Consumer Willingness to Pay for Tennessee Certified Beef

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This publication should be used in conjunction with its companion publication, *Tennessee Branded Beef Program: The Producers' Perspective and Willingness to Participate*, University of Tennessee Extension, publication W 484-A.

Introduction

Tennessee cattle production is primarily composed of cow-calf producers and secondarily by stocker and backgrounding operations. Given the competitive advantage other regions in the nation have in grain-finishing cattle, most Tennessee feeder cattle are sent to feedlots in Midwestern and Western states to be finished and harvested. In 2016, Tennessee commercial cattle slaughter totaled 64,900 head, which represents 6.8 percent of the 950,000 head of cows and heifers calved in Tennessee during 2016 (USDA National Agricultural Statistical Service [NASS], 2017a; USDA NASS, 2017b). This result indicates a majority of cattle are harvested/slaughtered outside of the state.

Over the past several years, consumer demand for local foods has grown, with increased consumer interest in knowing how their food is produced. Recognizing this consumer interest, several livestock producers across Tennessee have delved into direct marketing finished cattle and/or beef products to consumers. Additionally, in December 2013, Tennessee's governor challenged policymakers and state agricultural leaders to expand state agricultural and forestry industries. This challenge led to four major recommendations, one of which was to "expand marketing opportunities for Tennessee producers and encourage new production systems and agribusinesses" (Johnson, Upchurch, and Arrington, 2016). Thus, evaluating opportunities to expand cattle marketing alternatives is merited to help meet the governor's challenge.

Given the governor's challenge, consumer interest in local foods, and the consumer's desire to know the production practices used in food production, the question remains if Tennessee cattle producers can expand marketing opportunities and increase profitability by producing finished cattle and selling their beef under a Tennessee Certified Beef (TCB) program. To answer this question, there are several marketing components in need of evaluation including producer willingness to supply cattle to a TCB program (Griffith et al., 2018), consumer willingness to pay for TCB, and retailers' (restaurants, grocery stores and other consumer outlets) willingness to stock TCB.

At the time of publication, Tennessee has no beef state-labeling program. However, there are several programs in which cattle producers can participate and become certified that influence cattle production practices including Advanced Master Beef Producer (AMBP) and Beef Quality Assurance (BQA). University of Tennessee Extension coordinates and educates cattle producers for the AMBP program. The AMBP program covers topics such as marketing and management, production economics, genetics, reproduction, nutrition, cattle handling and transport, forages, cattle health, and other cattle industry issues. Similarly, the BQA program is a nationally coordinated, state-implemented program for both US beef producers and consumers to better understand animal husbandry techniques and scientific knowledge about emerging herd management methods. However, the level of consumer awareness regarding producer participation in these programs is limited. Because little research exists regarding Tennessee consumers' attitudes toward and willingness to pay premiums for beef labeled as Tennessee Certified Beef (TCB), information is not available to know whether consumers would be willing to purchase TCB or pay premiums for beef labeled as TCB.

The goal of this publication is to convey results of a consumer survey determining Tennessee consumer willingness to pay (WTP) for steak and ground beef labeled as Tennessee Certified Beef (TCB), labled as produced by cattle producers who have completed Advanced Master Beef Producer (AMBP) and Beef Quality Assurance (BQA) programs, and containing other labels that could appear on TCB (e.g., grass-fed, Certified Angus Beef [CAB], no hormones administered).

Survey

An online survey was used to elicit consumer willingness to pay (WTP) for USDA Choice boneless rib eye steaks and 85 percent lean/15 percent fat ground beef containing Tennessee Certified Beef (TCB) labels and other labels likely to appear with TCB labels. In the survey, participants were presented two different beef products with differing beef labels and prices. Consumers were asked which beef product they would choose, or they could choose neither of the beef options. It was assumed consumers would choose the product that maximizes their satisfaction given their budget.

Survey participants were required to be Tennessee residents over 18 years of age and a purchaser of beef. Consumers were asked the following question to determine whether they would evaluate different steaks or different ground beef options: "What beef products do you purchase (select all that apply)?" The options available were "steak," "ground beef" and "neither." Participants responding "steak" were assigned to the Steak Treatment. Participants responding "ground beef" were assigned to the Ground Beef Treatment. Consumers who chose both "ground beef" and "steak" were randomly assigned to either the steak or ground beef treatments. Consumers choosing the "neither" option were not allowed to continue the survey.

