SHOULD THE SOUTH AFRICAN A AND AB RED MEAT CARCASS CLASSES BE COMBINED?

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Abstract – In this study tenderness of South African A and AB red meat carcasses was evaluated to test whether these classes should be combined or not. Sheep (Dorper and Merino [n=60]) and cattle breeds (Nguni crosses, Bonsmara and Angus [n=90]) were used. Shoulder muscles were harvested for tenderness evaluation. A and AB carcass classes differed within and across breeds in sheep and feedlot cattle and A classes were more tender than AB classes. Contrary, meat from pasture-based cattle was tender at AB-age than A-age. Thus in feedlot animals tenderness decreased with age while in pasture animals tenderness increased with age, thus the A and AB classes should not be combined in the SA classification system.
Key Words – Age, breed, feedlot animals, pasture-based animals

I. INTRODUCTION

In the South African meat classification system there is a lot of controversy about combining the A and AB red meat classes. This has aroused from the assumption that these classes might have similar meat characteristics since they are nearly of the same age category. Nonetheless there is limited evidence on the relationship between these classes. A-class carcasses are normally from animals with no permanent incisors at slaughter while AB-class carcasses are those with 1-2 permanent incisors at slaughter [1]. In this regard carcasses are grouped based on similar traits that are visually appraised. In an attempt to revise the SA classification system many authors have suggested that production systems, breed, type of muscle and growth stimulants are among factors contributing to varying quality in red meat [2; 3; 4; 5; 6]. Along these, pre and post-slaughter treatments are also suggested to cause possible variations in meat quality. All these factors interact and cause a significant effect on the final quality of meat and this means that carcasses might not necessarily have similar quality regardless of their categorization into one class. This could be the worst case scenario for animals that are not even falling within the same class like the A and AB. Thus meat quality between A and AB carcass classes needs to be evaluated to make cognisant decisions on whether to combine them, hence this study.

II. MATERIALS AND METHODS

Three beef breeds (Nguni crosses, Bonsmara and Angus) and two sheep breeds (Dorper and Merino) were used in the study. Thirty animals were used in each breed (15 animals per class) totaling to 150 animals for the trial. All animals were sourced from a high throughput abattoir in South Africa (SA). After humane slaughter, the animals were subjected to the SA red meat classification system and thereafter shoulder muscles from A and AB carcasses were harvested for tenderness measurements. Tenderness was measured by means of Warner Bratzler Shear Force after 7 days refrigerator period. The data was analyzed using PROC GLM of SAS 2009 to test the effect of breed and production system between A and AB carcass classes and their relationship in sheep and cattle. The LSD method was used to separate means.

III. RESULTS AND DISCUSSION

Table 1 below shows tenderness of South African A and AB red meat carcass classes. In sheep carcasses tenderness for A-class differed from AB-class within and across breeds. Although the A classes had similar tenderness across breeds, the AB-classes were different. As expected the A-class carcasses were tender (10.4±1.89; 13.2±1.41) than the AB-classes (20.4±1.59; 26.2±2.11) for both breeds, thus tenderness decreased with age for sheep in the current study. Similarly in feedlot cattle the Bonsmara A-class was tender than its AB class, while the A and AB carcass classes were similar ($P>0.05$) within the Angus breed. Across breeds, Bonsmara A-class differed from the Angus AB-class, while the Angus A class had similar tenderness with the Bonsmara AB class. Likewise, in feedlot cattle A-classes were also tender than the AB classes but these results varied depending on breed. Contrary to this the Nguni crosses reared on natural pastures had improved tenderness with increasing age, where AB classes were tender than the A classes. Several international consumer surveys have shown that regardless of animal species, the most significant meat quality attributes include tenderness, juiciness and flavour [7; 8; 9] with tenderness being the most appreciated attribute by consumers particularly in beef (5; 7; 10;11;]. Variability in meat tenderness can be perceived as one of the factors contributing to decline in meat consumption, particularly red meat. Although in the current SA classification system it has since been argued that A and AB classes should be combined since they may have similar meat quality in particular tenderness, the results from this study suggest otherwise. Both sheep and feedlot cattle

carcasses had different tenderness between the A and AB age categories. This inconsistency in tenderness was further confirmed in animals falling within the same class across breeds in the current study. These results agree with those reported by Soji and Muchenje [12] that regardless of animals being categorized into one class, breed results in varying meat quality. The results also coincide with the current SA classification system that tenderness decreases with age i.e. the older the animal the tougher its meat. Contradictory results were, however, observed from pasture based animals. The fact that in pasture based animals tenderness increased with age may be attributed to marbling. South African grass-fed beef has improved marbling as compared to the feedlot animals which in turn favours their tenderness as they mature. In a study by Frylinck *et al*. [3] intramuscular fat played an important role in the tenderness outcome of grass-fed animals, where Nguni animals seemed to marble well as they mature (AB-age IMF <3%) thus improving their tenderness.

Table 1 Tenderness of South African A and AB red meat classes from different production system

Breed	***Class***	***WBSF (N)***
Dorper(n=30)	A (n=15)	10.4^{b}±1.89
	AB (n=15)	20.4^{a}±1.59
Merino (n=30)	A (n=15)	13.2^{b}±1.41
	AB (n=15)	26.2^{c}±2.11
Feedlot based cattle		
Bonsmara (n=30)	A (n=15)	21.2^{a}± 3.97
	AB (n=15)	29.9^{b}± 3.68
Angus (n=30)	A (n=15)	21.2^{a} ± 2.05
	AB (n=15)	$24.^{a,b}$± 6.88
Pasture based cattle		
Nguni Crosses (n=30)	A (n=15)	22.5^{a}±1.92
	AB (n=15)	13.2^{b}±1.70

$^{a, b}$ Means within column bearing different superscripts differ at $P<0.05$; WBSF-Warner Bratzler Shear Force

IV. CONCLUSION

The current study revealed that South African A and AB red meat carcasses have different tenderness. The inconsistency in tenderness between these classes and within each class was confirmed by breed and production system effects. Thus these classes should not be combined.

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