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Short Communications

TENDERNESS AND COOKING LOSS IN MEAT OF MALE DORPER SHEEP WEANED AT DIFFERENT AGES

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SUMMARY

This study was conducted to evaluate the meat quality of Dorper sheep weaned at different ages. 3 cuts of sirloin from 3 animals in each treatment groups were used in this study. 9 lambs were grouped into 3 different weaning groups (G1,G2, G3) of 30, 60 and 90 days, respectively. G3 was served as control group based on current practice. When the animals reached the age of 270 days, 3 out of 9 lambs from each of the treated groups were slaughtered for meat quality analysis. Results from this study shows no significant ($P<0.05$) difference of meat quality using sirloin cut in term of tenderness and cooking loss between G1, G2 and G3. Therefore, it can be concluded that weaning at any particular lamb age does not influence the quality of Dorper sheep meat.

Key words: Cooking loss, Dorper sheep, meat quality, tenderness, weaning ages

INTRODUCTION

Consumers' preference on meat is greatly depending on its quality. Meat quality might also contribute to the fluctuation of market meat price. Appearance, juiciness, flavour and texture are some of the most important sensory attributes of meat (Barton-Gade, Cross, Jones & Winger, 1988). The meat textures such as tenderness and water holding capacity are part of the important component in meat evaluation. Generally, tenderness is described as how easily it is chewed or cut. Tender meat is softer and easier to chew. Besides of that, tender meat is more palatable than harder meat. Tenderness is variable within the carcass depending on the function of individual muscles, connective tissue content, ageing potential and state of contraction (Von Seggern *et al.,* 2005). Amongst the palatability of meat (tenderness, juiciness and flavour), tenderness especially of beef is the most variable (Koohmaraie *et al.,* 2002). Okeudo and Moss (2008) explained that the differences in cooking losses and shear force between males and females due to higher intramuscular fat content of females. Fat has lower water content than muscle therefore muscle richer in adipose tissue have reduced water losses (Koohmaraie and Geesink, 2006). Van der Sman (2007) mentioned that cooking loss is the fluid expelled on meat surface with the presence of pressure. During cooking, muscle protein denatured, leading to decrease in their water holding capacity and shrinkage of the protein network. Most of the water loss during cooking is from the juice expelled by protein denaturation and contraction of muscle structures and this changes with the temperature of cooking (Kondjoyan *et al.,* 2013). Even though a few researches reported that early weaning offers many advantages such as allowing ewes to return to breeding condition earlier, thus accelerating lambing programs and early weaned lambs usually reach market weight earlier and this is directly associated with fast maturity but very less study on meat quality was reported. Therefore, this study was conducted to evaluate the meat quality of Dorper sheep weaned at different ages.

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MATERIALS AND METHODS

Experimental Animals

A total of 27 newborn male Dorper lambs (average body weight, 3.06 ± 0.74 kg) were randomly divided into three experimental groups which was G1 (weaned at day-30), G2 (weaned at day-60) and G3 (weaned at day-90). Each group consisted of nine animals. Creep and grower feeds were fed at 3.5% of their body weight before and after weaning, respectively. At the age of 270 days, three lambs from each treatment groups were slaughtered for meat quality analysis using the sirloin cut.

Tenderness

Meat tenderness was measured using Warner Bratzler Shear Test.

Warner Bratzler Shear Test

This test measures the force necessary to shear a piece of meat. The test cell consisted of a 3 mm-thick steel blade which had a 73° V cut into its lower edge and was fitted through a 4 mm wide slit in a small table. Blade edge was not sharpened and fitted loosely into the slit in the table. The meat samples were placed on the table under V blade and were cut through as the blade moved down with a constant speed through the slit of the table (assay parameters were: pre-test speed: 3.0 mms^{-1};

test speed: 1.0 mms^{-1}; post-test speed: 3.0 mms^{-1}). Down stroke distance was 30.0 mm.

The resistance of the meat samples to shearing was recorded every 0.01 s and plotted by a computer in a force-deformation plot. The parameter recorded was the maximum shear force.

Cooking Loss

Cooking loss was determined as described by Honikel (1998). Meat were weighed before heating in water bath at 80℃. Samples were cook until define internal temperature 75℃. Meat were cooled to room temperature and reweighed.

$$\% \text{ Cooking loss} = \frac{[(\text{raw weight} - \text{cooked weight})]}{\text{raw weight})] \times 100}$$

Statistical Analysis

Data was analysed using SPSS statistical software program 16.0 (SPSS Inc., Chicago, IL, USA). The groups were compared using ANOVA and the differences between means were tested by Turkey's test at $P<0.05$.

RESULTS AND DISCUSSIONS

Table 1 shows the Warner Bratzler Shear Force (WBSF) values and the cooking loss (%) for sirloin between treatment groups. According to Destefanis *et al.,* (2008), meat become tougher when WBSF values is higher. The results showed that better tenderness and less water loss for G3 compared to G1 and G2. The higher the percentage of water loss, the harder the meat. However, there were no significant differences of WBSF values and percentage of cooking loss between the treatment groups. This might be due to small sample size taken for the slaughtered animals. Russo *et al.* (2003) observed higher water holding capacity for heavy carcasses and cooking losses increased proportionally with the weight of the slaughtered animal. This is in contradiction with the findings from this study where by the higher the slaughtered weight, the lower of the cooking loss.

Table 1. Warner Bratzler Shear Force (WBSF) values and cooking loss (%) for sirloin between treatment groups.

	Treatment		
	G 1 n=3	G 2 n=3	G 3 n=3
WBSF (N)	46.73±2.19^{ns}	48.73±2.66^{ns}	45.46±2.15^{ns}
Cooking loss (%)	36.77±0.43^{ns}	39.73±1.61^{ns}	36.30±3.25^{ns}

Notes:

N=Newton, G1: weaned at 30 days, G2: weaned at 60 days, G3: control - weaned at 90 days. n*s=not significant at P<0.05*.

CONCLUSION

This study concluded that weaning age of Dorper sheep did not significantly affect the meat quality. However, other factors contributed to meat quality should be taken into account in future studies.

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CONFLICT OF INTEREST

There was no conflict of interest to declare.

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