Quality of Broiler Chicken Carcass Given Katuk Leaf Flour (*Sauropus androgynus*) in Feed

Chandra Agustama*, Ludfia Windyasmara, dan Sri Sukaryani
Faculty of Agriculture, Universitas Veteran Bangun Nusantara, Sukoharjo, Indonesia
*Corresponding Author: Chandra Agustama
Email: chandraagustamaa@gmail.com

Abstract

Broiler chickens are the result of crossing several breeds which are very productive, especially in the production of chicken meat. Market and public demand for broiler chickens for consumption is also very high. However, consumers are now increasingly smart in choosing animal products with excellent carcass quality. Adding katuk (*Sauropus androgynus*) leaf flour to feed can be an alternative to improving broiler carcass quality because katuk (Sauropus androgynus) leaf flour contains phytochemical compounds such as: saponins, tannins and B-carotene. This study aims to determine the effect of katuk (Sauropus androgynus) leaf flour supplementation on broiler chicken carcass quality. This research used a Completely Randomized Design (CRD) with a unidirectional pattern with a rearing period of 28 days with 4 treatments and 3 repetitions, namely P0: Giving 100% base feed without any additions, P1: Giving 100% base feed + (1%) katuk leaf flour , P2: Feeding 100% alkaline + (3%) katuk leaf flour, P3: Feeding 100% alkaline + (5%) katuk leaf flour. The variables observed included: carcass percentage, non-carcass percentage, and abdominal fat percentage. Research data was analyzed using Analysis of Variance (ANOVA), followed by the Duncan Multiple Range Test (DMRT). The research results showed the addition of katuk leaf flour with treatments of 0%, 1%, 3%, 5%. The addition of katuk leaf flour to feed can reduce the abdominal fat rate of broiler chickens, but does not affect the carcass rate and non-carcass rate of broiler chickens. P3 treatment with the addition of 5% katuk leaf flour to the feed had the effect of reducing the percentage of abdominal fat.

Keywords : Broile, Carcass Quality, Katuk leaf flour.

Introduction

Broiler chickens are a type of animal that is easy to care for, grows quickly and is cheap to care for. Broiler chickens grow rapidly between the ages of one and five weeks. The advantages of broiler chickens are in terms of genetics, feed efficiency and maintenance management.

Food derived from animals, known as meat, serves an important purpose in meeting a person's nutritional needs. Currently, there is a growing trend among consumers to choose animal products that have good quality carcass characteristics. Carcass is the remainder of a chicken's body after a halal slaughter process, removing the blood, feathers and stomach contents, excluding the head, neck and legs. (SNI, 2009 cited by Ulupi *et al*., 2018).

Consuming animal foods such as chicken which contain antibiotic residues has an impact on health. Menurut Singh *et al*., (2014) cited by Marlina *et al*., (2015), the impact of animal drug residues causes short-term dangers such as digestive tract diseases, allergies, anaphylaxis, hypersensitivity and skin diseases, serious dangers arise such as antimicrobial, mutagenic, carcinogenic, teratogenic and reproductive problems. To solve this problem, natural feed additives should be sought as a substitute for commercial feed during rearing. The use of natural complementary feed ingredients is expected to reduce the fat content of broiler carcasses, but does not reduce the utilization of broiler chicken weight and feed efficiency.

Consumers will pay attention to the need for low-fat meat because fat has an impact on the carcass. Broiler carcasses contain a lot of fat such as visceral fat (Juniarti *et al*., 2019). One alternative to reduce the fat content in broiler chicken carcasses is to use feed additives such as katuk leaf flour.

Fat has a significant influence on carcass quality, so consumers must consider the demand for low-fat meat. Broiler chicken carcasses contain much more fat, especially belly fat (Juniarti *et al*., 2019). One way to reduce the fat content in broiler chicken carcasses is to use additional katuk leaf flour as feed.

Katuk leaf flour can improve digestion and reduce the accumulation of stomach fat (Santoso dan Sartini, 2001 cited by Letis *et al*., 2017), Katuk leaves have very few side effects and can maintain product quality and performance (Simitzis, 2008 cited by Ismail *et al*., 2021).

Likewise with opinions Santoso dan Sartini (2001) cited bye Indriani, Y *et al*., (2019) The maximum levels obtained when looking at reducing body fat by adding katuk leaf flour to chicken feed can reduce belly fat.

