Chalaza Journal of Animal Husbandry

Url: http://usnsj.com/index.php/CJAH
Email: editor.cjah@usnsj.com

Percentage of Carcass and Protein Content of Breast Meat of Native Chicken Given Apu-Apu Flour (*Pistia stratiotes*)

AUTHORS INFO

Muhammad Basri
Universitas Islam Negeri Alauddin Makassar
Jiip.fst@gmail.com
+6285242054621

Muhammad Nur Hidayat
Universitas Islam Negeri Alauddin Makassar
hidayat.peteruin@gmail.com
+6281342363639

Rusny
Universitas Islam Negeri Alauddin Makassar
rusnydjunaid@gmail.com
+628114446710

ARTICLE INFO

e-ISSN: 2548-3803
p-ISSN: 2548-5504
Vol. 5, No. 1, June 2020
URL: https://dx.doi.org/10.31327/chalaza.v5i1.1255

Abstract

The research aimed to determine the percentage of carcass and protein content of super native chicken breast meat given rations containing apu-apu flour (*Pistia stratiotes*). The research design used was completely randomized design (C.R.D.) with five treatments and three replications. Each test consisted of three super three-month-old native chickens. Apu-apu flour levels in each treatment, namely P0 (0%), P1 (5%), P2 (10%), P3 (15%) and P4 (20%). The study was conducted for four weeks. The percentage of carcasses in each treatment were P0 (67.51%), P1 (69.33%), P2 (69.47%), P3 (68.76%) and P4 (70.88%). Furthermore, protein content in breast meat, namely P0 (25.21%), P1 (26.03%), P2 (25.43%), P3 (25.86%) and P4 (25.35%). There were no significant effects (P> 0.05) of fluorine in rations on the carcass percentage and protein content of super native chicken breast meat. The highest average value of carcass percentage was in the treatment of 20% *Pistia stratiotes* flour, while the highest breast meat protein content was in the treatment of 5% *Pistia stratiotes* flour.

Keywords: super native chicken, *pistia stratiotes*, carcass, meat protein

A. Introduction

The role of native chicken is still one of the supporting sources of animal protein and one of the providers of meat and eggs to meet the community's needs, especially in rural areas. The significant demand for free-range chicken production from both meat and eggs has not been

able to be fulfilled by native chicken farmers, especially if there is demand in large or continuous quantities. According to Varianti, Atmomarsono & Mahfudz (2017), native chicken is very popular with all people in Indonesia because it has more savory meat. However, the low level of productivity of native chickens is an obstacle for the community. Many people develop or improve the genetic quality of native chickens by crossing with chickens that have better genetic makeup, such as chicken Bangkok male with female laying hens.

One of the results of the progress of genetic selection in poultry, especially native chickens, is the emergence of super native chickens. According to Salim (2013), super native chickens are the result of the crossing of native male chickens with a great posture with female laying hens. This chicken has a reasonably good ability to adapt to environmental conditions. Efforts to support the productivity of super-high native chickens need quality feeding. However, this is an obstacle for farmers because commercial feed on the market is relatively expensive so that it will increase production costs. Therefore, the use of local resources as a source of food must have endeavored.

In super chicken farming, feed is a crucial factor in determining the success of raising livestock. The feed can spend quite high costs of around 60-70% of the total cost of production. One of the factors of the high production costs can be mentioned that the feed ingredients used in the preparation of the rations are still imported. Or example, the need for feed protein is supplied from fish meal, which is still primarily imported (Yudhitstira, Iskandar & Adriani, 2015).

Efforts to overcome this can be made by utilizing local sources that do not compete with human needs. Indonesia has abundant local resources in the form of water plants that have not been used as animal feed. Several studies have shown the potential of aquatic plants as a source of feed ingredients for poultry. Hidayat, Kiramang & Surati (2016) research results show that water hyacinth plants that are given fermentation treatment can be improved in nutritional quality so that it has the potential to be used as feed. Furthermore, the results of Rusli, Hidayat, Rusny, Suardi, Syam & Astati (2019) showed that *Pistia stratiotes* given up to the 10% level in super native chicken rations could improve the value of feed conversion compared to controls.

