

EFFECT OF INTENSIVE FEEDING ON KAROO LAMB SENSORY QUALITY

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I. INTRODUCTION

The continued production of origin-based meat products is dependent on the availability of dietary resources present in a specific region. These region-specific diets (e.g. herbaceous Karoo bushes) impart unique sensorial qualities (aroma and flavour) to both meat and fat. Karoo lamb is an origin-based South African meat product originating from the vast and arid Karoo region. Due to the extensive production systems utilised in producing these lambs, erratic climate events (droughts) are affecting the consistent supply of Karoo lamb meat to consumers. Thus, Karoo lamb producers are becoming increasingly dependent on intensive feeding, to produce market-ready lambs. The aim of this project is to define a period of intensive feeding that does not affect the unique sensorial quality of Karoo lamb meat and fat.

II. MATERIALS AND METHODS

Dorper ram lambs (n = 32) were randomly allocated to four treatment groups (G1-G4) with days-in-feedlot as treatment factor. Days-in-feedlot were allocated as 0, 21, 28, 35 d and correspond with treatment groups (G1 = 0 d; G2 = 21 d etc). Lambs were provided with a commercial diet mainly consisting of maize and lucerne *ad lib* (G2-G4) and placed in individual stalls. Lambs were slaughtered at a commercial abattoir according to their treatment factor. An additional eight certified Karoo lamb saddles (G5) were purchased as a validation group for G1 (light ~ 30 kg vs heavy Karoo lambs ~ 38 kg). Whole saddle (both left and right *Longissimus thoracis et lumborum*, LTL) were removed at an independent meat processor. Descriptive sensory analysis was performed on eight fat (subcutaneous) and meat samples (right LTL) per treatment by a trained sensory panel for attribute intensity using an adapted attribute list from Erasmus *et al* [1]. Statistics were processed and analysed according to the statistical procedure described by Erasmus *et al* [1] using SASTM statistical software.

III. RESULTS AND DISCUSSION

As postulated by Erasmus *et al* [1] the fat phase of Karoo lamb is where the unique sensorial qualities (i.e., "herbaceous") are imparted from a diet rich in Karoo bushes (Table 1). Meat aroma and flavour showed no differences between treatments, and thus is not presented. Heavy Karoo lamb fat (G5) scored higher for "typical lamb fat" and "sweet-associated" aromas compared to samples from supplemented lambs (G2-G4), and higher for "typical lamb meat" compared to all other treatments. "herbaceousness" was scored lower for G2 compared to G1, G4 and G5, which was unexpected for G4. "barnyard/kraal" aromas showed an increase as duration of supplementation increased but was also higher for G5 samples. "animal feed" aroma scored the lowest for G1 and G5 and differed from G3 and G4 (P<0.05). "rancidity" intensity was scored lower for fat of supplemented lambs than fat of heavy (G5) and light lambs (G1).

Table 1 Mean scores of aroma characteristics of lamb fat as affected by days-in-feedlot

Attributes	G1	G2	G3	G4	G5	LSD	P- value
Fat aroma							
Typical Lamb meat	51.2 ^{ab}	49.1 ^{bc}	47.6 ^c	49.3 ^{bc}	52.5 ^a	2.24	0.001
Typical Lamb fat	63.4 ^b	63.9 ^b	63.6 ^b	64.7 ^b	66.6 ^a	1.60	0.002
Herbaceous	29.0 ^a	27.3 ^b	27.8 ^{ab}	28.8 ^a	29.0 ^a	1.25	0.033
Sweet-associated	32.4 ^{ab}	30.5 ^c	31.0 ^{bc}	32.0 ^{bc}	33.7 ^a	1.56	0.002
Sheep wool	6.83 ^b	7.21 ^{ab}	9.18 ^a	8.83 ^{ab}	8.58 ^{ab}	2.06	0.104
Animal feed	4.80 ^b	6.58 ^{ab}	8.61 ^a	7.46 ^a	5.30 ^b	2.14	0.006
Barnyard/Kraal	7.00 ^b	9.94 ^b	14.9 ^a	15.1 ^a	11.0 ^{ab}	4.64	0.005
Rancid	1.66 ^c	3.61 ^{ab}	4.91 ^a	3.59 ^{ab}	2.64 ^{bc}	1.52	0.002

(LSD) Least significant difference at the 5% level of significance; ^{a-c} Values in the same row with different superscripts are significantly different ($P \leq 0.05$); Means for aroma determined by a 100-point unstructured line scale 0 = low intensity; 100 = high intensity.

Lucerne has been implicated in the production of “sickly” and “sharp” flavours and aromas in meat [2]. Medium chain length methyl branched chain fatty acids (BCFA) and 3-methyl indole (skatole) have been linked to descriptors such as “sheep meat”, “animal” (the odour produced from confined livestock) and “rancid” [3][4]. These compounds have also been linked to the distinctive flavours for lambs fed a diet supplemented with lucerne. Lucerne inclusion, (current study), could be associated with the increase in negative pastoral aromas such as: “barnyard/kraal”, “animal feed” and “rancid” in groups G2-G4. The relatively higher score for “barnyard” aroma in G5 was not expected. The study by Erasmus *et al* [1] noted that there were regional differences within the Karoo, whereby “herbaceous” and “barnyard/kraal” sensory attributes were prevalent for the north-west region (Hantam Karoo) of the Great Karoo region. Our investigation sourced lambs from the Central Karoo region where our fat aroma intensities found were not in line with those found by Erasmus *et al* [1]. This may be due to the variable nature of Karoo vegetation because of erratic climate patterns, causing the sensory profile to be to some degree also variable and inconsistent.

IV. CONCLUSION

Pastoral attributes affecting fat aroma is postulated to be because of the inclusion of lucerne in the commercial feedlot diet. However, the unique sensorial quality of Karoo lamb is closely related to the herbaceous aroma and flavour of the meat and fat, which is imparted through herbaceous Karoo bushes [2]. The “herbaceous” quality of Karoo lamb was not surrendered during intensive feeding, however, the subsequent increase in pastoral aromas changed Karoo lamb fat aroma negatively. Thus, using a feedlot diet lacking in lucerne or feedstuffs known to promote negative aromas and flavours might be more appropriate in maintaining the unique Karoo lamb meat aroma and flavour. The intensive feeding of Karoo lamb is thus not recommended for the periods prescribed in this investigation, when lucerne is present in the diet.

REFERENCES

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