UF-Gainesville Beef Cattle News Corner

Meat quality in Brahman influenced cattle.

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Beef product quality is a top priority for beef industry - because it has a great power to influence demand and also because the beef industry has the ability to improve it. Great effort was dedicated to understanding how consumers perceive beef quality and all studies point out that the strongest quality attributes are tenderness, juiciness, and flavor, followed by healthfulness and nutritional value. These issues are of particular importance for Brahman and Brahman crosses as they are routinely penalized for inadequate tenderness and relatively low marbling score. The Florida Cattle Enhancement Board funded a proposal last year which allowed us measure tenderness and genotype a subset of available steaks from Brahman-influenced cattle. Carcass and nutritional data (fatty acids and mineral content) was available on 1,300 Brahman influenced cattle. Tenderness was measured by Warner-Bratzler shear force (WBSF) – an objective measure of tenderness, on steaks from 350 Brahman influenced steers according to the American Meat Science Association Sensory Guidelines.

Twenty-eight individual fatty acids and three groups of fatty acids based on saturation level (**SFA** = saturated fatty acids, **MUFA** = monounsaturated fatty acids, **PUFA** = polyunsaturated fatty acids) were calculated and expressed as percentage of the total fatty acids and as mg/g of tissue.

Fatty acid composition was similar across Brangus populations from UF or from commercial FL producers, averaging 48-49% SFA, 46% MUFA, and 5-6% PUFA (*Figure 1*). Significant differences were found between Angus and Brahman-influenced populations, with Brahman cattle having more PUFA on a percent basis and less SFA compared to Angus.

Figure 1. *Average fatty acid percentages for Brangus cattle from the UF Multibreed population (n=30) Brangus cattle from commercial FL producers (n=1,065), Angus cattle from the UF Multibreed population (n=33) and Brahman cattle from the UF Multibreed population (n=59).*
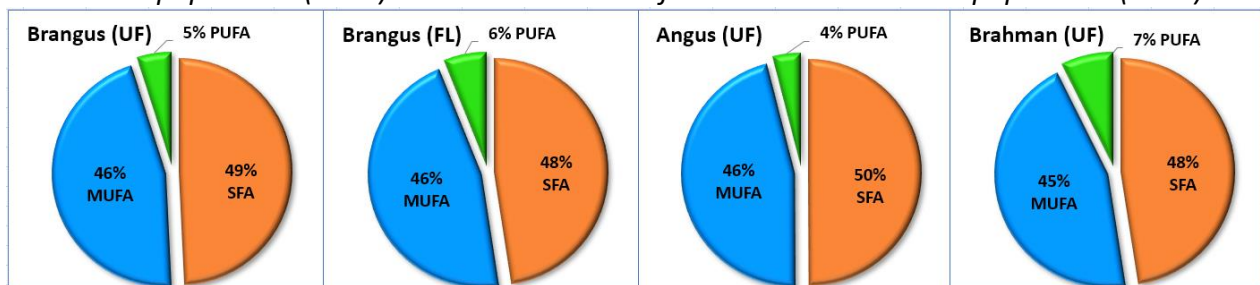
The differences between Angus and Brahman cattle are even more evident when we analyze the fatty acid composition as g/100 g muscle (or g/serving of beef, *Table 1*). Total fat content was highest in Angus (almost 14g/serving) followed closely by Brangus (around 11g/serving) and doubled than Brahman (7g/serving). The breakdown of total fat into fat categories is also interesting and shows that steaks from Brahman cattle will have about half the amount of SFA but relatively similar PUFA amount as steaks from Angus cattle. This is an important trend as

consumers are increasingly interested in a healthy lower fat diet with reduced SFA content and increased PUFA (omega 3 and omega 6).