Pistia stratiote is a plant that can be found in water areas such as lakes, ponds, rice fields, and even puddles and includes plants that are easy to breed, and some people consider this plant as pests. Fermented *Pistia stratiotes* have been used as feed up to *30%* (Yudhitstira et al., 2015). But there are still many people who do not know how to use these *Pistia stratiotes* as poultry feed. *Pistia stratiotes* have a relatively high production of dry matter biomass of 16.1 tons dry matter/ha/ year (Reddy & Debusk, 1985). Content nutrition, *Pistia stratiotes* plant by weight dried contains 37.0% BETN, crude protein 19.5%, ash content 25.6%, crude fat 1.3%, and fiber roughly 11.7% (Diler, Tekinay, Guroy, Guroy, & Soyuturk, 2007). This research was conducted to test the use of plant pests as intended by the effect of giving apu-apu flour (*Pistia stratiotes*) to the percentage of carcass and breast protein content in super native chickens.

B. Methodology

1. Research Procedure

The design applied in this study was a Completely Randomized Design (C.R.D.) method consisting of 5 treatments and three replications. Each test consisted of three super native chickens so that the total number of chickens used was 45 with treatment (P). P0 (basal feed without using *Pistia stratiotes* flour), P1 (basal feeding with 5% additional *Pistia stratiotes* flour), P2 (basal food with 10% added *Pistia stratiotes* flour), P3 (basal feed with an extra 15% *Pistia stratiotes* flour), and P4 (basal feed with an additional 20% *Pistia stratiotes* flour).

2. Preparation in Rearing

The Materials that will be used in the manufacture of bulkhead enclosures are such as bamboo, beams, and others. Then make a cage with an area of each partition that is 60 x 60 x 40 cm. After the pen is finished, then cage the cage using disinfectant or detergent then sprinkle the husk as a base with a thickness of 7 cm. Prepare a native chicken with the age of 3 months that will be maintained for four weeks. The treatment was applied to chickens from a period of 3 months until the completion of the study. The number of chickens used in this study was 45 tails, which were randomly selected and then put into a bulkhead cage where each bulkhead was filled with three chickens. Then the enclosure is equipped with 15-watt L.E.D. lights of 2 pieces.

Pistia stratiotes plants used in this study were taken in villages in Bantaeng. Made in a fresh state, then dried in the sun for several days. After drying, then milling is done to change the physical form of the material into flour. The nutritional content and ration formulation used in this study are presented in Tables 1, 2, and 3. Feed and drinking water are given adlibitum.

Table 1. The nutritional content of *Pistia stratiotes* flour

Nutrient	Composition (%)
Water	16.94
Crude Protein	35.74
Crude fat	7.67
Crude fiber	15.87
BETN	16.65
Ash	24,07

Source: Analysis results at the Laboratory of animal feed chemistry, Faculty of Animal Husbandry, Hasanuddin University, 2018.

Table 2. Compilation ingredients of the research ration

Feed ingredients	Treatment				
	P0	P1	P2	P3	P4
Corn (%)	54	53	53	53	53
Rice bran (%)	10	9	8	7	6
Fish flour (%)	10	9	7	5	3
Soybean Meal (%)	26	24	22	20	18
Apu-apu flour (%)	0	5	10	15	20

Table 3. Nutrition content of the study ration for each treatment

Nutrition	Treatment				
	P0	P1	P2	P3	P4
Crude Protein (%)	16,20	16,11	16,12	16.27	16.30
EnergyMetabolism (Kkal/kg)	2,821.5	2,808	2,808	2,807	2,806
Crude fat (%)	4,12	4,29	4,46	4,63	4,80
Crude fiber (%)	3,94	4,47	5,01	5,55	6,09

