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Castrated vs uncastrated beef cattle: instrumental quality (#396)

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Introduction

In Uruguay, beef cattle are slaughtered at 3 years old in average implying that castration is necessary to avoid meat quality problems. The use of concentrates for finishing purposes during the last years, allow farmers to reach the slaughter weight with younger and probably uncastrated animals. This scenario could imply that a new market niche for young uncastrated cattle could be necessary in Uruguay [1]. Animal welfare will probably be improved with the elimination of a painful procedure, but the challenge could be not to compromise animal welfare nor meat quality. At the commercial level, meat price decreases considerably for an entire animal from 18 months old, on. There are many old and new studies available on steer and bull comparisons [2,3,5]. However, there is not enough information regarding the age at which intact male meat quality declines. An important research line is being developed by INIA in cooperation with farmers associations and the livestock industry [1], to test meat quality at different ages in uncastrated males. The objective of this experiment was to evaluate the effect of castrated vs uncastrated condition, on meat quality from Braford cattle, being 20 months old at the time of slaughter.

Methods

20 Braford males, 20 months old and being raised on pasture, were finished in a confined system for 5 months. Treatments: T1: castrated and T2: uncastrated. Animals were slaughtered with 480 kg of live weight in average within each Treatment, 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 dorsii* muscle was extracted at 36 hours *post mortem, vacuum* packaged individually and transported to INIA Tacuarembó Meat Laboratory. Myoglobin concentration was determined and after 2 and 14 days of aging (at 2-4°C), meat colour was registered at the *L** (lightness), *a* (*redness/greenness*)* and *b** (yellowness/blueness*)* colour space, using a colorimeter (Minolta C10). Shear force (kg) using a Warner Bratzler, Model D 2000 (WBSF), was also determined after the same aging periods. The data was analyzed by General lineal models (PROC GLM, SAS System v9.4, 2012). Means were compared by the least square means procedure (PROC LSMEANS, SAS 2012).

Results

After 14 aging days, meat *a** value was higher for uncastrated animals (Table 1). It has been reported by other authors, that uncastrated males produce darker meat than those castrated [4], probably due to myoglobin concentration differences (4.46 castrated vs 5.31 uncastrated animals, p=0.04). In this experiment, however, differences in meat *a** values were not considered relevant (economic criteria). Besides, with 14 aging days, *L** was higher for the uncastrated treatment (Table 1).

Meat tenderness differed between treatments with 2 aging days, showing higher WBSF values for uncastrated animals (p=0.04, Table 1), but not after 14 days of aging (p=0.97, Table 1).

Aging had a significant effect on WBSF in uncastrated animals (7.45 vs 5.36, p=0.02.) but not in castrated ones (p=0.90). These results are consistent to those reported by Mach et al (2008) who found differences between bulls and castrated animals, from the day of the slaughter. However, these authors reported the effect of aging (7 days), within both treatments (p<0.05).

Conclusion

Meat quality from uncastrated animals slaughtered at 20 months of age, had no differences compared to castrated animals, when including 14 aging days. Further research is being developed to find out the age at which the quality of the meat is irreversibly affected in uncastrated cattle.

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Notes

Table 1. Meat colour (*L**, *a**, *b**) and Shear force (kg) after 2 and 14 aging days, for castrated and uncastrated animals.

Aging period	2 days			14 days		
Treatment	Castrated	Uncastrated	P value	Castrated	Uncastrated	p value
Meat colour *L**	33.20	31.42	0.33	32.30	36.20	0.01
Meat colour *a**	14.37	12.10	0.06	14.01	16.75	0.02
Meat colour *b**	6.86	4.76	0.00	6.29	8.20	0.06
WBSF (kg)	5,54	7,45	0.04	5.40	5,36	0.97

Meat colour and Shear force after each aging period, per Treatment.

Notes