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PERCENTAGE OF CARCASS PARTS OF BROILER CHICKEN GIVEN ADDITIONAL AFRICAN LEAF FLOUR FEED (VERNONIA AMYGDALINA)

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ABSTRACT
Feed is an important thing in supporting the broiler farming business and currently, research on natural feed ingredients as animal feed additives has been widely carried out by researchers and breeders, one of which is African leaves. This study aimed to analyze the carcass of broiler chickens fed with African leaf meal (*Vernonia amygdalina*) at different levels using 100 broiler chicks a day (DOC) strain SR 202 with a trial period and maintenance of 5 weeks using a completely randomized design (CRD) with 4 treatments and 5 replications. Each replication consisted of 5 chickens with feed in the form of CAB broiler concentrate feed, milled corn, bran, and African leaf flour mixed according to the needs in the treatment. The results showed the average percentage of broiler chicken breast pieces ranged from 35,89-37,18%, thigh weight ranged from 27,98-30,16%, wing pieces 11,36-11,61% and back weight percentage was 20,96-22,31%.

KEY WORDS
Carcass, broiler chicken, African leaf flour.

The demand for meat in Indonesia is relatively high, it is influenced by public demand for protein from animal origin. Fulfilling the need for protein, the development of poultry is very important as a provider of relatively cheap and economical meat one of them is chicken meat and the chicken meat consumed usually comes from broiler chickens. The obstacle for breeders in raising broiler chickens is the use of high-priced commercial feed because feed is the biggest cost of the total production cost (Bulkaini et al., 2021; Mushollaeni & Fitasari, 2021). The ability of livestock to digest the feed given is characterized by the efficiency of a food ingredient that can be digested or absorbed by the digestive tract.

The efficiency of broiler digestion in utilizing feed can be seen from the performance during maintenance which includes body weight gain, feed consumption, and feed conversion (Irmawati et al., 2020; Hikmat et al., 2021). Efforts to increase feed digestibility are usually done by adding a feed additive in the ration/feed (Sawadi et al., 2016; Jumiati et al., 2017). To overcome the high price of commercial feed, one of the steps that can be taken is to use alternative feed, namely African leaves. African leaves are herbal plants besides these African leaves are very easy to get. African leaves contain various kinds of nutrients, namely protein, fat, carbohydrates, vitamins, and minerals, and have bioactive substances such as alkaloids, flavonoids, glycosides, saponins, and tannins (Damayanti et al., 2019).

Provision of additional feed is intended to stimulate growth or increase productivity and health of livestock and increase production efficiency (Ananto et al., 2016; Degei et al., 2021). Additional feed that is commonly used by farmers today to increase livestock productivity comes from nutritious plants or herbal plants. Herbal plants have bioactive substances consisting of one or a mixture of compounds such as alkaloids, flavonoids, glycosides, saponins, and tannins. Additional feed commonly used consists of several types, one of which can come from medicinal plants such as African leaves (Siswanto & Astriani, 2016; Sukmawati et al., 2017). African leaves contain lots of nutrients and chemical compounds, including 19,2% protein, 19,2% crude fiber, 68,4% carbohydrates, 4,7% fat, phosphorus, potassium, sulfur, sodium, manganese, copper, zinc, magnesium, and selenium. Chemical compounds contained in African leaves include flavonoids, alkaloids, saponins, terpenoids, tannins, glycosides, indole alkaloids, anthraquinones, and luteolin (Sukmawati et al., 2017).

A good carcass is a carcass that is safe from germs and residues of synthetic or chemical feed additives because these materials can cause negative effects for humans who consume them (Saniwanti et al., 2015; Yaddi et al., 2019). The use of natural feed additives aims to maintain and maintain a healthy body from disease attacks and the effects of stress, increase appetite and stimulate growth. This natural feed additive works to inhibit the work of disease-causing microorganisms and improve ration conversion. One of the natural feed additives that have the potential to replace commercial feed additives is mangosteen rind flour. African leaf flour can be made from fresh leaves that are made into flour and can be stored for a long time.

The carcass is part of livestock after being slaughtered and the non-carcass parts are removed including offal (Nurlia et al., 2020; Leesi et al., 2021). A good carcass has a high percentage of live weight with maximum meat and minimal bone yield. The percentage becomes a calculation to determine the quality of broiler meat. Commercial cuts that are often found are the chest, thighs, wings, and back. Based on the background description, it is necessary to research the percentage of carcass parts of broiler chickens that are given additional African leaf meal (*Vernonia amygdalina*).