Note: Nutrition Content Based on Calculation Results

3. Parameters of Research

a. Percentage of carcass

At the end of the research, a chicken was taken for each experimental unit to determine the final body weight. The chicken is then cut into the respiratory tract (trachea), esophagus (esophagus), and blood vessels (jugular veins). Blood is released in the legs above and below the head. After the blood stops flowing and the chicken does not move anymore, soaking is finished. Then the chicken is weighed and scalding (at 50-55^{o}C, 45-120 seconds), hair retraction, body extraction, cutting head, neck, and legs. At each stage, the weighing is done. The carcass obtained is then weighed to determine the carcass weight (Ulupi, Nuraini, Parulian & Kusuma, 2018). The percentage of the carcass was calculated based on Hidayat, Malaka, Agustina & Pakiding (2016). That is, comparing the weight of super-native chicken without feathers, head, neck, legs, and internal organs (g) with live weight (g) later multiplied by 100%.

b. Breast meat protein content

The determination of meat breast protein content was analyzed using the Kjeldahl method. First of all, take and weigh carefully about 0.5 g of sample and then put it into a 100 mL Kjeldahl micro flask that added approximately 1 g and 25 mL concentrated H_2SO_4. Then the Khjedal flask and its contents are shaken until all the samples are moistened with H_2SO_4. Destruction in the fume hood until clear green then cooled to room temperature. Then poured into a 100 ml measuring flask, then rinsed using distilled water and let it cool. After that, it is squeezed until the hearing line of distilled water is then homogenized by shaking. Prepare a container consisting of 10 mL of 2% H_3BO_3 added with four drops of mixed indicator solution on Erlenmeyer. Take a sample solution of 5 mL using a dropper pipette then enter into the

distillation flask. Then add 10 ml of 30% NaOH and 100 mL of distilled water. Then distilled until the container volume becomes approximately 50 mL. Furthermore, the tip of the distillers rinsed with distilled water followed by the container along with the contents in the titration with H_2SO_4 0.0171 N solution (AOAC, 1990). The formula used in the calculation:

$$\text{Carcass protein (\%)} = \frac{V \times N \times 14 \times 6{,}25 \times P}{\text{Sample Weight (mg)}} \times 100\%$$

Information:

V = Example Titration Volume
N = Normality of Solution H_2SO4
P = Dilution Factor

4. Data Analysis

The data obtained will be analyzed using the Completely Randomized Design (C.R.D.). If the research treatment is significantly affected, further tests of the Ducan's multiple regions are carried out to see the difference between each treatment (Steel & Torrie 1991)

C. Results and Discussion

A 4-week (30-day) study of 13-week-old super-native chicken fed with apu-apu flour (*Pistia stratiotes*) in rations on the percentage of carcass and proteins are presented in Table 4.

Table 4. The average percentage of carcasses and meat breast protein content of 13-week-old super-native chicken meat maintained for 30 days.

Variable	Treatment					P-Value
	P0	P1	P2	P3	P4	
Carcass (%)	67,51	69,33	69,47	68,76	70,89	0,17
Meat Breast protein Content (%)	25,22	26.04	25,43	25,87	25,36	0,96

Note: (P0: Provision of basal feed without using *Pistia stratiotes* flour), (P1: Provision of basal feed with an additional 5% *Pistia stratiotes* flour), (P2: Provision of basal feed with an additional 10% *Pistia stratiotes* flour), (P3: Provision of basal feed with an additional 15% of *Pistia stratiotes* flour), and (P4: Provision of basal feed with an extra 20% *Pistia stratiotes* flour).

1. Percentage of carcass

Variance results showed no significant effect (P>0.05) in the percentage of the carcass of super native chicken that was kept for 30 days. The average rate of the 13-week-old super-native chicken carcass can be seen in Table 4 with results ranging from P0 (67.51%), P1 (69.33%), P2 (69.47%), P3 (68.76%) and P4 (70.88%). Based on these results indicate that the application of 20% apu-apu flour (*Pistia stratiotes*) in P4 treatment with an average percentage of carcasses of 70.89% higher than in other procedures.

