

The Effect of Feeding Schedule on Carcass Component Weight of Female Kacang Goats

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Abstract: This research was conducted at the Research Barn in Pengawu Village, South Palu Subdistrict, Palu City, Central Sulawesi Province, for 10 weeks, starting from May 19, 2014, to August 11, 2014. The aim of this study was to determine the carcass component weight of female Kacang goats fed at different times. Fifteen female Kacang goats, aged approximately 10 to 12 months and weighing between 10.20 to 16.00 kg, were used for the study. These goats were sourced from local farmers in Palu City and its surrounding areas. Each goat was placed in an individual pen with dimensions of 75 x 75 x 75 cm, and there was a total of 15 individual pens, each equipped with a feeding and drinking trough. The study used a Randomized Block Design (RBD) with five treatments and three blocks as replications. The five different feeding times were as follows: WM1 = Feeding at 08:00 WITA, WM2 = Feeding at 09:30 WITA, WM3 = Feeding at 11:00 WITA, WM4 = Feeding at 12:30 WITA, and WM5 = Feeding at 14:00 WITA. The results of the analysis of variance (ANOVA) showed that feeding at different times had a highly significant effect ($P < 0.01$) on the carcass weight of female Kacang goats in the neck, ribs, and legs. It also had a significant effect ($P < 0.05$) on the carcass component weight in the shoulder, loin, flank, and breast, but it did not have a significant effect ($P > 0.05$) on the carcass component weight in the arm.

Keywords: Carcass weight; Feeding schedule; Female goats; Kacang goats.

Introduction

In modern animal husbandry, optimizing livestock production and improving the quality of animal products have become paramount goals to meet the ever-growing demands of an expanding global population (Liang and Shah 2023). Among various livestock species, goats have gained significant attention due to their adaptability to diverse environments (Lima et al., 2022; Ankrah Twumasi and Jiang 2021; Akinmoladun et al., 2019), efficient feed conversion, and the nutritional value of their meat (Min et al., 2019). The Kacang goat breed, renowned for its robustness and meat quality, plays a vital role in the livestock industry, especially in regions with limited resources (Mazhangara et al., 2019).

In recent years, researchers and livestock farmers have been exploring different management practices to enhance the performance and yield of Kacang goats

(Khalil et al., 2019; Tahuk and Bira, 2020; Adiwintarti et al., 2019; Sari et al., 2020). One such practice is the manipulation of feeding time (Hermes et al., 2022), which is believed to influence the metabolic processes and nutrient utilization efficiency of the animals. The timing of feed provision could impact the goats' physiological responses, feeding behavior, and subsequent carcass composition (Sejian et al., 2021).

The primary objective of this study is to investigate the effect of feeding time on the weight of various carcass components in female Kacang goats. By assessing the potential variations in carcass traits resulting from different feeding schedules, we aim to gain valuable insights into optimizing livestock management strategies and, ultimately, achieving better meat production outcomes. Furthermore, understanding the relationship between feeding time and carcass component weight can offer significant contributions to sustainable agriculture. By identifying

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feeding practices that can enhance meat yield without compromising animal welfare or dietary requirements, livestock farmers can make informed decisions to improve production efficiency while reducing environmental impacts.

To achieve our research goals, we conducted a comprehensive feeding trial, closely monitoring the daily feeding patterns and growth parameters of female Kacang goats. Additionally, we measured the weight of various carcass components, including Neck, Shoulder, Ribs, Loin, Leg, Flank, Breast, and Shank, to assess how feeding time influenced the distribution of these components. The findings of this study are expected to provide valuable data for livestock producers, researchers, and policymakers, fostering a deeper understanding of the intricate relationship between feeding practices and meat quality in Kacang goats. Ultimately, this research may contribute to the sustainable development of the livestock industry and assist in meeting the rising global demand for high-quality, nutritious animal protein.

Method

This research used 15 female Kacang goats aged approximately 10 to 12 months with a weight range of 10.10 - 16.10 kg. The livestock were placed in individual pens measuring 75 x 75 x 75 cm, with a total of 15 pens.

The study lasted for 10 weeks in Pengawu Village, South Palu District, Palu City, Central Sulawesi Province, starting from May 19, 2022, to August 11, 2022.