LITERATURE REVIEW

African leaf (*Vernonia amygdalina*) is a plant that has properties for the treatment of diabetes, hypertension, reducing cholesterol, uric acid, removing toxins in the body (detoxification), rheumatism, sleeplessness, tingling, fever, headache, throat infection, eliminating phlegm, smoothing urinate, strengthen stomach function, cough, and indigestion (Zahra, 2021). Research on the use of African leaves was also carried out by Yani & Thristy, (2021) that the combination of ethanolic extract of African leaves 200 mg/kg/day with simvastatin 1 mg/kg BW/day was able to reduce triglyceride levels in rats induced by egg yolk. Even the part of this plant that can be used is the leaves, which are highly nutritious because they have lots of antioxidants. These leaves also contain various secondary metabolites. Research has shown that African leaf extract contains sugar components, terpenoids, polyphenols, alkaloids, saponins, glycosides, triterpenes or steroids, anthraquinones, and coumarins that do not contain cyanogenic substances. Meanwhile, the roots and bark only contain saponins, glycosides, and tannins without flavonoids (Suhaemi et al., 2021). Ethanol extract of African leaves (*Vernonia amygdalina*) at doses of 100, 200, and 400 mg/Kg had antihyperuricemic activity induced by melinjo and chicken liver juice with the largest percentage reduction in uric acid levels indicated by ethanolic extract of African leaves at a dose of 400 mg/Kg of 56% but still lower than the ability of allopurinol (Nuari et al., 2021). African leaves (*Vernonia amygdalina*) are reported to have antimalarial, antibacterial, anticancer, antioxidant, and other activities. This is closely related to the content of secondary metabolites in it, namely flavonoids (Esati et al., 2021). Supplementation of African leaf juice (Vernonia amygdalina) in drinking water on the chemical composition and malondialdehyde levels of quail eggs (*Coturnix coturnix japonica*) of 3 ml and 6 ml of tails^{-1} day^{-1} was able to reduce MDA levels of egg yolks (Hasbullah et al., 2020).

The results of the studies previously mentioned have provided an overview of the benefits of African leaves (*Vernonia amygdalina*) both for human health and for experimental materials for mice. Research on the use of African leaves in livestock such as broiler chickens has not yet been carried out due to the level of knowledge of farmers in utilizing potential feed resources. This study specifically examines the use of African leaves (*Vernonia amygdalina*) in broiler rations/feeds to determine the percentage of breast, wing percentage, thigh percentage, and back percentage of broiler chickens.

MATERIALS AND METHODS OF RESEARCH

The research was carried out in January-February 2022 at the broiler chicken coop of the Poultry Livestock Unit Laboratory, Faculty of Animal Science, University of Halu Oleo

Kendari. The materials used in this study were 100 broiler chickens strain SR 202 with different sexes using concentrate feed of broiler (CAB), milled corn, bran, and African leaf meal with the equipment to be used in the study was a 20-unit square cage. with a size of 80 cm x 80 cm, a place to feed, a place to drink, a scale, a knife, and a 60-watt incandescent lamp.

The materials used in this study were African leaves which were dried in the sun to dry and ground using a grinding machine to become flour and weighed according to the dose of each treatment. Preparation of the cage plot was first cleaned by sweeping, brushing, and washing with clean water, then sterilized using a disinfectant for 1 day to prevent microorganisms or pathogenic bacteria, followed by the installation of rice husks as a base for the cage and a heating device using a 60-watt lamp for 2 fruits in each cage plot. Each cage plot contained 5 broiler chickens equipped with feed and drinking water containers with 100 research chickens placed in 20 cage plots.

The rearing stage of broiler strain SR 202 was reared from DOC until the age of 5 weeks which was first given vita stress to overcome stress due to transportation travel. Before the treatment of African leaf, the feed was given, broiler chickens underwent an adaptation period to the feed for 7 days. African leaf feed treatment was given after the chickens were 8 days old to 5 weeks old. Feeding during the brooding period was carried out ad libitum using CAB concentrate feed, milled corn, and bran. The drinking water and feed containers are always cleaned before adding.

Feed is provided ad libitum. The nutritional content of the feed ingredients used in the study is presented in Table 1.