Participants were randomized into either the Control Treatment or the Information Treatment. Participants in the Information Treatment were provided the definitions of the different beef labels (see Appendix A). Results of the Information Treatment were compared to the Control Treatment to determine if consumers informed about the beef label definitions had a different WTP for specific beef labels compared to consumers who were not given the definitions.

Beef labels for the products consumers evaluated in the survey are reported in Table 1. Steak prices ranged from $5.99/lb to $11.99/lb, and ground beef prices ranged from $1.99/lb to $4.99/lb. A range of prices was chosen based on the USDA National Retail Report for Beef at the time the survey was launched. The labels evaluated were TCB; Master Quality Raised Beef (MQRB) that is a label indicating cattle producers completed Advanced Master Beef Producer (AMBP) and Beef Quality Assurance (BQA) programs; Certified Angus Beef (CAB); no hormones administered; and grass-fed.

The survey was initiated September 2016, and data were collected on 814 Tennessee consumers. Participants were presented with "choice sets," allowing them to choose between two beef alternatives with different labels or choose neither product. Figures 1 and 2 are examples of the steak and ground beef choice sets.

Table 1. Labels included in the survey choice sets

	USDA Choice Boneless Rib Eye Beef Steak	USDA Choice Ground Beef (85% Lean/ 15% Fat)
Attribute	**Attribute Levels**	**Attribute Levels**
Price	$5.99/lb	$1.99/lb
	$7.99/lb	$2.99/lb
	$9.99/lb	$3.99/lb
	$11.99/lb	$4.99/lb
Tennessee Certified Beef	Tennessee Certified Beef label	Tennessee Certified Beef label
	None	None
Master Quality Raised Beef	Master Quality Raised Beef label	Master Quality Raised Beef label
	None	None
Other attributes likely to appear on beef from Tennessee	Certified Angus Beef label	Certified Angus Beef label
	Grass-fed label	Grass-fed label
	No-hormones-administered label	No-hormones-administered label
	None	None

Note: *Price levels were based on the average weighted price for each beef product obtained from the National Retail Report for beef from the USDA at the time the survey was launched in September 2016.*

