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# Carcass Production and Chevon Quality of Kacang Buck Reared Traditionally in Grobogan, Central Java, Indonesia

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**ABSTRACT:** Kacang goat is one of indigenous goats in Central Java, Indonesia. Kacang goats are mostly reared traditionally that lead to low in productivity. This research was done to study the productivity and meat quality of Kacang buck reared traditionally in Grobogan, Central Java where the buck are concentrated. Ten heads of Kacang buck reared by farmers having the slaughtered weight of 14.60±2.84 kg were used in this study. They were reared in a combination of grazed during the day and kept in animal housing at night. Data were analyzed descriptively, except for meat quality in the *Longissimus dorsi* and *Bicep femoris* muscles were analyzed using T-test. The average carcass weight was about 5.66±1.16 kg (38.79±2.41%). Those Kacang buck produced 3.57±1.05 kg of chevon (62.69±6.50% of carcass without kidney) and had meat bone ratio of 2.21±0.64. The pH value, water-holding capacity, cooking loss, and tenderness (Warner-Bratzler shear force) in the *Longissimus dorsi* and *Bicep femoris* muscles were similar. The value of pH, water-holding capacity, cooking loss, and tenderness (Warner-Bratzler shear force) in the *Longissimus dorsi* muscles were 6.27±0.02, 34.84± 2.34%, 25.28 ±2.97%, and 6.18±0.36 kg/cm$^2$ respectively, while the value of those in the *Bicep femoris* muscles were 6.21±0.09, 32.35±1.83%, 25.91±3.03%, and 6.85±0.45 kg/cm$^2$ respectively. The content of moisture, protein, and fat in the *Longissimus dorsi* and *Bicep femoris* muscles were similar. Moisture, protein, and fat content in the *Longissimus dorsi* muscles were 74.87±1.96%, 19.65±1.77%, and 3.10±0.95%, while those in the *Bicep femoris* muscles were 74.42±1.60%, 19.58±1.29%, and 3.30±0.55%. It can be concluded that the carcass production and meat quality of Kacang buck reared traditionally might be increased by improving better management practice.

**Keywords:** Carcass production, Kacang goat, Meat quality.

## INTRODUCTION

There was a tendency of increasing chevon demand in Central Java, Indonesia. In 2011, goats in Central Java were slaughtered more than sheep (938,180 heads of goats vs. 500,300 heads of sheep) (BPS Jateng, 2012). People prefer chevon than mutton, because chevon has leaner meat, and nutritious (containing 19.6%-20.7% of meat protein (Musnandar *et al*., 2011)), therefore it is preferred by health conscious consumers (Webb *et al*., 2005). These conditions have stimulated people to increase local breed goat production. Kacang goat is one of indigenous goats in Central Java, Indonesia that well adapted to harsh condition. However, Kacang goats are mostly reared traditionally that lead to low in productivity. Although having small in size, Kacang goat had 46.67% of dressing percentage (Hutama, 2014) and prolific (Sodiq and Sumaryadi, 2002; Rahayu, 2011; Panjono *et al*., 2012).

Most of Kacang goats in Grobogan, Central Java are reared traditionally, grazed during the day in native pasture and kept in animal housing at night. Although the goats have low in

productivity, the quality of meat is more important to study because health conscious consumers need the information. This research was done to study the productivity and meat quality of Kacang buck reared traditionally in Grobogan, Central Java where the buck are concentrated.

## MATERIALS AND METHODS

Ten heads of Kacang buck reared by farmers in Grobogan, Central Java, Indonesia, having the slaughtered weight of 14.60±2.84 kg were used in this study. They were reared in a combination of grazed during the day and kept in animal housing at night. Parameters observed were dressing percentage, the percentage of carcass composition (meat, fat, and bone), chevon quality in the *Longissimus dorsi* and *Bicep femoris* muscles. Chevon quality observed were physical quality included pH, water-holding capacity/WHC, cooking loss, and tenderness using Warner-Bratzler shear force values (Shirima *et al*., 2013) and chemical quality included water, fat, protein content, and collagen in meat using near infrared spectroscopy (NIRS) (Prevolnik *et al*., 2004). Data were analyzed descriptively, except for meat quality in the *Longissimus dorsi* and *Bicep femoris* muscles were analyzed using T-test.

