*Indonesian Journal of Agricultural Research Vol. 07, No. 01, 2024 | 52 – 59*

talenta PUBLISHER

**InJAR**
Indonesian Journal of Agricultural Research

# Comparison of Carcass Percentage Among Four Duck Breeds under Traditional Rearing Conditions

***Harapin Hafid****

*Faculty of Animal Science, Halu Oleo University, Indonesia*

**Abstract.** The research aims to determine the extent of differences in the carcass composition of four types of ducks using semi-intensive cultivation. A total of 16 ducks aged 3 months were used as experimental units. A completely randomized design with 4 treatments and 4 replications was the research design. The results showed that ducks of the same age, namely: Alabio ducks, Peking ducks, Mojosari ducks, and Manila ducks, showed very significant differences ($P<0.01$) in the variables of slaughter weight, carcass percentage, thigh and back percentage. However, there was no significant difference ($P>0.05$) in the percentage of chest, wings, and neck. It was concluded that the live weight, carcass percentage, and carcass parts of Manila ducks were higher than those of Alabio, Peking, and Mojosari ducks. Meanwhile, Alabio ducks are taller than Peking ducks and Mojosari ducks.

**Keywords:** Alabio duck, carcass, carcass parts, live weight, Manila duck, Mojosari duck, Peking duck

Received 10 March 2023 | Revised 11 March 2024 | Accepted 12 March 2024

## 1. Introduction

Ducks are livestock that are quite popular among the people besides native chickens, laying hens, and broilers. Although currently the cultivation of ducks with the aim of producing meat has not been done so much, thus slowing down the popularity of duck meat, because most breeders are more oriented towards the development of laying ducks. When viewed in terms of nutritional content, duck meat is no less competitive than chicken meat. The protein content of duck meat is quite high, namely around 18.6–20.8% while chicken meat is 21.4–22.6%, as well as the fat content ranging from 2.7–8.2% while chicken meat is 4.8% [1] – [3].

The potential for duck livestock is generally cultivated as an egg producer, but some are cultivated as a meat producer. The duck population in Southeast Sulawesi in 2022 will be 678.263, this supports the increasing public demand for eggs and meat from year to year [4]. After obtaining results in the form of meat, live livestock must first be converted from live livestock to carcasses and then bonded to meat [5] – [6].

*Corresponding author at: Faculty of Animal Science, Halu Oleo University, Indonesia

E-mail address: harapin.hafid@uho.ac.id


p-ISSN: 2622-7681 | e-ISSN: 2615-5842 | DOI 10.32734/injar.v7i1.11478
Journal Homepage: https://talenta.usu.ac.id/InJAR

Ducks are one of the potential livestock sources for meat, but some consumption of ducks is still experiencing problems, namely the taste and smell of fishy meat from lamb and beef [7] – [8] so that the level of consumption of duck meat in Indonesia is still very low. Duck meat has the potential to be a reliable source of animal food from livestock because it contains quite high protein. The types of ducks developed as broiler ducks are Peking ducks, Alabio ducks, Mojosari ducks, and Manila ducks.

The slaughter duck business developed in Indonesia is usually a small-scale business, both in terms of livestock population and working capital. A deficiency that often occurs among farmers with small-scale businesses is their low ability to manage livestock resources more efficiently [9].

Most communities develop broiler ducks using a semi-intensive management pattern where the location of the cage is kept far from residential areas to avoid air (smell) and noise pollution but can be easily accessed by the marketing location [10]. Apart from that, duck farming is carried out semi-intensively, because in general, it is an additional family business so it does not receive enough attention from breeders. This research investigates the extent to which the carcass composition of the four types of ducks mentioned above differs from semi-intensive farming patterns.

## 2. Materials and Methods

### 2.1. Materials

In this research, four different types of ducks were used, namely: Alabio ducks. Mojosari ducks, Peking ducks, and Manila ducks. The number of each duck was two males and two females, so the total number of ducks used was 16 ducks. The research ducks were six months old with a body weight ranging from 1.8–2.5 kg. The equipment used in this research was: digital scales, a set of poultry cutting knives, plastic containers for carcasses and non-carcasses, plastic bases, notebooks, data lists, pencils, and documentation cameras.

