

Comparison of Growth Performance and Carcass Quality of KUB Kampung Chicken, Merawang Chicken, and In-ovo Feeding Kampung Chicken

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ABSTRACT. This study aims to determine the growth performance and carcass quality of three different Kampung chicken species (KUB Kampung Chicken, Merawang Chicken, and In-ovo Feeding Kampung Chicken). This research was conducted at the CV. Bittara Wanua in Soppeng Regency. The study followed a Completely Randomized Design (CRD) with three treatments and five replication plots. Each replication plot contained 5 chickens. The treatments namely: P1 uses KUB chicken, P2 uses Merawang chicken, and P3 uses Kampung chicken from in-ovo feeding. The parameters observed were growth performance including body weight gain, feed consumption, and feed conversion, while carcass quality includes carcass percentage, breast percentage, upper thigh percentage, lower thigh percentage, wing percentage, and back percentage. The results showed that treatment had a significant effect ($P < 0.05$) on body weight gain, feed conversion, breast percentage, lower thigh percentage, and back percentage. Still, they had no effect ($P > 0.05$) on feed consumption, carcass percentage, upper thigh percentage, and wing percentage. It could be concluded that KUB chicken has the best growth performance and carcass quality because it has fast growth, low feed conversion, and a high percentage of carcass parts of the breast compared to other types of native chickens.

Keywords: carcass, Kampung chicken, KUB, performance

INTRODUCTION

Kampung chicken often called native chicken has contributed to meeting the need for meat and eggs in Indonesia. Kampung chicken meat production in 2022 is 275,415.61 tons, and egg production is 375,253.1 tons. (Central Bureau of Statistics, 2023). This number has increased from the previous year. Even though it has increased, this number is still very far from the total production of broiler meat, which amounted to 3,765,573.1 tons, and the egg production of laying hens, which amounted to 5,566,339.4 tons (Central Bureau of Statistics, 2023). One of the reasons for the low production of Kampung chicken meat and eggs is due to low performance with slow growth characteristics (Sulistyoningsih *et al.*, 2013; Tamzil *et al.*, 2014) and low genetic potential (Azma *et al.*, 2011).

The low performance of Kampung chickens can be improved in several ways, such as through livestock breeding programs and the use of in-ovo feeding technology. Livestock breeding is a selection method or process based on criteria for a specific purpose to produce superior livestock, while in-ovo feeding technology is the process of adding additional nutrients to eggs during the incubation period.

The type of Kampung chicken that has undergone a breeding process is the Kampung Unggul Balitbangtan (KUB) chicken. This chicken is the result of 6 generations of Kampung chicken breeding innovations carried out by Badan Litbang Pertanian (Ekalinda & Zurriyati, 2019). The advantage of KUB chickens is that they have a body weight of 1.2–1.6 kg at 20 weeks of age and egg production of 160–180 eggs/head/year (Sartika *et al.*, 2014).

Using in-ovo feeding technology to improve Kampung chicken performance has been widely studied. Kampung chickens that had received in-ovo feeding treatment experienced an increase in embryo weight, embryo length, embryo chest circumference (Azhar *et al.*, 2016), and improved meat quality (low pH, high water holding capacity, and high tenderness) (Saifullah *et al.* 2021).

Merawang chicken is Kampung chicken originating from Merawang Village, Merawang District, Bangka Regency, Bangka Belitung Islands Province, and is a genetic source and community asset for the Bangka Belitung Islands Province based on the Decree of the Minister of Agriculture No. 2846/Kpts./LB.430/8/2012. Merawang chicken has an average daily body weight gain of 12.48 grams until the age of 4 months (Nuraini *et al.*, 2020) and has a male carcass percentage of 62.78% and 55.28% female (Nuraini *et al.*, 2018).

Based on this description, this study aims to determine the growth performance and carcass quality of three different Kampung chicken species (KUB Kampung Chicken, Merawang Chicken, and In-ovo Feeding Kampung Chicken).