Table 1. *Grams of fatty acid (SFA, MUFA, PUFA and Total fat) per 100 grams of tissues for Brangus cattle from the UF Multibreed population (n=30) Brangus cattle from commercial FL producers (n=1,065), Angus cattle from the UF Multibreed population (n=33) and Brahman cattle from the UF Multibreed population (n=59).*

	Grams FA/100g steak (~3oz., 1 serving)			
Population	**SFA**	**MUFA**	**PUFA**	**Total**
Brangus (FL)	6.03	4.16	0.66	10.86
Brangus (UF)	5.69	5.26	0.52	11.46
Angus (UF)	7.02	6.41	0.55	13.98
Brahman (UF)	3.28	3.22	0.43	6.93

The relationship between quality grade and tenderness was evaluated in the sample of 350 steaks. Quality grades were calculated based on marbling scores (select = 200-299, standard = 300-399, choice - = 400-499, choice = 500-599, choice + = 600-699, and prime = 700-999). We used a threshold of 4.7kg to classify a steak as tough (greater than 4.7kg WBSF) or tender (less than 4.7kg WBSF). The average WBSF was 4.97 kg and using the threshold above, 55% of the steaks would be considered tough and 45% as tender. Based on the degree of marbling, cattle

Figure 2. *Top graph shows the number of steaks classified as tender or tough across all quality grades, and the percentage of steaks classified as Select (30%), Choice- (49%), Choice (17%), Choice+ (2%) and Prime (2%). Bottom graph shows the percentage of tender and tough steaks within each quality grade. It is important to notice the similar percentages of tough and tender across all quality grades (except maybe Prime, but there were only 7 steaks graded Prime in this subset).*
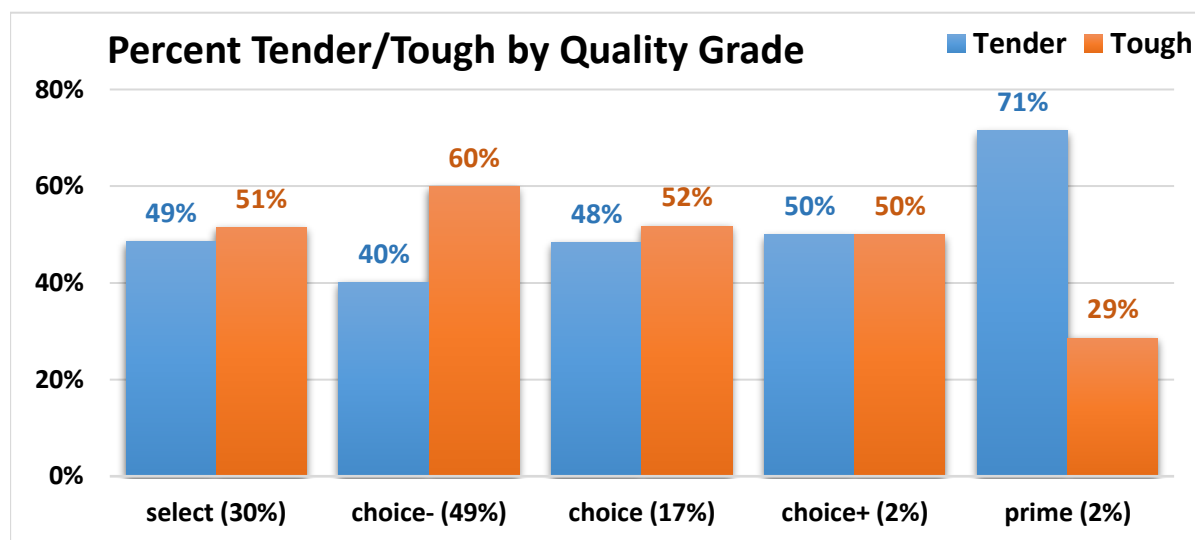
were classified as *Select* (30%), *Choice-* (49%), *Choice* (17%), *Choice+* (2%) and *Prime* (2%). *Figure 2* shows the percentage of tender and tough steaks within each quality grade. It is important to

notice the similar percentages of tough and tender across all quality grades (except maybe Prime, but there were only 7 steaks graded Prime in this subset, therefore the percentages for the Prime steaks should be considered with caution).

These results highlight again the limitation of the USDA grading system to predict eating quality or tenderness. There is considerable variation in the degree of tenderness across all quality grades, with similar percentages of tough and tender steaks within each quality grade category. Current genomic tests available for tenderness have been developed on datasets dominated by *Bos Taurus* data and they have limited prediction power in *Bos Indicus* influenced populations. The goal of our research group is to develop genomic tools to select for superior meat quality in *Bos indicus*-influenced cattle populations