### 2.2. Methods

#### 2.2.1. Slaughter

Before the duck is slaughtered, it is first rested while fasting from food for 8 hours but still given drinking water. The aim is to ensure that the ducks are not stressed, when they are slaughtered, maximum blood comes out and enough energy is available so that the rigor mortis process is complete. The aim of fasting is to obtain a valid empty body weight because there are no variations due to feed weight and facilitate the slaughter process, especially for aggressive or wild livestock [11] – [12]. The method of slaughtering poultry that is commonly used in Indonesia is the Halal method, where it is mandatory to read "basmalah" and three channels in the neck namely: the esophagus, jugular vein, and carotid artery are completely cut off by a sharp knife cut. At the time

of slaughter, blood should come out as much as possible. If the blood can come out completely, it will weigh about 4 percent of body weight. The process of bleeding in poultry usually lasts for 50–120 seconds, depending on the size of the bird being slaughtered.

### 2.2.2. Feather Separation

After slaughter, cleaning of the fur is carried out. In order to obtain carcasses and meat that is clean from fine feathers, the skin is peeled from the duck's body starting from slicing at the neck and pulling down towards the feet until the skin and feathers are completely separated from the body.

### 2.2.3. Evisceration (Removal of Innards)

After removing the hair or cleaning the fur, the innards are removed, one of the ways is as follows: the process of removing the innards begins with the separation of the crop and trachea as well as the oil glands in the tail. Then open the body cavity by making an incision from the cloaca towards the sternum. The cloaca and viscera or innards were removed, then the organs were separated, namely the liver, bile, and heart. The contents of the bile must be removed as well as the bile separated from the liver and discarded. The head, neck, and legs are also separated.

### 2.2.4. Carcass

After removing the non-carcass parts in the form of offal, skin, feathers, feet, and head, the carcass parts are obtained. What is measured is the percentage of carcasses and carcass parts. The carcass percentage is obtained by comparing the weight of the duck carcass with the weight of the duck before slaughter and then multiplying by one hundred percent. The method of separating carcass parts is by separating the two wings, both thighs and the neck from the body. The chest is separated at the end of the shoulder blades and the ribs at the back, as well as the wings are separated at the joint between the wings and the body. After all parts of the carcass consisting of two wings, two thighs, one breast and one back are separated, each is then weighed and recorded. The percentage of each part of the carcass is compared with the carcass weight and multiplied by one hundred percent [13].

## 2.3. Research Design

In this study, a completely randomized design (CRD) was used using four treatments and four replications. Treatment is as follows: treatment A = Pekingese duck ; treatment B = Alabio ducks; treatment C = Manila ducks; treatment D = Mojosari ducks.

## 2.4. Research Variables

The variables measured in this study are based on [5] – [6] which include:

1. Slaughter weight is the weight obtained when the duck is six months old after fasting for approximately eight hours.

2. Carcass weight, is the weight obtained after slaughtering, separating the skin and feathers, separating the head, and legs from the body, and removing the viscera.
3. Carcass percentage is the ratio between the weight of the carcass and the slaughter weight of the duck before slaughter and multiplied by one hundred percent. The percentage formula is as follows:

$$\text{Carcass percentage} = \frac{\text{carcass weight}}{\text{cutting weight}} \text{x} 100\% \quad (1)$$

4. Percentage of carcass and carcass parts such as breast, thigh, back, and wings. Calculated by the following formula:

**a. Chest**

$$\text{Percentage of breast} = \frac{\text{breast weight}}{\text{carcass weight}} \text{x } 100\% \quad (2)$$

**b. Thigh**

$$\text{Percentage of thigh} = \frac{\text{thigh weight}}{\text{carcass weight}} \text{x } 100\% \quad (3)$$

**c. Back**

$$\text{Percentage of back} = \frac{\text{back weight}}{\text{carcass weight}} \text{x } 100\% \quad (4)$$

**d. Wing**

$$\text{Percentage of wing} = \frac{\text{wing weight}}{\text{carcass weight}} \text{x } 100\% \quad (5)$$

### 2.5. Data Analysis

Data were analyzed using analysis of variance based on a completely randomized design. If there is a real effect, the analysis continues with the Least Significant Difference test [14]. The complete randomized design mathematical model is as follows:

$$Yij = \mu + Ai + \epsilon ij \quad (6)$$

where: Yij = result of the $i^{th}$ measurement of the $j^{th}$ repetition; μ = general average; τi = effect of treatment $i^{th}$; εij = treatment error $j^{th}$; i = treatment 1,2,3,4; j = repetition 1,2,3,4

## 3. Results and Discussion

### 3.1. Comparison of Carcass Percentage

The carcass percentage value is a comparison between the weight of the duck carcass and the live weight of the duck before slaughter which is often used as an estimate of the amount of meat in poultry [15]. Slaughter weight is the result of identification of the easiest or simplest production to measure growth, namely by weighing the ducks individually.