MATERIALS AND METHODS

This study was carried out at CV. Bittara Wanua in Soppeng Regency. The equipment used included research cages, analytical scales, hanging digital scales, hand sprays, bodypack sprayers, stationery, incandescent lamps, and fluorescent lamps for feeding and drinking containers. The material used was Day-Old Chicks (DOC) from three types of Kampung chickens. The study followed a Completely Randomized Design (CRD) with three treatments and five replication plots. Each replication plot contained 5 chickens. P1 uses KUB chicken, P2 uses Merawang chicken, and P3 uses Kampung chicken from in-ovo feeding. DOC Kampung chickens were placed in 5 plots of brooding cages with litter mats on each type of Kampung chicken treatment. Before use, the brooding cage is sprayed with disinfectant. Each brooding cage was filled with 5 DOCs of mixed sex. Each brooding cage is equipped with an incandescent lamp as a heater, a cover, a feeder, and a drinking bowl. After three weeks of age, the chickens were transferred to rearing cages which are equipped with litter mats, neon lights, feeders, and drinking bowls.

Table 1. Nutrient content of the diet

No	Nutrient	Content
1	Crude Protein (%)	20-22
2	Crude fiber (%)	4
3	Crude fat (%)	5
4	Water (%)	13
5	Ash (%)	7
6	Calcium (%)	0.9-1.1
7	Phosphorus (%)	0.6-0.9
8	Aflatoxin (ppb)	40

Source: analysis results of PT. Malindo Feedmill Tbk. 2019.

The rearing of Kampung chickens lasts for ten weeks, and weighing is carried out every week to collect body weight data. During the maintenance period, the source of drinking water used is well water, which has been chlorinated beforehand given ad libitum, and

replaced every morning and evening. The feed used is commercial feed which has a composition of yellow corn, soybean meal, fine bran, fish meal, meat meal, pollard, stone flour, Dicalcium phosphate (DCP), salt, Coconut Palm Oil (CPO), mineral premix, vitamin premix, and

antioxidants with total nutritional content as shown in Table 1. The feed was given ad libitum. At the age of 4 days, vaccination is carried out through eye drops and injections.

Parameters observed were body weight growth (g/head/day, feed consumption, and feed conversion). 1) Body Weight Gain (G/head/day) was calculated by weighing the group of chickens every week for ten weeks and calculating the difference between the body weights per week. Weekly body weight divided by 7 to get daily body weight and divided by 5 to get individual body weight. 2) Feed consumption (g/head/day) is calculated based on the amount of feed consumed for one week by subtracting the amount of feed given and the amount of leftover feed. The amount of feed is divided by 7 to get the amount of daily feed consumption; 3) Feed conversion is calculated based on the comparison between the total amount of ration consumption and the final body weight; 4) Carcass quality includes carcass percentage, breast percentage, drumstick percentage, thigh percentage, wing percentage, and back percentage. The calculation formula is as follows:

- Carcass Percentage (%) = carcass weight divided by slaughter weight multiplied by one hundred percent.
- breast percentage (%) = breast weight divided by carcass weight multiplied by one hundred percent.
- thigh percentage (%) = upper thigh weight divided by carcass weight multiplied by one hundred percent.
- drumstick percentage (%) = lower thigh weight divided by carcass weight multiplied by one hundred percent.
- Wing percentage (%) = wing weight divided by carcass weight multiplied by one hundred percent.
- Back percentage (%) = back weight divided by carcass weight multiplied by one hundred percent.

The data obtained were analyzed using the SPSS 16 application based on a Completely Randomized Design (CRD) with a mathematical model as follows:

$$Y_{ij} = \mu + \alpha_i + \varepsilon_{ij}$$

$$i = 1,2,3$$

$$j = 1,2,\dots,25$$

Where Y_{ij} is the observed value in treatment i , repetition to j , μ observational average, α_i the influence of the type of Kampung chicken i , ε_{ij} the effect of trial error on the types of Kampung chicken to i and to j replication, i numbers of treatments, j numbers of repetitions. If the variance analysis obtains results that have a significant effect, then proceed with Duncan's test (Gaspersz, 1991).

