

CASTRATED VS NOT CASTRATED BEEF CATTLE: INSTRUMENTAL QUALITY AND MEAT CONSUMERS PERCEPTION

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I. INTRODUCTION

Uruguay is a beef exporter country and meat production systems are mainly based on native pastures. Accordingly, animals are slaughtered at 3 years old in average implying that castration is a necessary management practice in beef production, to avoid mainly meat quality problems. During the last years, the use of concentrates in pastures during limited periods or for finishing purposes is becoming more common and the intensification of fattening systems with the use of short periods of confinement, makes it possible to reach slaughter weights with younger animals and probably uncastrated animals. This new scenario could probably imply that a new market niche for young uncastrated cattle could be necessary in Uruguay [1]. Although animal welfare will probably be improved with the elimination of a painful procedure, the challenge could be to reach slaughter points with young uncastrated animals without modifying or compromising animal welfare nor meat quality and consumers acceptance. An important research line is being developed by INIA to answer those questions, in conjunction with farmers associations and the livestock industry [1]. At the commercial level, meat price decrease considerably for a not castrated animal from 18 months old, on. However, scientific data regarding the age at which the quality of meat begins to be adversely affected in Intact males, is still not available. Therefore, the objective of this study was to evaluate the effect of castrated vs not castrated condition, on the instrumental quality and acceptability of beef from Braford cattle, being 26 months old at the time of slaughter.

II. MATERIALS AND METHODS

The experiment was developed by the National Institute of Agricultural Research, INIA, Tacuarembó Research Station, Uruguay. 24 Braford males, 26 months old and being raised on pasture, were finished in a confined system for 4 months. Treatments: T1: castrated one week after birth and T2: not castrated. Animals were slaughtered with 500 kg of live weight, on the same day, in a commercial abattoir licensed to export meat and following animal welfare standard procedures. The animals were fastened during transportation and lairage period and had access to water *ad libitum* in the lairage pen. Meat samples. One steak per animal (2.54 cm thickness) of the *Longissimus dorsi* muscle, was extracted at 36 hours *post mortem*, vacuum packaged individually and transported to INIA Tacuarembó Meat Laboratory for aging. Shear force (kg) was determined after 2 and 14 days of aging (at 2-4°C) using a Warner Bratzler, Model D 2000 (WBSF). A consumer panel (CP) was held (n= 60 people) comparing T1 vs T2 within each aging period. The CP consisted of: a) a preference test for tenderness, taste and global acceptability. A structured scale from 1 (I dislike it very much) to 8 (I like it very much) was applied; b) a parity test in order to assess the ability of consumers to differentiate treatments, regarding tenderness. Each consumer was offered 2 meat samples (one from T1 and one from T2) within each aging period, and they had to point the most tender one. Standardized cabins with red light were used in all cases. The data was analyzed by mixed models (PROC MIXED, SAS System v9.4, 2013). A discriminant analysis was performed to analyze the parity test. Means were compared by the least square means procedure (PROC LSMEANS, SAS 2013).

III. RESULTS AND DISCUSSION

WBSF was not different between treatments, within each aging period (2 aging days: 7.8 Kg in T1 vs 8.1 kg in T2; 14 aging days: 4.9 Kg in T1 vs 5.7 in T2; $P < 0.05$). Aging had a significant effect on WBSF within both

treatments ($p < 0.05$). These results differ from those reported by Mach et al (2008) who found differences between bulls and castrated animals, from the day of the slaughter. These authors reported similar results regarding the effect of aging (7 days), within both treatments ($p < 0.05$).

Regarding the CP, the preference test for tenderness, taste and global acceptability did not show any difference between treatments at any aging period (Table 1). Aging had a significant effect on the preference test for tenderness, for both treatments ($p < 0.05$).

Table 1. Panel of consumers. Preference test for Tenderness, Taste and Global Acceptability within each aging period.

	Castrated 2 days	Not castrated 2 days	P> t	Castrated 14 days	Not castrated 14 days	Significance
Tenderness	5.42	4.93	0.866	5.70	5.06	0.890
Taste	5.52	5.42	0.718	4.91	4.78	0.400
Acceptability	5.67	5.62	0.925	5.05	4.93	0.523

The parity test showed that consumers could differentiate meat tenderness between treatments with 2 aging days but not after 14 days of aging (Table 2).

Table 2. Number of consumers selecting each treatment as more tender, within each aging period.

Parity test 1 - 2 aging days			Significance
More tender	23	Castrated	$p < 0.001$
	7	Not castrated	
Parity test 2 - 14 aging days			Significance
More tender	19	Castrated	$p > 0.4$
	11	Not castrated	

IV. CONCLUSION

The joint interpretation of the instrumental results and the consumer panel suggests the consideration of a new commercial category in Uruguay, for Intact animals, slaughtered at maximum 26 months of age and finished in confined intensive systems. Further research is being developed to find out the age at which the quality of the meat is irreversibly affected in not castrated cattle.

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