Materials and methods

Place and Time

The research was carried out for 28 days in a broiler chicken coop located in Ngasem Hamlet, Jatirejo Village, Jumapolo District, Karanganyar Regency, Central Java Province, Indonesia.

Material

The material used in this research was 4 day old Cobb strain broiler chickens, totaling 60 chickens produced by PT. Djaya Multi Cahaya, katuk leaf flour, New Hope BR1 Starter brand broiler chicken feed produced by PT. Indonesia's New Hope. The equipment and supplies used were 12 cages with dimensions per unit, namely 70 cm long, 70 cm wide and 70 cm high. Each has a capacity of 5 chickens, curtains installed around the research pen, 12 feed bins, digital scales for weighing feed and leaf meal, plastic bags for feed bins that have been weighed for each unit, thermometer/thermogun, incandescent lamps for lighting, husks for cage floor, bucket to collect drinking water and wash cage equipment, paper, blower, newspaper, and stationery to record data during research.

Method

This research used a completely randomized design (CRD) with a unidirectional pattern. SPSS for Windows statistical analysis was used to analyze the data obtained, differences between treatments were tested using Duncan's Multiple Test (Duncan's Multiple Area Test). This study used 60 4-day-old chicks, which were then divided randomly into four treatment groups with the same number of chickens and each group consisted of three replicate sub-groups with five chickens each. The treatment groups are: P0: Alkaline feeding 100% without any additions, P1: Alkaline feeding 100% + (1%) katuk leaf flour, P2: Alkaline feeding 100% + (3%) katuk leaf flour, P3: Alkaline feeding 100% + (5%) katuk leaf flour.

Research Variable

a. Carcass Percentage

To calculate the percentage of carcass fat using the formula :

$$\text{Carcass Pecentage (\%)} : \frac{\text{Carcass weight}}{\text{Live weight}} \times 100\%$$

b. Non Carcass Percentage

To calculate the non-carcass percentage using the formula :

$$\text{Non Carcass Percentage (\%)} : \frac{\text{Weight of non carcass parts}}{\text{Live weight}} \times 100\%$$

c. Abdominal Fat Percentage

Abdominal fat is fat that is attached to the gizzard. To calculate the percentage of abdominal fat using the formula :

$$\text{Abdominal Fat Percentage (\%)} : \frac{\text{Abdominal fat weight}}{\text{Final body weight}} \times 100\%$$

Research Procedure

1) Preparation of katuk leaf flour
2) Chicken slaughtering process

Slaughtering of chickens is carried out at the end of rearing (32 days of age). Each replication produces one sample of one chicken. Chickens are weighed before being slaughtered.

The chicken slaughter process is carried out by cutting the carotid artery, jugular vein, trachea and esophagus (gullet) using Islamic methods. Post-harvest handling of chicken meat includes stages :

a. Slaughtering

Chickens are rested before being slaughtered. The method of slaughtering the chicken used is the Kosher method, namely cutting the carotid artery, jugular vein and esophagus. Slaughtering is attempted to remove as much blood as possible. Blood weight is around 4% of the animal's body weight.

b. Immersion

Soaking is done in warm water at 70-80°C for 1-2 minutes.

c. Removing and cleaning chicken feathers

The feathers are removed and cleaned until only the skin remains.

d. Evisceration

Evisceration begins with the separation of the crop. Then, the body cavity is opened by making an incision from the cloaca to the sternum. After the cloaca and viscera or viscera are removed, organs such as the liver, gallbladder, gallbladder and heart are separated. Apart from separating the bile from the liver, the contents of the gallbladder must also be removed.

e. Chicken carcass

The results of the slaughter showed that the feathers and contents of the abdominal cavity had been removed, except for the lungs and kidneys, and without parts of the neck, head and legs. A chicken carcass consists of breast, thighs, back and wings.

f. Non chicken carcass

The parts of the chicken's body that are included in the non-carcass components are blood, feathers, innards, abdominal fat, head, neck and feet.

g. Abdominal Fat

Obtained from taking fat around the gizzard, proventriculus, bursa of Fabricius, cloaca, and tissue around these areas.