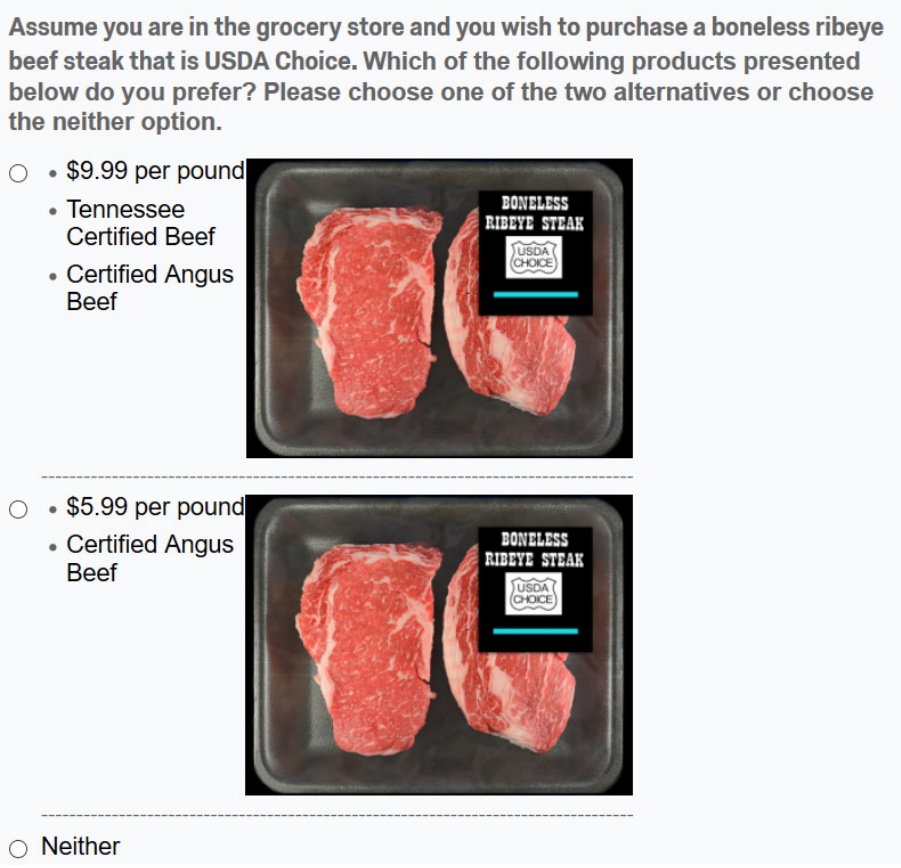


Figure 1. Example of steak choice set

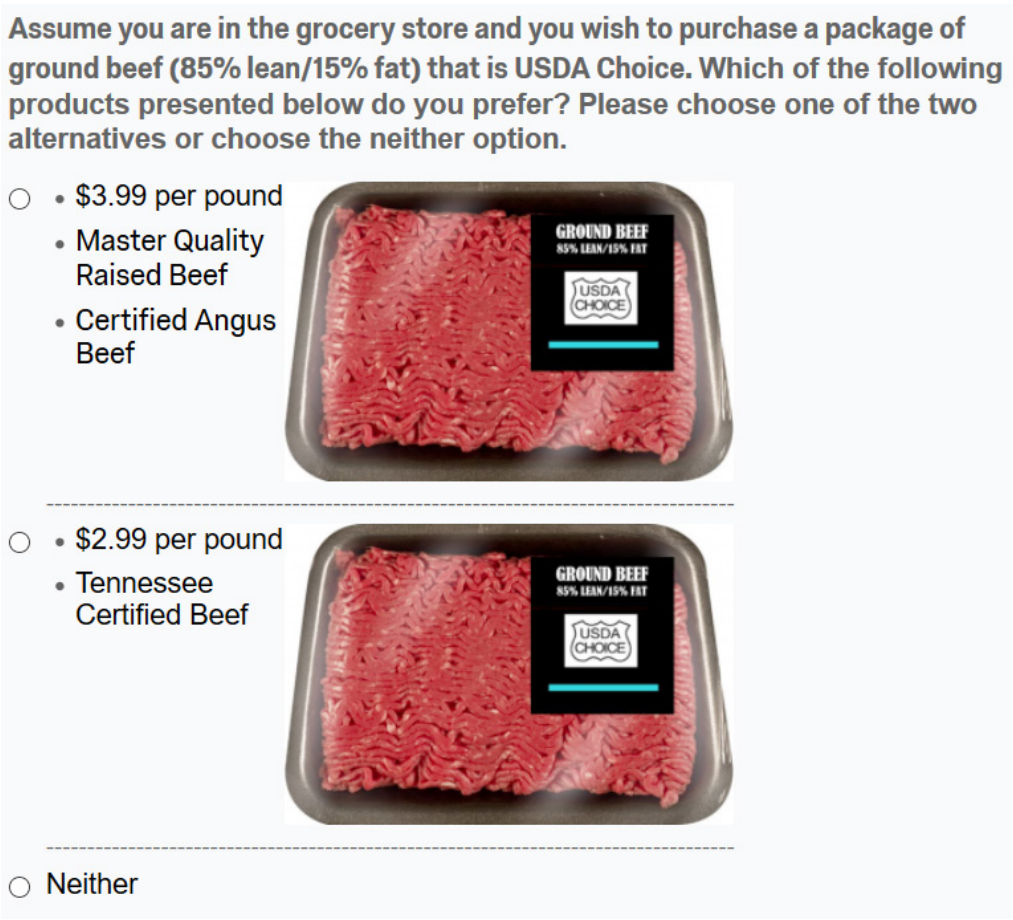


Figure 2. Example of ground beef choice set

Survey Participants' Characteristics

Survey participant characteristics appear in Table 2. Among the participants in the Steak Treatment, significant differences in characteristics between the Control Treatment and Information Treatment were found for gender (higher percentage "female" for Control Treatment). For participants in the Ground Beef Treatment, significant differences were found between the Control Treatment and Information Treatment for education (lower percentage "bachelor's degree or higher" for Control Treatment); household size (larger "household size" for Control Treatment); and race (higher percentage "white" race for Control Treatment). When comparing the respondents' characteristics with those of Tennessee residents, the percentage of females participating in the survey was higher than the state average. However, this discrepancy is expected as women tend to be the primary grocery shopper.