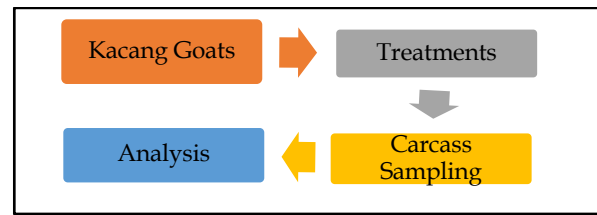


Figure 1. Flowchart of research

The feed provided in this research consisted of concentrates and grass from the field. The field grass used was obtained from pastures or field edges, while the concentrates used were a mixture of several ingredients, including groundnut meal, rice bran, ground corn, and coconut meal. The nutritional content and composition of the concentrate are listed in Table 1.

The design used was a randomized block design (RBD) consisting of 5 treatments and 3 groups as replications. The treatment given consisted of five different feeding schedules, namely: WM1 = Feeding at 08.00 WITA; WM2 = Feeding at 09.30 WITA; WM3 = Feeding at 11.00 WITA; WM4 = Feeding at 12.30 WITA; WM5 = Feeding at 14.00 WITA. Feeding of all treatments was stopped at 18.00 WITA.

Table 1. Nutritional Content and Composition of Concentrate Ingredients Used. (DW=Dry weight; CP=Crude protein; CF= Coarse Fiber; CFt=Crude fat)

Feed Ingredients	DW*	CP*	CF*	CFt*	TDN**	Portion (%)
Soybeans	86	31.58	6.02	15.43	68.45	5
Rice bran	86	10.55	9.10	11.98	61.79	59.5
Ground corn	86	9.78	1.54	1.51	81.73	26
Coconut cake	86	17.28	8.78	13.10	69.41	9.5
Total						100
Protein (%)***						12
TDN (%)***						68

* Tadulako University Agricultural Sciences Laboratory (1996)

** Total Digestible Nutrient (Hartadi et al., 1993)

*** Calculated based on the nutritional content and composition of the concentrate ingredients.

Prior to being slaughtered, animals are fasted for 12 hours for food, but drinking water is available ad-libitum. This is intended to reduce the contents of the digestive tract and to avoid contamination of the carcass by the contents of the digestive tract as well as to obtain a cut weight. The incision is made by cutting the jugular vein, oesophagus and trachea between the atlas and neck bones. The head is separated from the body at the occipito atlantis joint, the forelegs at the carpo metacarpal joints, and the hind legs at the tarso metatarsal joints. The animal's body is suspended by the

back joint near the Achilles tendon, the skin is removed, then a straight incision is made in the middle of the abdomen, and the contents of the chest and abdominal cavities are removed (Patriani et al., 2010). Furthermore, the parts are separated according to the observed dependent variable.

The dependent variable (tied) observed in this study is: *Neck*: is a carcass component located in the neck area from the first cervical vertebrae to the seventh cervical vertebrae. *Shoulder*: is a carcass component located in the shoulder area from the seventh cervical

vertebrae to the middle of the fifth and sixth ribs. *Ribs*: is a carcass component located in the rib area from the middle of the fifth and sixth ribs to the twelfth and thirteenth ribs, bordering the breast. *Loin*: is a carcass component located in the waist area from the thirteenth rib to the eighth lumbar vertebrae. *Leg*: is a carcass component located in the thigh area from the ninth vertebrae to the patella joint. *Flank*: is a carcass component located on the side area, starting from the projection of the thirteenth rib drawn straight from the end of the chest and bordering the base of the thigh. *Breast*: is a carcass component located in the chest area (from the straight part of the sternum backward to the projection of the sixth lumbar vertebrae). *Shank*: is a carcass component located in the arm area (from the joint between the humerus and radius ulna to the carpus).

Next, the obtained data will be tabulated and analyzed using analysis of variance (ANOVA). If the results show a significant effect, then the analysis will continue with the Least Significant Difference (LSD) test. The LSD test is one of the post hoc tests that compares all the means between treatments.

Result and Discussion

The Effect of Treatments on the Weight of Carcass Components

The results of the observations on the carcass component weights of female Kacang goats, fed at different times, are presented in Table 2.

To elaborate further, the study analyzed the weights of various carcass components in female Kacang goats under different feeding schedules. These findings provide valuable insights into the potential impact of feeding time on the overall carcass composition of the goats. It is evident that the feeding time might play a crucial role in determining the distribution of weight across various carcass components in female Kacang goats. Carcasses are strongly influenced by gender (Hatta et al., 2020). The implications of these findings could have significant implications for livestock management practices and the optimization of meat production in the goat farming industry.