3) Preparation Before Research

Before carrying out the research, the preparations carried out were as follows :

a. Make a cage of 12 partitions (units) with dimensions of 70 cm long x 70 cm wide and 70 cm high. Then it is sprayed with disinfectant and the floor is covered with rice husks with a thickness of 2-3 cm.
b. Clean the cage and then spray disinfectant to kill bacterial microbes.
c. Clean the food and drink containers then wash them with soap.
d. Labels were attached to each treatment and replication randomly to obtain the same opportunity to obtain the position of the cage unit which can be seen in the illustration 1.

4) Body weight was measured to determine body weight at the start of the study. Body weight was measured at the beginning of rearing (4 days old) to determine the initial body weight of each treatment. Next, randomize to replication units for each treatment.
5) Maintenance of treated chickens for 32 days (4 weeks), includes::

a. Feed and katuk leaf flour are measured every week according to standards and given for one week (following the development of the chicken).
b. Drinking water is provided ad libitum or every day by controlling it so that drinking water remains available and cleaning is done every morning.
c. Chicken body weights were weighed once a week.

6) Lay out placement of research materials

Random placement of research materials was carried out by labeling each cage unit. Layout of material placement can be seen in the illustration 1.

Ilustration 1. Layout of the Research Enclosure

P0.3	P3.3	P2.2
P1.3	P2.3	P3.1
P3.2	P0.2	P1.2
P1.1	P2.1	P0.1

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Results and Discussion

Carcass Percentage

Results the average percentage of broiler chicken carcasses for the four treatments can be seen in Table 1.

Table 1. Average percentage of broiler chicken carcass (%)

	Treatment			
	P0	P1	P2	P3
1	73,31	71,42	71,45	74,18
2	65,00	67,49	72,78	72,58
3	73,03	73,53	72,25	71,54
Average^{ns}	**70,45**	**70,81**	**72,16**	**72,77**

Note: Not significantly different (P>0.05)

Based on data during the research, the average carcass percentage for each treatment was P0 = 70.45; P1 = 70.81; P2 = 72.16; P3 = 72.77 %. The statistical test results showed that the addition of katuk leaf flour to the feed gave results that were not significantly different (P>0.05). This means that the addition of katuk leaf flour in the feed has no effect on the carcass percentage of broiler chickens. This can be seen from the relatively similar carcass percentage values in the four treatments.

Even though the statistical results show that there is no significant difference, chickens that are given feed with the addition of katuk leaf flour tend to produce better carcass percentage results than chickens that are only fed concentrate without the addition of katuk leaf flour. According to research data, the P3 treatment produced the highest carcass percentage among the four treatments. This is because the highest level of giving katuk leaf flour at P3, namely 5%, is able to reduce the presence of free radicals and reduce fat. The higher the level of addition of katuk leaf flour, the higher the carcass percentage. Katuk leaves contain phytochemical compounds that can inhibit the growth of harmful microorganisms in the digestive tract so that food substances consumed by chickens can be absorbed optimally. If food substances can be absorbed optimally then nutritional absorption can also be optimal which can influence body weight gain (Bidura *et al*., 2007 cited by Ismail *et al*., 2021). Standard carcass percentage according to Suprayitno and Indraji (2007) cited by Anwar *et al*.,

(2019) namely 59-63% of live weight. In this study, this means that the carcass percentage is above average, namely 70.45 - 72.77%. This is because the broiler chickens in this study have a healthy condition and good immune system so that feed consumption is higher. The average feed consumption in the study was 103.64 g/head/day, which has a higher value than the feed consumption in previous research, namely 98.12 g/head/day (Rahayu, 2024). According to Subekti *et al*., (2012) cited by Juniarti *et al*., (2019) the variables that influence body weight gain are feed consumption, environmental conditions, type of seed, and quality of available feed. A good carcass has a lot of muscle tissue and little fat tissue. Other factors that influence the carcass percentage of broiler chickens are body conformation and degree of fatness. Fat livestock has a high carcass percentage. (Soeparno 2005 cited by Hetharia dan Sanda, 2021)

Persentase Non Karkas

The average non-carcass percentage of broiler chickens for the four treatments can be seen in Table 2.