Table 2: Sample characteristics by treatment and product and Tennessee population characteristics

	USDA Choice Boneless Rib Eye Beef Steak		USDA Choice Ground Beef (85% Lean/15% Fat)		
Variable	Control Treatment n=204	Information Treatment n=204	Control Treatment n=204	Information Treatment n=204	Tennessee Population
Gender (% female)	78.9%**	70.6%**	78.9%	75.0%	51.3%[6]
Median Age (years)	42.0	41.5	39.0	42.0	38.7[5]
Race (% white)	81.9%	81.4%	89.7%***	77.0%***	78.8%[6]
Education (bachelor's degree or higher)	27.0%	29.4%	22.5%**	33.3%**	24.9%[6]
Average Household Income	$51,078.43	$51,403.94	$46,840.80	$50,049.02	$45,219[6]
Household Size	2.97	3.00	2.96*	2.68*	2.53[6]
Kids under 12 (% yes)	36.3%	34.3%	38.7%	33.3%	-
Farm Background (% yes)	26.6%	27.0%	20.1%	26.0%	-
Type of Region (% Rural)[1]	39.7%	42.6%	33.3%	40.2%	-
Type of Roots (% Rural)[2]	52.5%	52.0%	49.0%	45.6%	-
Area of Residence[3]					
East Tennessee	33.3%	41.2%	42.2%	38.2%	36.7%[6]
Middle Tennessee	36.8%	35.8%	42.6%	41.2%	38.7%[6]
West Tennessee	29.9%	23.0%	15.2%	20.6%	24.6%[6]
Consequentiality[4]	3.95	4.01	4.03	4.00	-

Notes: *[1]Percent of respondents answering they live in a rural area, compared to a city center or suburbia. Rural was self-defined by respondents.*
[2]Percentage of respondents who consider their roots to be rural compared to urban or suburban. Rural was self-defined by respondents.
[3]Areas created based on the Tennessee "Three Grand Divisions," based on county of residence (Tennessee Secretary of State, 2017).
[4]Participant's belief that their answers will be used to analyze the feasibility of Tennessee Certified Beef with 1=Not at All to 6=Very Much.
[5] Tennessee Department of Economic and Community Development, 2016.
[6] U.S. Census Bureau, 2016.
****,**,* Denote statistically different means between the Control Treatment and the Information Treatment sample at the 1%, 5%, and 10% levels, respectively.*

Willingness to Pay Results

Steak Treatment

The willingness to pay (WTP) results for USDA Choice boneless beef steak are provided in Figure 3. The WTP indicates how much more a consumer would pay for a specific labeled steak compared to an unlabeled steak. Uninformed and informed consumers indicated positive WTP for all label attributes studied and when multiple labels appeared on the beef item. Steak consumers indicated the highest WTP for Tennessee Certified Beef (TCB) both when informed and uninformed regarding the TCB definition (Control Treatment: $2.42/lb; Information Treatment: $2.89/lb). No hormones administered garnered the second-highest premium both when informed and uninformed regarding its definition (Control Treatment: $2.35/lb; Information Treatment: $2.71/lb). Of the steak labels evaluated, consumers placed the smallest premium on grass-fed and Certified Angus Beef (CAB). For the beef cattle farmer certification program Master Quality Raised Beef (MQRB), consumers in the Control Treatment and Information Treatment were willing to pay premiums of $1.39/lb and $1.67/lb, respectively, when this label appeared on steak.

Uninformed and informed consumers were willing to pay a premium for beef steaks when other labels were combined with the TCB label. The uninformed consumer was willing to pay a premium of $4.37/lb for steak labeled as both TCB and no hormones administered, whereas the informed consumer was willing to pay $3.28/lb (i.e., 24.9% less) (Figure 3). Similarly, the premium for steak with the TCB and grass-fed label decreased from $3.93/lb to $3.56/lb when consumers were given the definitions. Given the lower willingness to pay by consumers who were provided label definitions, results may indicate consumers believe grass-fed and no hormones administered are redundant attributes when



Figure 3. Willingness to pay for USDA Choice boneless rib eye beef steak

combined with TCB. The interaction between TCB and grass-fed garnered the second-highest premium across both the Control Treatment and Information Treatment for steak.

Uninformed and informed consumers were willing to pay $2.62/lb and $3.67/lb more for steak, respectively, when TCB and MQRB appeared on the same label (Figure 3). The $1.05/lb difference between the Control Treatment and Information Treatment represents the largest increase in WTP among all labels in the Steak Treatment. Of the labels studied, this increase in WTP suggests consumers may be least knowledgeable about the TCB and MQRB labels. It is likely consumers are unaware beef producers complete the Advanced Master Beef Producer (AMBP) and Beef Quality Assurance (BQA) certification programs and what these certification programs represent.