The percentage of the carcass in this study was higher than that of the survey by Darmawan, Suprijatna, & Atmomarsono (2017) in 12-week-old super-native chickens was 59.56% - 64.15%. Likewise, with the research of Cindy, Jacob, Leke, Cherlie, Sarajar, & Tangkau (2019) in 12-week-old chickens in the range of 65.96% -67.74%. Differences in the results of this study with other studies on super native chicken showed that differences in age could affect the resulting carcass differences. According to Abdullah, Al-beitawi, Rjoup, Qudsieh., & Ishmais. (2010)The percentage of carcasses can increase with the age of chickens.

This study also showed a higher percentage of carcass compared to some other types of native chicken. It showed that Research on Arabian chickens (57.86%), and crossbreeding of Arabian chickens with Kedu (56.04%) (Iskandar, 2005). Furthermore, Situmeang (2014) reports that the percentage of six-week-old native chicken carcasses is 62.80% -63.17%. The difference in the results of this study with previous studies showed that chicken species, age, and ration were different. Given can affect the percentage of the carcass. It is supported by the opinion of Iskandar (2005), stating that carcass weight is influenced by the type of chicken, ration, live weight, sex, and age.

There was no statistical difference (P>0.05) of the percentage of carcasses between these treatments, indicating that the apu-apu flour has not been able to provide a significant effect on the rate of super native chicken carcasses. The procedure given 20% *Pistia stratiotes* flour has a

carcass percentage of 70.89% compared to other treatments. The use of 20% *Pistia stratiotes* flour contributes to the amount of dietary protein content (16.30%) given. The ration content in these treatments was higher than the other treatments. It shows that protein ration nutrition is essential to be considered to produce a high percentage of carcasses.

The amount of protein content in the ration is one of the elements needed for tissue growth. The growth rate of the chickens increased as the level of protein increased The amount of protein in the ration will affect the achievement of animal body weight (Liu, Niu, Min, Wang, Zhang, He, Li, Sun & Liu, 2015). Soeparno (1998) has stated, one of the food substances that significantly affects the growth of carcass-forming tissue is protein. It is supported by Rasyaf's opinion (2006), which states that chicken body weight is influenced by the quantity and quality of feed consumed by livestock. Differences in the content of feed ingredients and the amount of feed consumed will impact the resulting weight gain due to the content of feed substances that are balanced and sufficient following the needs needed for optimal growth. According to Nuraini, Hidayat & Yolanda (2018), the carcass percentage starts from the growth rate, which is indicated by the increase in body weight will affect the resulting weight cut.

2. Breast meat protein content

Protein is one of the nutrients that are needed by living things, both animals and humans. In Indonesia, one of the protein suppliers is chicken, purebred chicken, and native chicken. Variance results showed no significant effect ($P>0.05$) on the protein content of super native chicken breast meat that was kept for 30 days. Protein content of breast meat in a row, namely P0 (25.21%), P1 (26.03%), P2 (25.43%), P3 (25.86%) and P4 (25.35%). The highest value of protein content in this study was found in treatment P1 (26.04%), while the lowest value of protein content was in treatment P0 (25.22%).

The protein content of super native chicken meat in this study are in the range 25,21%-26,04% was higher when compared to studies on native chickens that were given 100% broiler feed based on the average protein content ranging from 19.38% (Dewi, 2013). According to Susanti (1991), the protein content of free-range chicken meat is around 23.05% greater than that of purebred chicken, which is 21.86%. This research proves that the use of apu-apu flour (*Pistia stratiotes*) in super native chicken rations can substitute high protein content such as soybean meal and fish meal.

There is a protein content of chicken meat ranging from 16% to 22%, the chemical content of meat from livestock also varies greatly depending on age, nation, species, stress, feed and sex (Lawrie, 1995). Feed with low protein content will have low meat protein content (Kartikasari, Soeparno, & Setiyono, 2001). Chicken meat contains essential amino acids. It is like valine, tryptophan, threonine, methionine, leucine, isoleucine, lysine, and histidine (Soeparno, 1994).