RESULT AND DISCUSSION

The average performance of the three types of Kampung chickens can be seen in Table 2. The analysis of variance showed that treatment had no effect ($P>0.05$) on feed consumption but had an effect ($P<0.05$) on feed conversion and body weight gain.

Feed Consumption

The highest average feed consumption was found in KUB chickens, followed by Kampung chickens in-ovo feeding and Merawang chickens. The results showed that there was no difference in feed consumption in all treatments. The results of research on feed consumption are in line with the research of Sri *et al.* (2022) which reported that there was no difference in feed consumption in cruciferous Kampung chickens that were given commercial broiler feed. There is no difference in feed consumption because the feed given has the same shape, size, and energy content. Feed consumption in chickens is influenced by the shape and size of the feed, placement of the feed (Eriko *et al.*, 2016), production level, stress level, livestock activity, the energy content in the feed, and environmental temperature (Anggitasari *et al.*, 2016).

The amount of feed consumption in chickens is more influenced by the energy level of the feed, therefore in preparing the ration, it is necessary to pay attention to the balance between metabolic energy, protein, and amino acids. The nutritional needs of Kampung chickens in the starter phase based on a report by Lisnahan *et al.* (2018) metabolized energy of 2,965.35 kcal/kg, crude protein 22.47 g/head/week, methionine 0.04 g/head/week, lysin 0.08 g/head/week, calcium 2.35 g/head/week, phosphor 0.79 g/head/week, and crude fiber 9.40 g/head/week.

Body Weight Gain

The highest average daily body weight gain was obtained from KUB chickens, followed by in-ovo feeding Kampung chickens and Merawang chickens (Table 2). The analysis results showed that the treatment had a significant effect ($P < 0.05$) on body weight gain. There is a significant effect caused by differences in the type of Kampung chicken used in the study.

Body weight gain varies based on the type of native chicken. KUB chickens have high body

weight gain because KUB chickens have a high fractional growth rate compared to other Kampung chickens. The fractional growth rate is directly proportional to body weight, so the higher the fractional growth rate, the body weight will increase. KUB chickens are the result of crosses between strains and the selection of female Kampung chickens in West Java to increase productivity and obtain a high level of heterosis (Puteri *et al.*, 2020). Meanwhile, Merawang chickens and Kampung chickens from in-ovo feeding have not gone through the stages of selection and breeding. Daud *et al.* (2017) stated that one of the factors that can affect the body weight gain of chickens is the genetic factor of each chicken strain.

Feed Conversion

The lower the feed conversion value, the more efficient the use of feed, and the higher the feed conversion value, the more wasteful the use of feed. The lowest feed conversion value was in the treatment of KUB chickens followed by the treatment of Merawang chickens and in-ovo feeding Kampung chickens (Table 2).

Table 2. The growth performance of three types of Kampung chicken ages 10 weeks.

Parameters	Types of Kampung chicken			p-value
	KUB	Merawang	In-Ovo Feeding	
Feed consumption (g/head/day)	33.81±1.93	34.29±2.02	33.33±1.84	0.163
Body weight gain (g/head/day)	11.32±1.73 ^a	9.07±1.49 ^b	9.86±2.78 ^b	0.000
Feed conversion ratio	2.88±0.21 ^a	3.01±0.30 ^b	3.21±0.21 ^c	0.000

^{abc} Different superscripts following the mean value in the same line show significant differences ($P < 0.05$).

The results of the analysis of variance showed that there was a significant effect ($P < 0.05$) between the treatments and feed conversion, and after Duncan's test, it was found that all treatments were significantly different ($P < 0.05$). The feed conversion value obtained was lower than the study by Rajulani *et al.* (2022) obtained a feed conversion value of 4.2-4.7.