Table 1 – Nutrient content of feed ingredients

Feed Ingredients	Nutritional Content of Feed Ingredients			
	Metabolic Energy (Kkal/kg)	Crude Protein (%)	Crude Fat (%)	Crude Fiber (%)
Concentrate CAB [(2)]	2711	38,5	3	7
Ground Corn [(1)]	3350	8,5	3,8	2,2
Bran [(1)]	2980	12	13	11
African Leaf Flour [(3)]	2844	23,3	2,1	11

The composition of feed ingredients based on the treatment used in the study is presented in Table 2.

Table 2 – Composition of feed based on treatment

Feed Ingredients	Treatment			
	P0 (%)	P1 (%)	P2 (%)	P3 (%)
Concentrate CAB	40	40	40	40
Ground Corn	40	40	40	40
Bran	20	18	16	14
African Leaf Flour	0	2	4	6
Total	100 %	100 %	100 %	100 %

The nutrient content of the ratio based on the treatment used in the study is presented in Table 3.

Table 3 – Nutrient content of feed based on treatment

Treatment	Crude Fiber (%)	Crude Fat (%)	Crude Protein (%)	Metabolic Energy (Kcal)
P0	5,9	5,3	21,2	3020,4
P1	5,9	5,1	21,4	3017,68
P2	5,9	4,9	21,7	3014,96
P3	5,9	4,7	21,9	3012,24

Observations on the percentage of the breast, the percentage of the wings, the percentage of the thighs, the percentage of the back when the chickens were 5 weeks old by cutting the chickens based on 2 tails each treatment so that the chickens were slaughtered as many as 40 chickens. But before slaughtering, the chicken is fasted for 6 hours and left for 1-3 minutes until the blood stops dripping and dipped in hot water until the feathers are easily removed. Then the carcass collection was carried out by cutting the head to the neck bone separated from the body, separating the legs to the knees, and removing the contents of the chicken then carcass was carried out and continued with carcass cutting to produce carcass parts and carcass percentage, chest, wings, thighs, back.

The data obtained were analyzed statistically using analysis of variance (ANOVA) with the help of SPSS software. If there is a significant effect (P<0.05) from the treatment, it will be continued with the Duncan Multiple Range Test (DMRT) (Gasperz, 1991).

RESULTS AND DISCUSSION

The percentage of broiler chicken breasts fed with additional African leaf meal is presented in Table 4.

Table 4 – Percentage of Broiler Chicken Breasts

Repeat	Treatment			
	P0	P1	P2	P3
1	37,39	38,20	36,48	38,89
2	37,58	35,01	38,84	33,46
3	35,06	34,86	39,06	33,92
4	38,27	34,75	34,91	36,07
5	37,07	38,24	36,60	37,61
Average ±SD	37,07±1,21	36,21±1,87	37,18±1,75	35,89±2,18

The results of the analysis of variance showed that the addition of African leaves had no significant effect (P>0.05) on the percentage of broiler chicken breast pieces. The addition of African leaves up to the level of 6% has not been able to increase the percentage of the chest. This is probably caused by the carcass weight which has no effect. to the percentage of the chest. Although in African leaf flour there is a flavonoid content whose purpose is as an antioxidant and flavonoids can increase feed consumption, increase the immune system, and can improve the digestive tract. The average percentage of broiler chicken breast pieces ranged from 35,89-37,18%.

The results of this study are higher than the research of Jeprizal et al., (2021) on the use of mangosteen rind flour (33,90%), and better than the results of Sukaryana & Zairiful (2014) on the use of beluntas leaf extract as much as 10%, namely 22,02-28,62%, and higher than the results of research by Yusniatin et al., (2018) on the use of beluntas leaf extract 33,56-36% to a level of 15%. Armissaputri et al., (2013) stated that the percentage of chest weight will increase with increasing body weight and carcass weight. The decrease in the percentage of broiler chicken breasts can also be caused by the high crude fiber content in African leaf flour, so that the feed consumed is not digested properly, thus affecting growth which will then have an impact on carcass weight reduction.

Table 5 – Percentage of broiler chicken thigh pieces

Repeat	Treatment			
	P0	P1	P2	P3
1	29,41	26,89	29,24	28,63
2	28,90	31,63	29,42	26,40
3	31,15	30,86	29,27	27,68
4	30,78	30,95	29,66	28,06
5	30,56	30,12	26,80	29,15
Average ±SD	30,16±0,96^{a}	30,09±1,87^{a}	28,88±1,17^{ab}	27,98±3,1,05^{b}

Note: Different superscripts in the same column show significantly different treatments (P<0,05).