Ground Beef Treatment

For the Ground Beef Treatment (Figure 4), in both the Control Treatment and Information Treatment, the highest willingness to pay (WTP) was for the no-hormones-administered label, followed by Tennessee Certified Beef (TCB). Once again, the WTP indicates how much more a consumer would pay for ground beef carrying the specified label than they would pay for unlabeled ground beef. Ground beef consumers placed the smallest WTP value on Certified Angus Beef (CAB) in the Control Treatment at $0.41/lb. With respect to the beef cattle farmer certification program, Master Quality Raised Beef (MQRB), uninformed consumers were willing to pay a $0.65/lb premium in the Control Treatment and a $0.95/lb premium in the Information Treatment, suggesting gains in WTP from information provided about the MQRB label. The informed consumer was

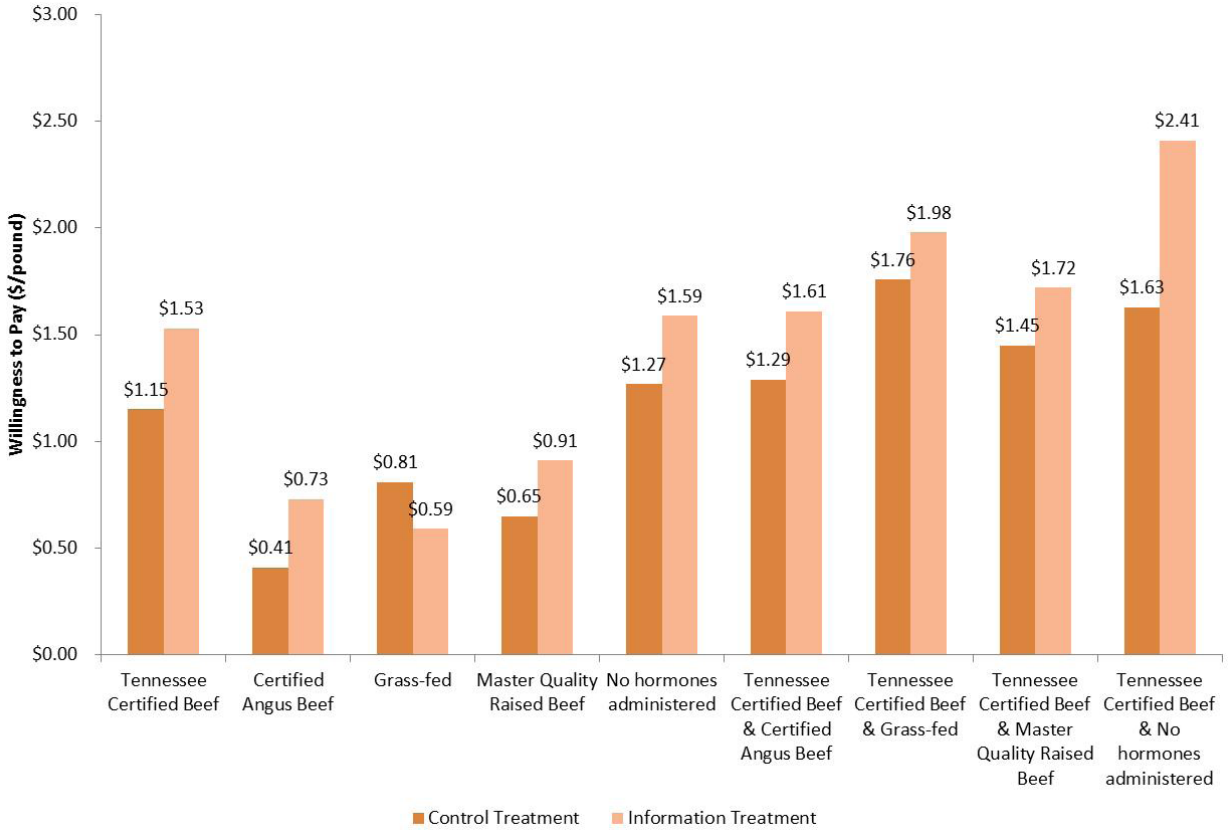


Figure 4. Willingness to pay for USDA Choice ground beef (85% lean/15% fat)

willing to pay a higher premium than the uninformed consumer in the case of all labels except the grass-fed label by itself.