The amount of growth that can be shown through the increase in body weight of the animal really determines the weight of the animal before being slaughtered. Carcass percentage is influenced by ration quality and livestock growth rate [11]. According to [16] carcass weight and carcass percentage were not significantly different because slaughter weight also showed results that were

not significantly different. The sex and age of the ducks used were male and female with a slaughter age of six months. The results of statistical analysis determined that the treatment of four different duck breeds at the same age showed very significant differences (P<0.01) in slaughter weight. The lowest slaughter weight was found in Mojosari ducks weighing 866.00 grams, while the highest slaughtered weights were in Manila ducks weighing 1617.00 grams.

According to [11], the slaughter weight of livestock is greatly influenced by the age of the livestock and the amount of body weight gain achieved, while body weight gain is influenced by nutrient intake and digestion in the livestock body. So far, Manila ducks are still used as egg producers and as a means of incubating duck eggs, whereas Manila ducks can be used as meat-producing poultry. In the opinion of [2], the percentage of carcasses of Manila ducks with a live weight of 3.75 kg is 62.6%. The average slaughter weight of ducks in semi-intensive rearing is shown in Table 1.

**Table 1.** Comparison of Slaughter Weight (g) and Carcass Percentage (%) of Ducks in Semi-Intensive Rearing

| Parameter | Treatment | | | |
|---|---|---|---|---|
| | **Pekingese Duck (P1)** | **Alabio Duck (P2)** | **Manila Duck (P3)** | **Mojosari Duck (P4)** |
| Cutting weight | 1138.25±155.86$^{b}$ | 1249.25 ±156.52$^{b}$ | 1617.00±431.86$^{a}$ | 866.00 ±47.97$^{c}$ |
| Carcass | 45.44 ± 3.11$^{c}$ | 48.14 ± 3.50$^{b}$ | 51.77 ± 3.03$^{a}$ | 44.09 ± 3.37$^{c}$ |

Note: Numbers with different superscripts on the same parameter show high significant differences (p<0.01)

The results of statistical analysis showed that differences in duck breeds of the same age had a very significant influence (P<0.01) on carcass percentage. The highest carcass percentage was shown by Manila ducks at 51.77 ± 3.03%, while the lowest carcass percentage was shown by Mojosari ducks at 44.09 ± 3.37%. Daud *et al.* [17] reported that from a Peking duck carcass weight of 870 g, a carcass weight percentage of 55.1% was obtained. Brake and Havenstein [18] stated that carcass percentage is related to sex, age, and slaughter weight. Carcass increases with increasing age and slaughter weight. As a result of the difference in slaughter weight, it will directly affect the level of difference in carcass weight (breast, thigh, and wing) in poultry.

### 3.2. Comparison of Carcass Parts

The part of the duck carcass that is important enough to be a concern for every consumer is the proportion of the chest, thighs, back, wings, and neck. These carcass parts are also special parts to be processed later as serving ingredients to consumers [19]. The percentage of duck carcass parts is obtained by comparing the weight of each part of the carcass in question, for example: thighs, breasts, wings, and back with carcass weight (g) multiplied by 100% [20].

**Table 2.** Comparison of Carcass Percentage (%) and Carcass Parts (%) in 4 Different Types of Ducks

| Parameter | Treatment | | | |
|---|---|---|---|---|
| | **Pekingese Duck (P1)** | **Alabio Duck (P2)** | **Manila Duck (P3)** | **Mojosari Duck (P4)** |
| Carcass | 45.44 ± 3.11$^{c}$ | 48.14 ± 3.50$^{b}$ | 51.77 ± 3.03$^{a}$ | 44.09 ± 3.37$^{c}$ |
| Chest | 26.06 ± 1.47 | 26.22 ± 3.18 | 27.03 ± 5.27 | 22.97 ±2.17 |
| Thigh | 26.46 ± 1.24$^{a}$ | 25.35 ± 0.76$^{b}$ | 23.69 ± 0.54$^{c}$ | 26.35 ± 1.23$^{a}$ |
| Back | 21.87 ± 0.50$^{b}$ | 22.36 ± 1.63$^{a}$ | 22.48 ± 3.20$^{a}$ | 22.92 ± 3.08$^{a}$ |
| Wing | 14.24 ± 1.40 | 14.19 ± 1.32 | 17.84 ± 2.15 | 15.05 ± 1.24 |
| Neck | 11.35 ± 1.69 | 11.85 ± 0.74 | 8.70 ± 0.91 | 12.69 ± 0.05 |

Note: Numbers with different superscripts on the same parameter show high significant differences ($p<0.05$)

### 3.2.1. Percentage of Chest Pieces

The results of statistical analysis showed that there was no real difference between types of ducks of the same age in the percentage of duck breasts (P>0.05). The percentage of duck breasts is in the range between 27.03±5.27% to 22.97±2.17%. Daud *et al.* [17] reported that from a Peking duck carcass weight of 870 g, a carcass weight percentage of 55.1% was obtained, which further decomposed into 21% breast percentage, 21% thigh percentage and 16% wing percentage.