## RESULTS AND DISCUSSION

**Carcass Production of Kacang Buck.** The average carcass weight of Kacang buck was about 5.66±1.16 kg (38.79+2.41% of the slaughter weight). The slaughtered weights of Kacang bucks in this research were around 10.18 kg to 19.11 kg (14.60±2.84 kg). The slaughtered weights were lower than other researchers that reported 15 kg (Sumardianto *et al*., 2013), 18.60 kg (Devendra, 1993), and 21.10-21.92 kg (Gafar *et al*., 2013). Kacang bucks reared by farmers in Grobogan were infested worms in their gastrointestinal tracts because they were grazed early in the morning, were not dewormed, and never fed concentrate. Therefore, the body weight gain decrease gradually. The carcass weight produced was similar to Sumardianto *et al*. (2013) that reported 5.63 kg (37.50%). However, the dressing percentage were relatively lower than those reported by Devendra (1993), Naser (2006), Gafar *et al*. (2013), and Hutama (2014). Kacang buck fed concentrate produced 53.3-56.75% (Gafar *et al*., 2013), 51.64% (Naser, 2006), and 46.67% of dressing percentage (Hutama, 2014). Devendra (1993) stated that dressing percentage of Kacang goat reared by farmers in Malaysia was 44.20%, while those reared in the research station with better management produced 51.30%.

Those Kacang bucks produced 3.57±1.05 kg of chevon (62.69±6.50%), 0.40±0.12 kg of fat (7.26±2.13%), and 1.62±0.15 kg of bone (30.05±6.31% of carcass without kidney). They had meat bone ratio of 2.21±0.64. These results were similar to Sumardianto *et al*. (2013) research that Kacang goat produced 62.28% of chevon, 9.70% of fat, and 28.02% of bone, and 2.6 of meat bone ratio. Those results indicated that Kacang goats that were grazed and fed roughage without concentrate produced lower chevon. Sebsibe *et al*. (2007) reported that Ethiopian goats fed concentrate had higher meat bone ratio (4.03 - 5.01) than those pre-experimental slaughter group (3.75 - 4.30).

**Chevon Quality of Kacang Buck.** The pH value, water-holding capacity, and cooking loss in the *Longissimus dorsi* muscles were 6.27±0.02, 34.84±2.34%, and 25.28±2.97% respectively, while the value of those in the *Bicep femoris* muscles were 6.21±0.09, 32.35±1.83%, and 25.91±3.03% respectively (Table 1). Those value were not significantly different (P>0.05) in both L*ongissimus dorsi* muscles and *Bicep femoris* muscles.

**Table 1.** Physical Quality of Chevon from Kacang Buck

| Parameters | Longissimus dorsi | Biceps femoris |
|---|---|---|
| pH | 6.28 + 0.02 | 6.21 + 0.09 |
| Water-holding capacity (%) | 34.84 + 2.34 | 32.35 + 1.83 |
| Cooking loss (%) | 25.29 + 2.97 | 25.91 + 3.03 |
| Tenderness (kg/cm$^2$) | 6.18 + 0.36 | 6.85 + 0.45 |

