The influence of calving season in Retinto calves meat quality

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Background

In extensive production systems, natural feed resources plays an important role in the system profitability. The calving season determines calves preweaning growth. Calves born early in the season (October-November) have a more efficient growth than those born later, since the period in which they need more amount of milk is the period in which the mother has more pasture availability. Therefore, these calves have larger weaning weight than calves born later in the season at a lower cost. However, it is important to determine the effect of calving season in the quality of the obtained meat.

Not many studies were performed to analyze the effect of calving season in meat quality. But several studies characterize meat quality parameters for a predetermined calving season. Albertí and Sañudo (1997) characterize meat quality traits of several rustic Spanish breeds under feedlot conditions. Osoro et al. (1997) compared meat color (L, a, b) quality parameters for traditional feedlot systems versus feeding systems using natural pastures according to pastures availability and considering calving season, for Asturiana breed. At the moment some results are contradictory and there is not many information on the effect of calving season in relation to meat quality traits. For this reason, this study compares meat quality parameters for three different calving periods (October, December and February) focusing in parameters like tenderness and color because they mainly determine consumer preferences (Pearson, A.M. 1966; Prescott, J.H.D. and Hinks, C.E 1968).

Objectives

To compare important meat quality parameters from calves born in three different calving periods (October, December and February).

Methodology

Seventeen Retinto male calves born in three different periods: 5 in October, 5 in December and 7 in February were purchased after weaning with an average weight of 290 kg. for animals born in October, 255 kg. for animals born in December, and 200 kg. for animals born in February. After an adjustment period of a week, calves started a feeding period with a commercial concentrate and straw at libitum until they reach an average weight of 480 Kg. Therefore, the feeding period was shorted for animals born in October than for those born in February. At this weight (480 kg), animals were slaughtered and carcasses were stored for a 24 hr. period at a temperature of +4°. After this period, a portion of the longissimus dorsi (LD) muscle corresponding with rib 10 was aged for 6 days and used to calculate meat quality parameters such as, pH, instrumental color parameters, (***L *a *b**) (CIE, 1976); water holding capacity (WHC) in %, with pressure method as defined by Grau and Hamm, (1953) and modified by Sañudo et al. (1986), quantity of heminic pigments (HP) (µgrams hematine/g) with the Hornsey method (1956) (Boccard et al., 1981); dry matter in % (DM), cooking loses (CL) in %, the load at maximum load (LOAD) in Newton and displacement at maximum load (DISS) in mm. (INSTRON with Warner Blaztler); and the water holding capacity (WHC) in %. Data were analyzed by using the General Linear Model (GLM) procedures in SAS.

Results and discussion

Table 1, shows the results obtained from the variance analysis. There were calving season significant differences for the following parameters: color L, HWC, DM, LOAD and DISS. The mean values presented in Table 1 are all calculated after an aging period of six days as indicated in the methodology. The pH mean value 5.67, was similar to the value obtained by Albertí and Sañudo (1997) using also Retinto calves under similar system and methodology of 5.61. As indicated in Table 2, the L value was larger for animals born in February 38.8 than L value of those animals born in October 30.6. Similar L mean values of 38.9 were obtained by Albertí and Sañudo (1997) for animals born in February. Osoro et al. (1997) studying the Asturiana breed, obtained values of 40.4 for animals in feedlot and 41.0 for animals fed with pasture for meat aged only five days. Color value means were 15.7 (a) y 8.13 (b). The mean value agree with values obtained by of 15.1 but the authors b mean value of 9.7 was larger than our value. Osoro et al. (1997) obtained values for the Asturiana breed of 20.0 (a) and 9.8 (b). Although, differences in a and b values were not significant, a and b values were similar for December and February parities, and larger than those values for animals born in October (17.0 vs. 14.1) for a values and (6.8 vs. 8.7) for b values.

Mean values for LC of 18.3 were larger than those observed by Albertí and Sañudo (1997) of 13.2. In our study, there was a large variation for this parameter (SD= ±6.3) and therefore, our study needs a further study. In addition, there were not statistic differences in LC for these three parities, probably due to a large experimental error, as indicated previously. Mean value for WHC 16.1 was smaller than results presented by Albertí and Sañudo (1997) of 18.9. It is important to remark that this parameter was computed by the pressure method and this methodology is highly influenced by the technician. Animals born in December have significant less WHC that the other animals (see Table 2). This result is hard to explain and needs also further studies with a more consistent technique. In relation to DM, the average DM was 22.4 . There were significant differences for this trait, having the animals born in October lower values of DM than those born in February (21.0 vs. 23.6), and this value of 23.6 was lower than the values presented by Albertí and Sañudo (1997) of 25.2 for Retinto calves born in late February.

Finally, a very important parameter is this related with meat tenderness, in this study 2 parameters were analyzed, LOAD and DISS. There were strong differences in LOAD for all parities as presented in Table 2, and in relation with DISS calves born in February have DISS values significantly larger than those calves born in October and December.

Conclusion

Calves born in February have larger L parameters than calves born in other season, also have larger WHC, and MS. Also these calves have more tauter meat than animals born in other parities. Therefore, to produce calves born in October-November may produce a low cost meat and more tender than meat from calves born in other seasons. However, this meat may be slightly darker.

Literature cited

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Table 1. Significance levels, means, standard deviations and F values of differents meat quality parameters.

PARAMETERS	*MEAN*	*STD DEV*	*F*	*SIGNIF.*[a]
PH	5.67	0.27	0.3956	-
L*	35.96	4.61	0.0011	*
a*	15.72	2.53	0.1373	-
b*	8.13	2.09	0.2909	-
LC	18.33	6.29	0.9097	-
WHC	16.06	3.72	0.0404	*
DM	22.41	1.54	0.0131	*
LOAD	51.75	17.58	0.0898	+
DISS	33.05	2.54	0.0001	**
HEMA	145.80	18.95	0.0699	*

[a](+ significance at 10%, * at 5 %, ** at 1%).

L,a ,b: color parameters. LC: Cooking loses.

WHC: Water holding capacity. DM: Dry matter.

LOAD and DISS: Warner Blazer maximun load and dissplacement.

HEMA: Amount of hematine.

Table 2. Least square means and standard errors of different meat quality parameters for three calving seasons

CALVING SEASONS	*L**	*Std. Err.*	*WHC*	*Std. Err.*	*DM*	*Std. Err.*	*LOAD*	*Std. Err.*	*DESP.*	*Std. Err.*
1 (October).	30.56^{a}	0.1193	15.60^{ab}	1.413	21.20^{a}	0.541	40.05^{a}	7.074	31.20^{a}	0.275
2 (December).	37.34^{b}	0.1193	13.20^{a}	1.413	22.00^{ab}	0.541	49.21^{a}	7.074	30.90^{a}	0.275
3 (February).	38.82^{b}	0.1008	18.43^{b}	1.194	23.57^{b}	0.457	61.92^{b}	5.979	35.91^{b}	0.232

L: Ligtness. WHC: Water holding capacity. DM: Dry matter. LOAD and DISS: Warner Blazer maximun load and dissplacement.