### 3.2.2. Percentage of Thigh Pieces

The results of statistical analysis showed that duck breeds of the same age had significant differences in thigh percentage (P<0.05). The highest percentage of duck thighs was in Peking ducks at 26.46 ± 1.24% and the lowest was in Manila ducks at 23.69 ± 0.54%. Lestari [21] stated that the average percentage of intact thighs obtained in Alabio ducks was 22.93%.

### 3.2.3. Back Cut Percentage

The results of statistical analysis showed that duck breeds of the same age were significantly different (P<0.05) in the percentage of duck backs. The highest percentage of backs was in Mojosari ducks at 22.92 ± 3.08% and the lowest percentage of backs was in Peking ducks with a value of 21.87 ± 0.50%. This is in accordance with [22] who found that the percentage of backs of Cihateup-Alabio cross ducks was 14.26%.

### 3.2.4. Percentage of Wing Pieces

The results of statistical analysis show that differences in duck breeds of the same age are not significantly different (P>0.05) in terms of percentage wing pieces (P>0.05). The percentage of wing pieces in this study ranged from 14.19 ± 1.32% to 17.84 ± 2.15%. Daud *et al.* [17] reported that from a Peking duck carcass weight of 870 g, a carcass weight percentage of 55.1% was obtained, which further decomposed into 21% breast percentage, 21% thigh percentage, and 16% wing percentage.

### 3.2.5. Percentage of Neck Cut

The results of statistical analysis showed that differences in duck breeds of the same age were not significantly different (P>0.05) in the percentage of duck necks. The neck percentage in this study was between 8.70 ± 0.91% to 12.69 ± 0.60%. Simanullang *et al.* [23] stated that the average neck weight of PMp ducks (Peking Mojosari) fed the rest of the restaurant was 106.45 ± 16.21 grams with a neck percentage of 15.23%, while PMp ducks fed commercial feed was 158 .50 ± 30.29 grams with a neck percentage of 19.11%.

## 4. Conclusion and Recommendation

It was concluded that the four types or breeds of ducks, namely: Peking ducks, Alabio ducks, Manila ducks, and Mojosari ducks, showed very significant differences (P<0.01) in the slaughter weight and carcass percentage variables. Significantly different (P<0.05) to the percentage of parts: thighs and back. However, there was no significant difference (P>0.05) in the percentage of parts: chest, wings, and neck.

In general, the Manila duck breed is superior in live weight variables, carcass percentage, and carcass parts compared to the three duck breeds, namely Mojosari ducks, Alabio ducks, and Peking ducks. Likewise, Alabio ducks are taller than Peking ducks and Mojosari ducks.

## REFERENCES

[1] K. Jun, O. H. Rock, and O. M. Jin, “Chemical composition of special poultry meat,” *Chungnam Taehakkyo*, vol. 23, no. 1, pp. 90-98, 1996.

[2] B. Srigandono, *Beternak ltik Pedaging*, Jakarta: Trubus Agriwidya, 2000.

[3] Kim, G.D. 2006. Division of Applied Life Science, Graduate School, Gyeongsang National University, Jinju, Gyeongnam 660-701, Korea. pp 1-3.

[4] *Buku Statistik Peternakan*: Direktorat Jenderal Peternakan dan Kesehatan Hewan Departemen Pertanian RI, BPS, 2022. [Online]. Available: https://www.bps.go.id/id/statistics-table/2/NDc5IzI=/populasi-itik-itik-manila-menurut-provinsi.html.

[5] H. Hafid. *Pengantar Evaluasi Karkas*, Cetakan pertama, Kendari: Unhalu Press, 2011.

[6] H. Hafid, Nuraini, and Inderawati, “Potensi produksi karkas itik afkir lokal yang berasal dari peternakan rakyat di Sulawesi Tenggara”, Prosiding Seminar Nasaional Peternakan dan Veteriner, Bogor, pp. 443-447, 2015.