The high pH of Kacang bucks was maybe caused by low muscle glycogen content. Low muscle glycogen content could be due to lack of nutrition caused by traditionally management system. Soeparno (2009) stated that there is a relationship among pH value, glycolysis process, and post-mortem muscle glycogen reserve. Sebsibe *et al*. (2007) reported that a relatively high pH (5.78 to 5.94) in the local Ethiopian goat (Afar, Central Highland, Long-eared Somali) was caused by inadequate nutrition from the extensive management system. Judge *et al*. (1989) stated that animal could have high post mortem muscle pH (around 6.5-6.8). The high pH will increase water-holding capacity (relatively the same as living muscle) and decrease cooking loss (Judge *et al*., 1989). Judge *et al*. (1989) also stated that the ultimate pH variation was influenced by energy metabolism during muscle to meat conversion process. In this study, the pH value (6.21-6.28) and water-holding capacity/WHC (32.35-34.84%) were higher and the cooking loss (25.29-25.91%) was lower than those of Das and Rajkumar (2010) research. Das and Rajkumar (2010) reported that meat pH of Barbari, Marwari, and Jamunapari goats were between 5.67 and 5.79, while WHC were 22.00-24.00% and cooking loss were 36.00-38.00%. Limea *et al*. (2009) also reported that Creole goats having lower pH (5.52-5.84) had higher cooking loss (24,40-33,00%). Judge *et al*. (1989) stated the higher pH (5.2 to 6.8), the more protein bound water, and therefore the WHC increased.

Meat tenderness (Warner-Bratzler shear force) in the *Longissimus dorsi* (LD) and *Bicep femoris* (BF) muscles were similar (P>0.05) that were between 5.77 and 7.81 kg/cm$^2$ (6.18±0.36 kg/cm$^2$ in the LD and 6.85+0.45 kg/cm$^2$ in the BF muscles). The similarities of tenderness in LD and BF muscles was influenced by the collagen content of meat that was similar (1.89±0.31% in the Longissimus dorsi muscles, while 2.13±0.11% in the *Biceps femoris* muscles. Lawrence and Fowler (2002) stated that the higher collagen content, the meat will be less tender.

The content of water, fat, and protein in the *Longissimus dorsi* and *Bicep femoris* muscles were similar (P>0.05). Water, fat, and protein content in the *Longissimus dorsi* muscles were 74.87±1.96%, 3.10±0.95%, and 19.65±1.77%, while those in the *Bicep femoris* muscles were 74.42±1.60%, 3.30±0.55%, and 19.58±1.29% (Table 2).

**Table 2.** Chemical Quality of Chevon from Kacang Buck

| Parameters | Longissimus dorsi | Biceps femoris |
|---|---|---|
| | ---------- % ---------- | |
| Water content | 74.87 + 1.96 | 74.42 + 1.60 |
| Fat content | 3.10 + 0.95 | 3.30 + 0.55 |
| Protein content | 19.66 + 1.77 | 19.58 + 1.29 |
| Collagen | 1.89 + 0.31 | 2.13 + 0.11 |

The water content of meat in Kacang buck reared traditionally (fed roughage) was

relatively high (72.29%-78.83%). In this study, the water content of meat was higher than in Baiti *et al.* (2013) research. Baiti *et al*. (2013) reported that the prediction of water content in goat fed roughage and concentrate (CP=12%) was 58.09% to 58.25%. However, Wismer-Pedersen (1987) stated that water content in lean meat might reach 76%. The variation of water content was influenced by fat content of meat. The higher fat content, the water content will decrease up to 10% (Wismer-Pedersen, 1987). In this research, the high water content was caused by the relatively low fat content of meat (1.19%-4.33%). Low fat content of meat could be caused by under nutrition from traditionally management system that goats were only fed roughages without concentrate (energy source). The fat content of meat was similar to those of Barbari, Marwari, and Jamunapari goats (Indian local breed goats) from semi intensive management system: 1.98-2.64% (Das and Rajkumar, 2010). However, Baiti *et al*. (2013) predicted that the fat content in goats fed concentrate were around 21.10% to 21.33%. Soeparno (2009) stated that grazed animals tended to produce low fat content and high water content of meat. The protein contents of meat in this study (16.48%-21.89%) were similar to Das and Rajkumar (2010) research that reported 19.21% to 20.01%. Judge *et al.* (1989) stated that lean meat contained 19-23% of protein, while Musnandar *et al.* (2011) reported 19.6%-20.7% of meat protein content.

## CONCLUSIONS

It can be concluded that the carcass production and meat quality of Kacang buck reared traditionally might be increased by improving better management practice. Farmers should improve the quality of feed, and prevent the goat from worm infection to produce higher carcass production and better chevon quality.

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