The feed conversion value in the KUB chicken treatment was the lowest compared to the other treatments. It is because KUB chickens

have high body weight gain and final body weight. Meanwhile, the feed conversion value for in-ovo feeding kampung chickens received the highest value due to health problems resulting in decreased feed consumption and slowed body weight gain at the end of the rearing period. Health problems cause the degradation of muscle protein and slow growth rate. Factors that affect feed efficiency include growth rate, body weight, adequacy of nutrients in the feed, ambient temperature, and livestock health (Fitasari *et al.*, 2016).

Carcass Quality of Kampung Chicken

The average carcass quality of the three types of Kampung chickens is presented in Table 3. The analysis of variance showed that treatment had no effect ($P>0.05$) on carcass percentage, upper thigh percentage, and wing percentage. However, it had a significant effect ($P<0.05$) on the chest percentage, lower thighs, and back. The Duncan test shows the chest percentages of all treatments are significantly different, while the lower thigh and the back of KUB chicken are significantly different with Merawang chicken and in-ovo feeding Kampung chicken. However, Merawang chicken and in-ovo feeding chicken have no difference.

The average percentage of carcass all treatments show has no difference. It happened because there was no difference in the age of the Kampung chickens used in the study, and the live body weight of all chickens was in line with the wasted body weight. KUB chickens have a high live weight compared to the other two types of Kampung chickens but have a high wasted body weight. The impact was that there was no difference in the carcass percentage of all treatments. The percentage of carcass obtained in this study was higher than that of Nurani *et al.* (2018), who obtained a carcass percentage of 55-

62%, and Ramdani *et al.*, (2018) who obtained a carcass percentage of 62.90%.

There were differences in the carcass components of the breast, lower thigh, and back in the treatment. The difference in the percentage of carcass components in the breast is caused by the degree of obesity, body size, and the level of flesh attached to the breast (Jull, 1979). KUB chicken has the largest percentage of breasts because it has a high level of fatness and meat compared to other types of Kampung chicken. The percentage of carcass parts of the breast is not much different from the research of Ramdani *et al.* (2018) which obtained a value of 25.25%. According to Resnawati (2004), the percentage of breast carcasses will increase with increasing body weight, and carcass weight is also influenced by age and genetic factors.

There was no difference in the percentage of upper thighs in the treatment of native chicken species (Table 3). It is due to the same feed protein content and carcass percentage. The upper thigh is a part of the carcass that contains a lot of muscle, so its growth is influenced by the nutritional content of the feed, especially protein (Resnawati, 2004). The average percentage of the upper thigh is 18%. This average is not much different from the research of Ramdani *et al.* (2018), which is 18.21%.

Table 3. Carcass quality of three types of Kampung chicken

Percentage	The types of Kampung chicken			P value
	KUB	Merawang	In Ovo Feeding	
Carcass (%)	63.92±2.98	63.45±2.56	64.25±2.16	0.699
Breast (%)	27.94±1.99 ^a	25.70±1.62 ^b	24.40±1.25 ^c	0.000
Upper thigh (%)	18.34±1.17	17.99±0.98	17.97±0.69	0.509
Lower thigh (%)	17.12±0.58 ^a	17.71±0.77 ^b	17.87±0.57 ^b	0.007
Wings (%)	15.77±0.91	15.90±0.77	16.37±0.92	0.152
Back (%)	20.83±1.76 ^a	22.69±2.02 ^b	23.39±1.66 ^b	0.001

^{abc}: Different superscripts following the mean value in the same row show significant differences ($P<0.05$).

There is a difference in the percentage of lower thighs in the treatment of Kampung chicken species. The average of carcasses was higher than that of Adnyana *et al.* (2014), which was 10.9%. Merawang chicken and Kampung

chicken from in-ovo feeding are higher than KUB chicken. It is due to Merawang and Kampung chicken from in-ovo feeding having more muscle fiber due to high natural activity such as gripping. Merawang chickens and in-ovo

feeding Kampung chickens have not undergone a breeding and selection process so the natural characteristics of Kampung chickens are still high.