Table 2. Average percentage of non-carcass broiler chickens (%)

	Treatment			
	P0	P1	P2	P3
1	19,45	19,95	18,12	17,55
2	20,31	18,19	19,73	19,75
3	18,99	19,79	18,80	18,49
Average^{ns}	**19,58**	**19,31**	**18,88**	**18,60**

Note: Not significantly different (P>0.05)

Based on data during the research, the average carcass percentage for each treatment was P0 = 19.58; P1 = 19.31; P2 = 18.88; P3 = 18.60%. The statistical test results showed that the addition of katuk leaf flour to the feed gave results that were not significantly different (P>0.05). This means that the addition of katuk leaf flour to the feed does not have a real effect on the non-carcass percentage of broiler chickens. There was no real difference because the non-carcass weight between treatments was almost the same, resulting in almost the same non-carcass percentage. Chickens with small body weights usually have a greater non-carcass percentage than chickens with large body weights (Resnawati, 2010 cited by Sibarani *et al*., 2014).

Even though the statistical results showed that there was no significant difference, chickens fed with the addition of katuk leaf flour produced better non-carcass percentage results than chickens fed only concentrate feed. The lower the non-carcass percentage of broiler chickens, the higher the percentage of broiler chicken carcasses. In this study, the addition of katuk leaf flour at a level of 5% in the feed produced the highest carcass percentage and the lowest non-carcass percentage according to the data. Seen in table 2, the average non-carcass percentage for broiler chickens ranges from 18.60-19.58%. This result is lower than the research results (Haril *et al*., 2018) namely the addition of katuk leaf flour at a level of 3-12% produces a non-carcass percentage ranging from 26.16-28.12%.

Pesentase Lemak Abdominal

The average abdominal fat content of broiler chicken meat in the four treatments can be seen in Table 3.

Table 3. Average percentage of abdominal fat for broiler chickens (%)

	Treatment			
	P0	P1	P2	P3
1	1,00	0,97	1,04	0,77
2	1,18	1,10	1,10	0,97
3	1,16	1,14	1,00	0,83
Average	**1,11^{b}**	**1,07^{b}**	**1,05^{b}**	**0,86^{a}**

Note: Different superscripts on the same line are significantly different (P<0.05).

Based on data during the research, the average percentage of abdominal fat for each treatment was P0 = 1.11; P1 = 1.07; P2 = 1.05; P3 = 1.86%. The statistical test results showed that the addition of katuk leaf flour to the feed made a significant difference (P<0.05). This means that adding katuk leaf flour to feed has an influence on the percentage of stomach fat in broiler chickens. P0 is significantly different from P3 but not significantly different from P1 and P2. In the P3 treatment, the addition of 5% katuk leaf flour was able to reduce the abdominal fat content of broiler chickens.

Chickens that were fed with the addition of katuk leaf flour had lower abdominal fat deposits compared to chickens that were only given concentrate feed without the addition of katuk leaf flour. This can happen because katuk leaf flour contains crude fiber which plays a role in reducing fat absorption so that fat deposition in the chicken's body is inhibited. Low production of bile salts by the gallbladder can also inhibit fat absorption in the digestive tract. The decreased production of bile salts is caused by the binding of bile salts by fiber so that they cannot form micelles which will be excreted with the excreta (Uebelhack *et al*., 2014 cited by Letis *et al*., 2017). Katuk leaf flour also contains phytosterol compounds which can inhibit fat absorption in the digestive tract, resulting in a decrease in liver and carcass cholesterol metabolism levels which can then increase the carcass percentage and reduce the abdominal fat percentage (Suprayogi, 2000 cited by Letis *et al*., 2017).

Standard abdominal fat percentage according to Sari (2009) cited by Sari dan Anggraini, (2019) ranges from 1.69 – 1.89%. In this study, the percentage of abdominal fat ranged from 0.86 – 1.11% so it was still considered good. Abdominal fat is influenced by several factors, namely genetics, nutrition, gender, age of the chicken, and environmental factors antara 1,69 – 1,89 % (Oktaviana *et al*, 2010 cited by Juniarti *et al*., 2019).

Conclusion

The addition of katuk leaf flour to feed was able to reduce the quality of the abdominal fat percentage in broiler chickens but did not have a significant effect on the quality of the carcass percentage and non-carcass percentage of broiler chickens. The results of this study require further research regarding fat and cholesterol levels.

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