

## MEAT AND CARCASS QUALITY OF YOUNG BULLS AND STEERS FROM THE NORTHWEST OF ARGENTINA

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**Abstract - The objective of this study was to carry out a meat and carcass quality survey on young bulls and steers, focusing at the relationship between the argentine grading on carcasses and shear force values. Samples of *Longissimus dorsi* muscle (9-13 rib) were collected on castrated (S) or young bulls (B) confined and slaughtered at the same chronological age (DCA) (not permanent teeth (0), 2 (2) and 4 (4) permanent teeth). There were classified according the argentine system and measured the Warner Bratzler shear force. Data were analyzed using the Proc Mixed (Infostat); differences among treatments (category and chronological dental age) were analyzed by Tukey test. It was possible to show that Argentina needs a more sensitive method to ensure reliability classification for carcass quality, do not observe significant differences between quality grades and chronological dental age in WB shear force however differences between categories were significant in hardness.**

**Key Words: beef, quality grades, chronological age, shear force**

### I. INTRODUCTION

Argentine beef industry does not have an objective system of carcass quality control. The classification system of Argentine cattle is a subjective method based on certain

physical characteristics of the animal, made by a qualified person (Resolution No. J-240/90 Former National Meat Board). The cattle is classified by development of muscle mass and degree of fatness, regardless of the value of tenderness, being one of the qualities most valued by the consumer [1][2] confusing high grades of beef average values with tender meat [1][3]. Animals are rated without regard the chronological dental age. Only few commercials slaughterhouses that export meat add the classification taking in account chronological dental age, being a method that could be added to the existing, especially for Bos Indicus breeds and the crossbreeds, as the meat of these biotypes gets tougher with increasing maturity.

### II. MATERIALS AND METHODS

The study was conducted in the northwest region of Argentina on confined productive system. Steers (S) or uncastrated (B) animals ('Criollo', Zebu, Braford/Brangus cattle) slaughtered at the same dental chronological age (DCA) (not permanent teeth, 2 and 4 permanent teeth).

Samples: Animals were slaughtered in a commercial slaughterhouse where were first classified according the argentine grading

system. This determination is based by the observation, on the analysis of the development of the muscular masses, relating of the proportion of meat and bone, being guided by the shapes, profiles and contours of the carcass. Also, the fat coverage is observed, assigning on it an alphanumeric classification.

Then, samples were obtained from *Longissimus dorsi* muscle (9 to 13 ribs) of 27 steers and 24 young bulls. Vacuum packed samples were frozen (-18°C±1), transported and delivered to the Meat Quality Laboratory of the School of Agriculture (University of Buenos Aires). After that, samples were thawed at a chamber of refrigerated temperature for 24 hours; they were placed in another refrigerated chamber (2.5±0.5°C) with light control to simulate retail conditions and exhibition. Ageing time of the samples was 4 days.

Measurements: Shear force with a Warner Bratzler shearing attachment (Instron 4442 Universal Testing Machine; Canton, MA, USA) on cooked samples (water bath heated at 70°C for 50 minutes, monitored by thermocouples) was carried out. Statistical analysis of data was performed using the Proc Mixed of SAS. Differences among treatments were analyzed by Tukey test ( $p < 0.05$ ).

### III. RESULTS AND DISCUSSION

Data and significance differences on Warner Bratzler values of Category, Quality Grade and Dental chronological age are shown in Table 1. There were no significant differences between quality grades and chronological dental age, but differences between categories were significant, as demonstrated in a previous work [4]. The number of samples could be the cause that no differences were found between the variables analyzed. Furthermore, the *Bos Indicus* crossbreeds, commonly used in the northern region, are

less tender than meat from *BosTaurus* cattle used in other regions [4][5][6][7] so it would be of great importance to include the tenderness in carcass classification, like the Australian VIASCAN or the Beef Center Classification in Denmark. In other countries such as Australia, the use of evaluation systems for consumers (Standards Association of Australia (MSA) brings benefits for both, consumers and producers.

Table 1. Probability and Warner Bratzler shear force values (lbs) according to the castrated/uncastrated category, quality grades and dental chronological age.

		MeansWB	SE
Category	S	8,33 a	0,22
	B	9,96 b	0,25
Quality Grade	J	8,28 a	0,41
	U	8,26 a	0,32
	A	8,70 a	0,39
	B	9,45 a	0,32
	U2	9,10 a	0,48
	C	10,05 a	0,48
DCA	0	9,03 a	0,19
	2	8,76 a	0,30
	4	9,85 a	0,75
Probability	Category	0,0379	
	CQG	nsd	
	DCA	nsd	

Category: S: uncastrated and B: young bull. CQG: Carcass Quality Grade: J, U, A, B, U2, C (alphanumeric classification for carcass quality grade). DCA: Dental Chronological Age: 0 (not permanent teeth, 2 (2) and 4 (4) permanent teeth). nsd: no significant difference. Means with common letter are not significantly different ( $p \leq 0.05$ )

### IV. CONCLUSIONS

Tenderness remains one of the most important sensory attribute that determines consumer acceptability and as the official classification system in Argentina does not take in account it as an important parameter, beef quality is affected. It is necessary a more objective system classification that

ensures to the consumers the meat quality, basing on the assessment of tenderness, among others major attributes. A best grading system would improve the rate price/product.

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