There was no difference in the percentage of wings between treatments. The wings percentage obtained is not much different from the results of Damanik *et al.* research (2022), namely 14-15%. It is because the wings are part of the carcass which is dominated by bones and does not produce much meat (Suprianto *et al.*, 2019). Carcass weight affects the percentage of carcass and its parts. The breast and thigh carcass are more dominant during growth than the wing carcass (Marzani *et al.*, 2016).

The highest percentage of carcass components on the back was found in in-ovo feeding Kampung chicken, followed by Merawang chicken, and lastly KUB chicken. The difference in the percentage of the back is caused by the size of the bones and the lack of muscle in the back.

CONCLUSION

Among the three types of Kampung chickens, KUB chicken has the best growth performance and carcass quality because it has fast growth, low feed conversion, and a high percentage of carcass parts of the breast compared to other types of native chickens.

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CONFLICT OF INTEREST

This paper has no affiliation or involvement in any organization or entity with any financial interest or non-financial

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REFERENCES

- Adnyana. I. G. S., G. A. M. K. Dewi, & M. Wirapartha. 2014. Pengaruh imbalanced energi dan protein ransum terhadap karkas ayam kampung betina umur 30 minggu. *Jurnal Peternakan Tropika* 2 (3): 415 - 424.
- Anggitasari, S., O. Sjojfan, & I. H. Djunaidi. 2016. Pengaruh beberapa jenis pakan komersial terhadap kinerja produksi kuantitatif dan kualitatif ayam pedaging. *Buletin Peternakan*. 40 (3): 187-196.
- Azhar M., D. P. Rahardja, & W. Pakiding. 2016. Embryo development and post-hatch performances of kampung chicken by *in ovo* feeding of *L-Arginine*. *Media Peternakan*. 39(3): 168-172.
- Azma, I. A. A, E. A. E & Azahan. 2011. Dressed yield and edible parts of crossbred village (Kampung) chickens as affected by restrictions in feed. *Malaysian Journal Animal Science* 14: 57-60.
- Central Bureau of Statistics. 2023. *Statistik Indonesia* 2023.
- Damanik, M. R., N. W. Siti, & N. M. S. Sukmawati. 2022. Pengaruh penggantian ransum komersial dengan limbah roti terhadap potongan komersial karkas ayam Kampung Unggul Balitnak (KUB). *Jurnal Peternakan Tropika*. 10 (2): 450-467.
- Daud M., Z. Fuadi, & Mulyadi. 2017. Performa dan persentase karkas ayam ras petelur jantan pada kepadatan kandang yang berbeda. *Jurnal Agripet*. 17(1): 67-74.
- Ekalinda O, & Y. Zurriyati. 2019. Budidaya Ayam KUB (Ayam Kampung Unggul Balitbangtan). Kementerian Pertanian, Badan Penelitian dan pengembangan Pertanian, Balai Pengkajian Teknologi Pertanian Riau.