[7] H. Hafid, Nuraini, and Inderawati, “Sifat organoleptik daging itik afkir yang diberi perlakuan stimulasi listrik”, Prosiding Seminar Nasional Peternakan dan Workshop Optimalisasi Sumberdaya Lokal Fakultas Peternakan Universitas Hasanuddin, Makassar, 2014.

[8] H. Hafid, A. Napirah S. M. Sarifu, R. Rahman, and Inderawati, “Effect of electrical stimulation on physical and organoleptic properties of muscary duck meat”. *Jurnal Ilmu Ternak dan Veteriner*, vol. 23, no. 4, pp. 202-209, 2018.

[9] D. Biyatmoko, “Kajian arah pengembangan itik di masa depan,” *Ekspose Konsultan Pengembangan Ternak Kerbau dan Itik serta Diseminasi Teknologi Peternakan Tahun 2005*, Banjarbaru, Dinas Peternakan Provinsi Kalimantan Selatan, pp. 1-13, July 11, 2005

[10] E. Supriyatna and U. Atmomarsono, *Ilmu Dasar Ternak Unggas*, Jakarta: Penebar Swadaya, 2005, pp 8-29.

[11] Soeparno. *Ilmu dan Teknologi Daging Edisi Revisi*, Yogyakarta: Gadjah Mada University Press, 2015.

[12] H. Hafid, "Growth and development of chicken carcass in different sex and age," *Indonesian Journal of Agricultural Research*, vol. 5, no. 2, pp.121-131, 2022.

[13] M. Irham, "Pengaruh pengunaan enceng gondok (*Eichornia crassipes*) fermentasi dalam ransum terhadap persentase karkas, nonkarkas dan lemak abdominal itik lokal jantan umur delapan minggu," Skripsi, Fakultas Pertanian, Universitas Sebelas Maret, Surakarta, 2012.

[14] R. G. D. Steel and J. H. Torrie, Principles and Procedures of Statistics, 3rd Ed, New York, Toronto, London: McGraw-Hill Book Company (in Bahasa Indonesia), 1960.

[15] Abubakar and A.G. Nataamijaya, "Persentase karkas dan bagian-bagiannya dua galur ayam broiler dengan penambahan tepung kunyit (Curcuma domestica val) dalam ransum," *Buletin Peternakan, Edisi Tambahan*, 173- 180, 1999.

[16] M. Kamal, *Nutrisi Ternak I.* Fakultas Peternakan, Universitas Gadjah Mada, Yogyakarta, 1994.

[17] M. Daud, Mulyadi, and Z. Fuadi, "Persentase karkas itik Pekin yang diberi pakan dalam bentuk wafer ransum komplit mengandung limbah kopi," *Jurnal Agripet*, vol. 16, no. 1, pp. 62-68, 2016.

[18] J. Brake, G. B. Havenstein, S. E. Scheideler, P. R. Ferket, and D. V. Rives, "Relationship of sex, age and body weight to broiler carcass yield and offal production," *Poultry Science*, vol. 72, no. 6, pp. 1137-1145, 1993.

[19] M. Purba, L. H. Prasetyo, "Respon pertumbuhan dan produksi karkas itik pedaging EPMP terhadap perbedaan kandungan serat kasar dan protein dalam pakan," *JITV*, vol. 19, no. 3, pp. 220-230, 2014.

[20] Nirwana, "Pemberian berbagai bentuk ransum berbahan baku lokal terhadap persentase karkas, lemak karkas dan lemak abdominal ayam broiler," Skripsi, Fakultas Peternakan, Universitas Hasanuddin, Makassar, 2011.

[21] F. E. P. Lestari, "Persentase karkas, dada, paha dan lemak abdomen itik Alabio jantan umur 10 minggu yang diberi tepung daun beluntas, vitamin C dan E dalam pakan," Skripsi, Fakultas Peternakan, Institut Pertanian Bogor, Bogor, 2011.

[22] P. R. Matitaputty, "Peningkatan produksi karkas dan kualitas daging itik melalui persilangan antara itik Cihateup dengan itik Alabio," Disertasi. Fakultas Peternakan, Institut Pertanian Bogor, Bogor, 2012.

[23] S. Simanullang, I. Setiawan, and N. Hilmia, "Bobot potong, edible dan non edible itik Peking Mojosari Putih (PMp) pada pemberian pakan sisa rumah makan dan komersial", *Students e-Journal,* vol. 4, no. 4, 2015.