Table 2. Mean Weight of Female Peanut Goat Carcass Components Fed on Different Schedules (kg)

Carcass Components	Treatment				
	WM1	WM2	WM3	WM4	WM5
Neck	0.79 ^a	0.78 ^a	0.78 ^{ab}	0.74 ^{bc}	0.71 ^c
Shoulder	2.57 ^a	2.56 ^{ab}	2.55 ^{ab}	2.52 ^b	2.51 ^b
Ribs	0.78 ^a	0.77 ^b	0.76 ^c	0.70 ^c	0.70 ^c
Loin	0.81 ^a	0.80 ^a	0.78 ^a	0.78 ^a	0.76 ^b
Leg	2.88 ^a	2.87 ^a	2.85 ^a	2.84 ^a	2.80 ^b
Flank	0.24 ^a	0.23 ^a	0.22 ^{ab}	0.20 ^b	0.19 ^b
Breast	0.53 ^a	0.53 ^a	0.50 ^{ab}	0.48 ^b	0.47 ^b
Shank	1.47 ^a	0.88 ^a	0.86 ^a	0.74 ^a	0.74 ^a

Table 2 shows that the average carcass component weights of female Kacang goats fed at 08:00 AM WITA were higher and decreased as the feeding time became later. The analysis of variance indicated that feeding at different times had a highly significant influence ($P < 0.01$) on the carcass weights of the neck, ribs, and legs of female Kacang goats. It also had a significant effect ($P < 0.05$) on the shoulder, loin, flank, and breast weights, but no significant impact ($P > 0.05$) on the shank weights. This was attributed to the variations in feeding schedule, leading to differences in body weight gains and ultimately affecting the overall income.

The results of the Honest Significant Difference (HSD) test revealed that feeding female Kacang goats at 08:00 AM WITA (WM1) did not significantly differ from feeding them at 09:30 AM WITA (WM2) and 11:00 AM WITA (WM3) in terms of all carcass component weights. However, it was significantly higher compared to feeding at 12:30 PM WITA (WM4) and 02:00 PM WITA (WM5) in the neck, shoulder, ribs, flank, and breast weights. Feeding at 09:30 AM WITA (WM2) did not differ significantly from 11:00 AM WITA (WM3) but was significantly different from feeding at 12:30 PM WITA (WM4) and 02:00 PM WITA (WM5) in terms of the shoulder, ribs, flank, and breast weights. Feeding at 11:00 AM WITA (WM3) did not differ significantly from 12:30 PM WITA (WM4) but was significantly higher than feeding at 02:00 PM WITA (WM5) in the neck, loin, and leg weights. Feeding at 12:30 PM WITA (WM4) did not significantly differ from feeding at 02:00 PM WITA (WM5), except for the loin and leg weights.

The findings from this study indicate that the feeding schedules has a significant impact on the carcass component weights of female Kacang goats. Feeding at 08:00 AM WITA resulted in higher carcass weights, while feeding at later schedules, such as 12:30 PM WITA and 02:00 PM WITA, led to decreased carcass weights. These results suggest that the timing of feed provision plays a crucial role in determining the growth and development of various carcass components in female Kacang goats.

The observed decline in carcass weights with later feeding schedule could be attributed to the goats' natural feeding behavior. Goats are known to be more active and exhibit higher feed intake during the morning hours (Goetsch et al., 2010; Neave et al., 2018). Feeding them at 08:00 AM WITA aligns better with their feeding patterns, allowing for more efficient nutrient utilization and higher weight gains. On the other hand, feeding at later hours may lead to reduced appetite and lower feed consumption, ultimately affecting the growth of different carcass components (Ke et al., 2023; Alemu et al., 2020).

Moreover, the significant differences observed in specific carcass components at different feeding schedule suggest that certain body parts are more

sensitive to the timing of feed provision. For instance, the neck, shoulder, ribs, flank, and breast showed higher weights when fed at 08:00 AM WITA, indicating their greater responsiveness to early feeding. In contrast, the shank did not show significant differences, implying that its growth might be less influenced by feeding time.

Conclusion

Based on the findings of this study, it can be concluded that feeding at different schedules significantly influences the carcass weight of female Kacang goats in the neck, ribs, and legs. There is a significant effect on the carcass component weight in the shoulder, loin, flank, and breast, but no significant effect on the carcass component weight in the shank of female Kacang goats.

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Author Contributions

SA; Collect data, analysis, and prepare manuscript

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Conflicts of Interest

The authors declare no conflict of interest.

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