This research was carried out for four weeks (30 days) in super native chicken, 13 weeks old using a flour-shaped ration (mash). Mash is a form of a complete feed that is finely ground and mixed so that birds cannot easily separate ingredients; each mouthful provides a well-balanced diet; besides that, a simple manufacturing procedure is required for the form of feed mash (Jahan, Asaduzzaman, & Sarkar, 2006). Even though flour-shaped food has the advantage of being more easily digested by livestock, but the habit of chickens consuming food in the form of grains results in a lack of palatability for feed in the form of flour.

The treatment given 20% *Pistia stratiotes* flour has a carcass percentage of 70.89% compared to other treatments. Will have a lower breast meat protein content among the treatments provided by *Pistia stratiotes* flour, which is 25.36%. While the treatment with the highest content of breast meat protein is found in the treatment of 5% *Pistia stratiotes* flour, the high protein content of rations can affect the percentage of super native chicken carcasses produced, as in this research in the treatment of 20% Pistia stratiotes flour.

The high protein content of *Pistia stratiotes* flour is one of the potential local resources that can be used to reduce the use of other protein feed sources, such as fish meal and soybean meal in this study. Giving *Pistia stratiotes* flour up to 5% in the ration did not harm the percentage of carcass and protein content of super-native chicken breast meat. Therefore, Pistia stratiotes flour can be used as an alternative feed that needs to be studied further about its potential as poultry feed.

D. Conclusion

Pistia stratiotes flour can be used as a substitute for protein-source feed-in super-native chicken, such as soy flour and fish meal up to 5%.

E. References

Abdullah, Y. A., Al-Beitawi, N., Rjoup, M M. S., Qudsieh, R. I. & Ishmas, M. A. A. (2010). Growth performance, carcass, and meat quality characteristic of different commercial crosses of broiler strains of chicken. *Poult. Sci. Vol. 47*(1), pp. 13–21.

AOAC. (1990). *Official Method of Analysis*. 15th Edition. Association of Official Analytical Chemists. Virginia: Arlington.

Cindy, C., Jacob, C. C., Leke, J. R., Sarajar, C .L. K., & Tangkau, L. M. S. (2019). Penampilan produksi ayam kampung super melalui penambahan juice daun gedi (*Abelmochus Manihot* L. Medik) dalam air minum. *Zootec. Vol. 39*(2), pp. 362-370.

Darmawan, I., Suprijatna, E., & Atmomarsono, U. (2017). Pengaruh frekuensi dan periode pemberian pakan terhadap produksi karkas ayam buras super. *Jurnal Peternakan Indonesia*. *Vol. 19*(1), pp. 10-15.

Dewi, S .H .C. (2013). Kualitas Kimia Daging Ayam Kampung Dengan Ransum Berbasis Konsentrat Broiler. *Jurnal AgriSains. Vol. 4(6),* pp. 42-49.

Diler, I., Tekinay, A., Guroy, D., Guroy, B. K., & Soyuturk, M. (2007). Effects of *Pistia stratiotes* on the growth feed intake and body composition of common carp *Cyprinus carpio* L. *Journal of Biological Sciences*. *Vol. 7(2),* pp. 305–308.

Hidayat, M. N., Kiramang, K., & Surati. (2016). Kandungan bahang kering, serat kasar dan air daun eceng gondok yang difermentasi dengan berbagai level em4 pada lama waktu yang berbeda. *Jurnal Ilmu dan Industri Peternakan. Vol. 2(2)*, pp. 162-170.

Hidayat, M. N., Malaka, R., Agustina, L., & Pakiding, W. (2016). Abdominal fat percentage and carcass quality of broiler given probiotics Bacillus spp. *Scientific Research Journal*. *4*, pp. 33-37

Iskandar, S. (2005). Pertumbuhan dan Perkembangan Karkas Ayam Silangan Kedu X Arab pada Dua Sistem Pemberian Ransum. *JITV. Vol. 10(4)*, pp. 253-259.