The chest and thighs are some of the parts of the carcass that have high economic value. The thigh is one part of the carcass cut called a commercial cut. The thigh consists of two parts, namely the upper and lower thighs. The upper thigh is the part of the carcass that is cut from the border of the thigh joint (femur), while the lower thigh is cut from the border of the shin joint (tibia) (Soeparno, 2009). The percentage of broiler thigh pieces that were given additional African leaf meal is presented in Table 5.

The results of the analysis of variance showed that the addition of African leaf flour had a significant effect (P<0.05) on the percentage of broiler chicken thigh pieces. Duncan's test results showed that the percentage of broiler thighs in treatment P3 was significantly lower (27,98%) than treatment P1 (30,09%) and control (30,16%), but not different from treatment P2 (28,88%). This shows that the addition of higher African leaf flour did not increase the percentage of thigh pieces produced.

The average percentage of broiler chicken thigh pieces ranged from 27,98% to 30,16%. The average value of thigh weight percentage in this study is almost the same as the results of Jeprizal et al., (2021) on the use of mangosteen rind flour (30,47%). The results of this study are higher than those of Sari et al., (2014). According to Muryanto et al., (2002), the thigh is the part of the carcass that contains a lot of meat so its development is much influenced by the protein content of the feed. In addition, the percentage of carcass cut weight is determined by gender. Male broilers have a greater percentage of upper and lower thigh weights than females (Resnawati, 2008).

The percentage of broiler chicken wings that were given additional African leaf meals is presented in Table 6.

Table 6 – Percentage of broiler chicken wings

Repeat	Treatment			
	P0	P1	P2	P3
1	11,67	9,88	11,73	12,09
2	11,43	11,77	11,53	11,82
3	11,84	12,70	11,09	10,72
4	11,64	12,85	12,05	11,52
5	10,24	10,86	10,66	10,65
Average ±SD	11,36±0,64	11,61±1,26	11,41±0,55	11,36±0,65

The results of the analysis of variance showed that the addition of African leaf flour had no significant effect (P>0.05) on the percentage of broiler chicken wings. The average percentage of broiler chicken wings ranged from 11,36% to 11,61%. This may be due to the difference in protein content and ration energy from each treatment. The results of this study are higher than the results of research by Yusniatin et al., (2018) on the use of beluntas leaf extract, namely 9,81-10,80%. Meanwhile, the results of this study were not different from those of Jeprizal et al. (2021) on the use of mangosteen rind flour, which was 10,94-11,51%. According to Bidura et al., (2008) on the size and structure of wing feathers, it can be estimated that food substances in the form of protein and energy will be used in large quantities for the formation of bones, meat, and feathers.

The percentage of broiler chicken backs fed with African leaf meal is presented in Table 7.

Table 7 – Percentage of broiler chicken back pieces

Repeat	Treatment			
	P0	P1	P2	P3
1	21,04	23,71	22,27	19,94
2	21,62	20,88	20,00	18,79
3	22,04	20,90	19,98	26,91
4	22,56	20,81	22,86	23,35
5	17,53	20,49	26,42	22,19
Average ±SD	20,96±1,99	21,36±1,32	22,31±2,64	22,24±3,17

Based on the results of the variance showed that the addition of African leaf flour had no significant effect (P>0.05) on the percentage of back weight. This shows that all treatments have the same relative effect on the average percentage of the back because the back weight and carcass weight of broiler chickens also show no significant difference, so the percentage of the back of broiler chickens shows the same results. In line with what Rashid et al., (2004) stated that the back of broilers contains a lot of bone tissue so that the mineral content in the ration has more effect on back weight compared to protein.

The average percentage of back weight in the results of this study ranged from 20,97-22,31%, this result is different from the statement of Kidd et al., (1996) that the average percentage of the back of broiler chickens is 18% of carcass weight. The results of this study are greater than the results of the Parista study (2014) ranging from 17,61-19,40% and the research of Jeprizal et al., (2021) ranging from 19,75-19,81%. The back is a part that is dominated by bone and has less potential to produce meat. During growth, bone grows continuously with a relatively slow rate of growth, while muscle growth is relatively faster so that the ratio of muscle to bone increases during growth (Soeparno, 2005; Hafid, 2011).

CONCLUSION

Based on the results of the study, it can be concluded that the addition of African leaf flour at different levels had a significant effect (P<0.05) on the percentage of breast weight but did not give a significant effect (P>0.05), on the percentage of breast weight, wing weight percentage, and percentage of the back weight of broiler chickens.

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