As shown in Figure 4, there was a significant positive WTP for all of the interactions between TCB and the other attributes. The highest WTP for all of the interactions was for TCB and no hormones administered ($2.41/lb in the Information Treatment), followed by TCB and grass-fed ($1.98/lb in the Information Treatment). The smallest interaction premium was between TCB and CAB ($1.29/lb in the Control Treatment), followed by TCB and MRQB ($1.45/lb in the Control Treatment). Also, the informed consumers indicated a higher WTP than the uninformed consumers in the case of each of the interactions for ground beef. The largest increase in WTP with the interaction of TCB across information treatments was for the interaction with no hormones administered ($0.78/lb) and the smallest was for TCB and grass-fed ($0.22/lb). These results suggest consumers greatly value a combination of TCB with no hormones administered, especially when provided with information about these labels.

Conclusions

Consumers' desire to know how their food is produced is increasing. There is also a strong sentiment from some consumers concerning local foods. Though many Tennessee cattle producers participate and become certified in educational programs such as Beef Quality Assurance (BQA) and Advanced Master Beef Producer (AMBP), it is unlikely many consumers are aware of the certifications earned by many Tennessee cattle producers.

To aid in cattle farmers making the decision of finishing cattle to supply beef into local foods markets, it is helpful to know whether consumers would pay a premium for these products. The goal of this study was to determine how much consumers were willing to pay for beef products labeled as Tennessee Certified Beef (TCB), Master Quality Raised Beef (MQRB), and other attributes that could appear with TCB and MQRB labels. Results indicate Tennessee beef consumers would pay a premium for a TCB product. Steak consumers placed the greatest premium on TCB and would also pay a premium for beef raised by AMBP- and BQA-certified Tennessee cattle producers.

Consumers were willing to pay more for TCB and MQRB when information about the programs was provided, which suggests the premium consumers are willing to pay would increase if label information was provided. This result suggests the potential importance of labels, pamphlets or other informational programs explaining what the programs are and what the labels mean. For steak and ground beef, a combination of TCB and the MQRB program resulted in increased willingness to pay (WTP), suggesting consumers place additional value on beef certified under these programs.

Consumers positively valued the attribute "no hormones administered," resulting in the second-highest premium for steak and the highest premium for ground beef, regardless of whether the USDA definition was provided. This result demonstrates the importance consumers place on the no-hormone-administered label and warrants producer evaluation of this production practice when marketing beef and when labeling beef items.

Consumers also placed a high value on products carrying both the TCB and the grass-fed labels. However, the grass-fed attribute individually garnered some of the lowest premiums. Such a finding could mean consumers who prefer locally raised beef from Tennessee also prefer grass-fed beef. From a labeling standpoint, producers of grass-fed beef would likely experience increased premiums when also including the TCB label.

This study provides valuable consumer information concerning the feasibility of a Tennessee Certified Beef Program. However, it is also important to evaluate the feasibility of producing TCB from a producer standpoint because producers are not likely to participate if the estimated premiums do not meet or exceed the additional production and management costs. It may also be beneficial to determine the best method to educate consumers regarding label definitions and to promote certification programs since the definitions and program awareness typically increased consumer WTP.

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Appendix A

Definition of Beef Labels Used in Survey

Tennessee Certified Beef: Animal was born, raised and harvested in Tennessee and graded USDA Choice or Prime.

Master Quality Raised Beef: Indicates that beef purchased originated from cattle that were raised throughout their entire lifespan by farmers who are certified in the following two programs: (1) Advanced Master Beef Producer Program (AMBPP), and (2) Beef Quality Assurance (BQA) Program:

> ***AMBPP:*** Educational program provided by the University of Tennessee designed to help cattle farmers improve cattle health management and cattle farm profitability. This program is open to any cattle farmers in the United States. The AMBPP certification is given to producers who complete the program.
>
> ***BQA:*** Nationally coordinated, state-implemented program that provides systematic information to U.S. beef producers and beef consumers of how common husbandry techniques can be coupled with accepted scientific knowledge to raise cattle under optimum management and environmental conditions. BQA guidelines are designed to make certain consumers can take pride in all beef they purchase — and can trust and have confidence in the entire beef industry.

Certified Angus Beef: USDA graders inspect black-hided cattle (typical of the Angus breed) and give it a grade. All beef considered for the brand must grade in the top two-thirds of Choice or Prime.

Grass-Fed: Indicates that the animal was fed only grass and forage.

No Hormones Administered: The term "no hormones administered" may be approved for use on the label of beef products if sufficient documentation is provided to the USDA by the beef producer showing no hormones have been used in raising the animals.

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