Jahan, M. S., Asaduzzaman, M, & Sarkar, A. K. (2006). Performance of Broiler Fed on Mash, Pellet, and Crumble*. International Journal of Poultry Science. Vol. 5(3)*, pp. 265-270.

Kartikasari, L. R., Soeparno., & Setiyono. (2001). Komposisi kimia dan studi asam lemak daging dada ayam broler yang mendapat suplementasi metionin pada pakan berkadar protein rendah. *Buletin Peternakan. Vol. 25(1)*, pp. 33-39.

Lawrie, R. A. (1995). *Ilmu Daging*. Edisi Ke-5. Jakarta, Indonesia: Universitas Indonesia Press.

Liu, S. K. I., Niu, Z. Y. I. Min, Y. N. I., Wang, Z .P .I., Zhang, J. I., He, Z. F. I., Li, H. L. I., Sun, T. T. I., & Liu, F. Z. I. (2015). Effects of Dietary Crude Protein on the Growth Performance, Carcass Characteristics, and Serum Biochemical indexes of Luoyang Black-boned Chickens from Seven to Twelve Weeks of Age. *Brazilian Journal of Poultry Science. Vol. 17(1)*, pp. 103-108.

Nuraini, Hidayat, Z., & Yolanda, K. (2018). Performa bobot badan akhir, bobot karkas serta persentase karkas ayam merawang pada keturunan dan jenis kelamin yang berbeda. *Sains Peternakan. Vol. 16(2)*, pp. 69-73.

Rasyaf, M. (2006). *Beternak Ayam Kampung.* Jakarta, Indonesia: Penebar Swadaya.

Reddy, K. R., & Debusk, W. F. (1985). Growth characteristics of aquatic macrophytes cultured in nutrient-enriched water.II: Azola, Duckweed, and Salvinia. *Economic Botany. Vol. 38*, pp. 200-208.

Rusli, Hidayat, M. N., Rusny., Suarda, A., Syam, J., & Astati. (2019). Konsumsi ransum, pertambahan bobot badan dan konversi ransum ayam kampung super yang diberikan ransum mengandung tepung Pistia stratiotes. *Jurnal Ilmu dan Industri Peternakan. Vol. 5(2)*, pp. 66-76.

Salim, E. (2013). Empat Puluh Lima Hari Siap Panen Ayam Kampung Super. Yogyakarta: Lily Publisher.

Situmeang, E. C. (2014). *Persentase karkas ayam kampung hasil penambahan zeolit dalam ransum. Skripsi Sarjana. Fakultas Peternakan*. Bogor, Indonesia: Institut Pertanian Bogor.

Soeparno. (1998). *Ilmu dan Teknologi Daging*. Yogyakarta, Indonesia: Gadjah Mada University Press.

Steel, R. G. D., & Torrie, J. H. (1991). *Prinsip Dan Prosedur Statistika Suatu Pendekatan Biometrik*. Jakarta, Indonesia: PT. Gramedia.

Susanti, S. (1991). *Perbedaan Karakteristik Fisikokimiawi dan Histologi Daging Sapi dan Daging Ayam*. Fakultas Teknologi Pertanian, Bogor, Indonesia: Institut Pertanian Bogor

Ulupi, N., Nuraini, H., Parulian, J., & Kusuma, S. Q. (2018). Karakteristik karkas dan non karkas ayam broiler jantan dan betina pada umur pemotongan 30 hari. *Jurnal Ilmu Produksi dan Teknologi Hasil Peternaka. Vol. 6(1)*, pp. 1-5.

Varianti, N. I., Atmomarsono, U., & Mahfudz, L. D. (2017). Pengaruh pemberian pakan dengan konsentrasi berbeda terhadap efesiensi penggunaan protein ayam lokal persilangan. *Agripet, Vol. 17(1)*, pp. 53-59.

Yudhitstira, S., Iskandar & Adriani, Y. 2015. Pengaruh penggunaan daun apu-apu fermentasi dalam pakan terhadap pertumbuhan harian dan rasio kompersi pakan benih ikan nilem. *Jurnal Akuatika. Vol. 6(2*), pp. 118-127.