- Eriko, Jatmiko, & H. Nur. 2016. Pengaruh penggantian sebagian ransum komersial dengan dedak padi terhadap performa Ayam Kampung. *Jurnal Peternakan Nusantara*. (1): 27-33.
- Fitasari E., K. Reo, & N. Niswi. 2016. Penggunaan kadar protein berbeda pada Ayam Kampung terhadap penampilan produksi dan pencernaan protein. *Jurnal Ilmu-Ilmu Peternakan*. 26 (2): 73 - 83.
- Gaspersz. 1991. *Metode Perancangan Percobaan*. Penerbit CV. Armico, Bandung.
- Jull M. A., 1979. *Poultry Husbandry*. Tata Mc Graw Hill Publishing Co. Ltd. New Delhi, 22: 36 - 46.
- Lisnahan, C. V. 2018. Penentuan Kebutuhan Nutrien Ayam Kampung Fase Pertumbuhan yang Dipelihara Secara Intensif dengan Metode Kafetaria. Disertasi. Ilmu Peternakan. Universitas Gajah Mada.
- Marzani, R., Samadi, & Herawati. 2016. Pengaruh substitusi amtabis yang difermentasi dengan *Aspergillus Niger* terhadap berat dan persentase karkas kroiler. *Jurnal Ilmiah Mahasiswa Pertanian Unsyiah*. 1(1): 835 - 842.
- Nuraini, Z. Hidayat, & K. Yolanda. 2018. Performa bobot badan akhir, bobot karkas serta persentase karkas Ayam Merawang pada keturunan dan jenis kelamin yang berbeda. *Jurnal Sains Peternakan*. 16(2): 69 - 73.
- Nuraini, Z. Hidayat, & S. Puspito. 2020. Performa ayam merawang dalam berbagai umur dengan tingkat pemberian bungkil inti sawit dalam ransum. *Jurnal Peternakan Indonesia*. 22(1): 66-72.
- Puteri N. I., Gushairiyanto, & Depison. 2020. Pola pertumbuhan, berat badan, dan morfometri Ayam KUB, Ayam Sentul dan Ayam Arab. *Jurnal Buletin Peternakan*. 44 (3): 67-72.
- Rajulani C., S. Bahri, & S. Zainudin. 2022. Performans ayam Kampung Unggul Balitnak (KUB) yang diberi ampas tahu fermentasi menggunakan *Microbacter Alfaafa-11*. *Gorontalo Journal of Equatorial Animals*. 2(2): 82-86.
- Ramdani I., D. Kardaya, & Anggraeni. 2016. Pengaruh substitusi pakan komersil dengan tepung ampas kelapa terhadap bobot potong dan bobot karkas ayam kampung. *Jurnal Peternakan Nusantara*. 1: 9 - 16.
- Resnawati, H. 2004. Bobot Potongan karkas dan lemak abdomen ayam ras pedaging yang diberi ransum mengandung tepung cacing tanah (*Lumbricus rubellus*). Seminar Nasional Teknologi Peternakan dan Veteriner. Bogor.
- Saifullah, M. I. A, & W. Pakiding. 2021. Physical meat quality comparison of selected KUB Chicken, original kampung, and improved kampung chicken with in ovo feeding technology. IOP Conf. Series: Earth and Environmental Science.
- Sartika, T., H. Resnawati., S. Iskandar., M. Purba, D. Zainuddin, & A. Unadi. 2014. *Buku Panduan: Teknik Formulasi Ransum Ayam KUB Berbasis Bahan Pakan Lokal*. Pusat Penelitian dan Penembangan Peternakan, Badan Penelitian dan Pengembangan Pertanian, Kementerian pertanian.
- Sri D., H. Nurcahya, & I. Rizki. 2022. Penggunaan pakan komersial berbeda pada ayam lokal silangan fase pertumbuhan sampai umur 10 minggu. Prosiding Seminar Teknologi dan Agribisnis Peternakan IX, Fakultas Peternakan Universitas Jenderal Soedirman.
- Sulistyoningsih, M., D. Sunarti, E. Suprijatna, & Isroli. 2013. Performance of indigenous chicken under intensive rearing with various litter materials. *International Journal of Science and Engineering*. 4(2): 52-56.
- Suprianto I. K. E., N W. Siti, & N M. S. Sukmawati. 2019. Pengaruh pemberian probiotik *Effective Microorganism-4* pada air minum terhadap potongan karkas komersial Itik Bali jantan umur 8 minggu. *Jurnal Peternakan Tropika*. 7 (2): 599-611.
- Tamzil, M. H., R. R. Noor., P. S. Hardjosworo., W. Manalu, & C. Sumantri. 2014. Hematological response of chickens with different heat shock protein 70 genotypes to acute heat stress. *International Journal of Poultry Science*. 13(1): 14-20.