by the weight of the livestock body, the higher the weight of the livestock body, the higher the weight of the carcass. Abdominal fat tends to increase with weight gain. Factors that affect the formation of abdominal fat include age, gender, species, nutritional content, and environmental temperature (Dewanti *et al.*, 2013). Excess fat has to do with poor ratio conversion because more food is needed to produce fat in the same weight compared to producing meat (Amrullah, 2004). The higher the content of coarse fiber in the ration will cause the intestines cannot absorb perfectly the nutrients contained in the ration given and come out with the stool. The high content of coarse fiber can reduce the fat content of chickens and the type of feed consumed by chickens greatly affects fat levels (Salam *et al.,* 2013).

The results of the various analysis test on the average value of the treatment group differed markedly ($P<0.05$) in the percentage of fat of broiler chickens aged 5 weeks. So that further tests are carried out with the Tukey test, the result is P1 (Control) feed with additional feed P2, P3, P4, P5, and P6 there is no noticeable difference ($P>0.05$). The percentages of addition of fermented coconut, and pulp do not differ markedly ($P>0.05$) between P2, P3, P4, P5, and P6 to the percentage of fat. Based on table 2 of the first to fourth treatments (P1-P4) decreased data, this is good because the lower the percentage of fat produced, the better the carcass obtained. The low percentage of abdominal fat produced indicates that the resulting softening conditions tend to be better. It is well known that abdominal fat is a result of participation that can affect the quality of the carcass (Massolo *et al.*, 2016). Therefore, the lower the percentage of abdominal fat, the better the carcass obtained. Fat if found to have increased data, there is a decrease in the quality of meat in broiler chickens, and results in a waste of energy. the abdominal fat of broiler presentation is increasing then carcass fat will also increase, causing a decrease in the quantity and quality of meat produced and considered a waste of energy (Juniarti *et al*., 2019). The high quality of broiler carcasses is determined by the amount of abdominal fat contained in broilers. If the higher the abdominal fat of broiler chickens, then the lower the quality and quantity of carcasses obtained (Zhang *et al.,* 1999).

A broiler is a meat-producing chicken that has high productivity because within 5 weeks it can reach a body weight of 1.75-2 kg (Nuraini *et al.,* 2018). Factors that affect the final body weight of broiler chickens include; genetics, gender, protein ratio, temperature, trade management, and sanitation (Anggorodi, 1995). In the life weight range of 1.36-2.27 kg, the percentage of abdominal fat achieved is 2.6-3.5% (Salam *et al.,* 2013). Broiler that is limited in feed has more abdominal fat than chickens fed ad libitum. This is due to thermoregulation processes where energy is more used for fat synthesis so that abdominal fat in chickens is more (Ahmad *et al.,* 2006). Abdominal fat will increase in chickens fed rations with low protein and high ration energy. Excess energy will be stored in the form of fat in tissues. One part of the body used to store fat by chickens is the part around the abdomen (Salam *et al*., 2013). Genotype, gender, and nutrition of broiler chickens are some of the factors that influence the deposition of body fat (Tumova and Teimouri, 2010). The abdominal fat count of broiler chicken cobb500 strains is lower by 0.4% compared to the ross strain (Ristic, 2005).

Conclusion

The addition of coconut pulp (*Cocos nucifera L*) in feed by 40% can increase the percentage of carcasses but does not lower the percentage of abdominal fat in broiler chickens. Fermented coconut pulp mixture is recommended in the addition of commercial feed to get a higher percentage of carcasses.

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