

# Sensory attributes of the meat of male, female and castrate Dorper lambs subjected to free-range or feedlot finishing

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## Abstract

This study investigated the effect of production systems on sensory quality characteristics of Dorper lambs. Sixty lambs were divided into two production groups (feedlot-{FL} or free-range {FR}) of 10 lambs from each gender class at weaning. Feedlot lambs were fed a commercial pelleted diet while the free-range group utilized natural pastures. Lambs within groups were randomly selected and slaughtered on two dates, one week apart. Cooked loin samples were evaluated by a trained sensory panel for Initial juiciness, sustained juiciness, tenderness and flavour. The meat from FL-lambs was juicier and more tender than meat from FR-lambs. No aroma and flavour differences attributable to production system were observed. Meat from FR-ram lambs slaughtered on slaughter date 1 was the least tender when the production system by gender by slaughter date interaction was considered. Lamb flavour was compromised in ram lambs in the FR-production system when the feeding system by gender interaction was considered. The gender effect indicated that meat tenderness was compromised in ram lambs, when compared to the other gender groups. It is concluded that free-range meat may not necessarily be distinguished from feedlot meat as far as aroma and flavour are concerned although juiciness and tenderness differed.

## Introduction

In recent years some segments of the larger population have become particularly interested in diet / health relationships, the impact of animal production systems on the environment and animal welfare issues. Modern day consumers believe that a free-range product, such as meat, is healthier because it is lean, natural, and free of hormones. The eating quality of meat is extremely important to consumers. Many consumers consider meat tenderness to be the most important palatability trait, while juiciness and flavour are important in overall product acceptability. Although there is plenty of information on the effect of free-range and feedlot production systems on sensory meat quality, this has not yet been reported under South African conditions. This study intended to fill this gap by studying the performance of Dorper sheep under South African conditions. The objectives of this study were to investigate the effect of production system (free-range or feedlot) on the sensory quality characteristics of Dorper lamb. The effect of gender on lamb sensory quality characteristics was also investigated.

## Materials and methods

Generic descriptive sensory analysis was used to evaluate the differences in lamb aroma, initial impression of meat juiciness, sustained meat juiciness and overall flavour on the *Longissimus dorsi* muscle of 60 Dorper meat samples using a seven member trained panel. The effects of production system and gender on the sensory attributes were evaluated on the basis of 100 mm unstructured lines with anchor points at each end, zero (left anchor point) representing minimum and hundred (right anchor point) representing maximum. Scores were considered as the distance from the left anchor point. Dorper lambs were reared at the Nortier experimental farm, situated approximately 10 km north of Lamberts Bay in the North Western Cape Province during 2005. Analysis of variance (ANOVA) using SAS version 8.2 statistical software was performed to evaluate different sources of variation on all the sensory attributes.

## Results and discussion

Results of this investigation revealed that, on average, meat from FL-lambs was juicier and more tender than meat from the FR-lambs (Table 1). Meat from ram lambs had the lowest tenderness score (Table 1). In this study, flavour was compounded in the FR-system x ram lamb combination, resulting in the observed interaction. Results also indicated that meat from FR-ram lambs slaughtered on slaughter date 1 was the least tender compared to all the other means contained in the three-way interaction.

**Conclusions**

Results from this investigation indicate that production system affects some sensory characteristics of Dorper lambs. The advantage of FL-feeding appears to be its ability to produce juicier and more tender meat compared to FR-feeding. Overall, production system had no effect on either the aroma or flavour of Dorper lamb. The gender effect suggested that meat tenderness was compromised in ram lambs compared to the other gender groups. Meat tenderness was compromised in ram lambs in the FR-production system for lambs slaughtered on slaughter day 1 when the production system by gender by slaughter date interaction was considered. However, lamb flavour was more intense in ram lambs in the FR-production system when the feeding system by gender interaction was considered.

**Table 1.** Means ( $\pm$  s.d) depicting the effect of slaughter date, production system and gender on the sensory attributes of Dorper lamb

Attribute	Slaughter date		Production system			Gender	
	1	2	Feedlot	Free-range	Castrates	Ewes	Rams
Aroma	81.83 <sup>b</sup> $\pm$ 8.91	83.14 <sup>a</sup> $\pm$ 7.92	82.82 <sup>a</sup> $\pm$ 8.52	82.15 <sup>a</sup> $\pm$ 8.37	82.17 <sup>a</sup> $\pm$ 8.07	83.02 <sup>a</sup> $\pm$ 8.76	82.26 <sup>a</sup> $\pm$ 8.52
Initial juiciness	81.72 <sup>b</sup> $\pm$ 8.16	84.25 <sup>a</sup> $\pm$ 7.08	83.94 <sup>a</sup> $\pm$ 7.58	82.02 <sup>b</sup> $\pm$ 7.80	83.25 <sup>a</sup> $\pm$ 7.42	83.70 <sup>a</sup> $\pm$ 7.95	82.33 <sup>a</sup> $\pm$ 7.86
Sustained juiciness	79.38 <sup>b</sup> $\pm$ 9.31	81.63 <sup>a</sup> $\pm$ 8.69	81.67 <sup>a</sup> $\pm$ 8.82	79.33 <sup>b</sup> $\pm$ 9.18	80.75 <sup>a</sup> $\pm$ 8.36	81.38 <sup>a</sup> $\pm$ 9.88	79.40 <sup>a</sup> $\pm$ 8.84
Tenderness	85.48 <sup>a</sup> $\pm$ 8.53	85.48 <sup>a</sup> $\pm$ 8.74	86.69 <sup>a</sup> $\pm$ 8.19	84.21 <sup>b</sup> $\pm$ 8.90	86.56 <sup>a</sup> $\pm$ 8.42	86.98 <sup>a</sup> $\pm$ 8.63	82.85 <sup>b</sup> $\pm$ 8.29
Flavour	82.20 <sup>a</sup> $\pm$ 8.21	82.67 <sup>a</sup> $\pm$ 8.05	82.57 <sup>a</sup> $\pm$ 8.46	82.30 <sup>a</sup> $\pm$ 7.78	82.65 <sup>a</sup> $\pm$ 7.72	82.82 <sup>a</sup> $\pm$ 8.51	81.84 <sup>b</sup> $\pm$ 8.13

<sup>ab</sup> Different subscripts differ at  $P < 0.05$ **Table 2.** Means ( $\pm$  s.d) depicting the effect of the two way interactions (slaughter date x production system, slaughter date x gender, production system x gender) on the flavour of Dorper lambs

Attribute	Production system x Gender					
	FL-castrate	FL-ewe	FL-ram	FR-castrate	FR-ewe	FR-ram
Flavour	82.37 <sup>a</sup> $\pm$ 7.92	82.64 <sup>a</sup> $\pm$ 8.77	82.71 <sup>a</sup> $\pm$ 8.81	82.95 <sup>a</sup> $\pm$ 7.56	82.98 <sup>a</sup> $\pm$ 8.32	80.98 <sup>b</sup> $\pm$ 7.39

<sup>ab</sup> Different subscripts differ at  $P < 0.05$