

U.S. CONSUMER ACCEPTANCE AND VALUE OF BEEF FROM VARIOUS COUNTRIES OF ORIGIN

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Background

With the increasing trend of global trade, more meat products from various countries are imported into the United States. Imported meat may include grain-finished or grass-finished beef, depending on the country of origin. Flavor differences may exist because of the different production systems and different lengths of cooler aging.

Objectives

This research was conducted to determine sensory differences and U.S. consumer value of domestic grain-fed beef steaks compared to steaks from grass-fed beef in Australia and grain-fed beef in Canada.

Methods

Fresh (unfrozen) Australian grass-fed and Canadian AAA beef strip loins (IMPS #180) were purchased from a beef importing company and domestic strip loins were purchased from a commercial meat plant in Nebraska. The domestic strip loins were aged for 8 to 11 days - the average time for fresh beef to get from the packing plant to the meat counter. The Australian grass-fed strip loins were aged for 67 to 73 days and the Canadian strip loins were aged for 24 days.

The strip loins were cut into 2.5-cm thick steaks. The first steak was utilized for marbling score and proximal analysis. The second steak from the anterior end of the loin was used to determine Warner-Bratzler shear value. The third and fourth steaks were evaluated by the taste panels. The remaining steaks were sold frozen in an auction to the consumer panelists.

Two pairs of loins were compared by each taste panel: 1) Australian grass-fed versus domestic and 2) Canadian versus domestic. To the extent possible, steaks were paired to similar Warner-Bratzler shear force and visual marbling score to reduce variation within the pair.

Taste Panels: Steaks were broiled to 70 C, cut into cubes, and held in a double broiler for < 20 min until served. Samples were rated on an eight point hedonic scale, where 1 = extremely undesirable and 8 = extremely desirable. One sample from the pair was served and evaluated for desirability of flavor, juiciness, tenderness, and overall acceptability. The second sample of the pair was then served and evaluated for sensory traits. After both samples had been evaluated for sensory traits, the panelists then submitted a written, sealed bid for each steak. Taste panels (12/city) were conducted in Chicago, IL and Denver, CO. A total of 273 panelists participated.

Auction Procedures: Panelists were paid \$50 to participate. They were not required to bid; however, if panelists won the auction, they were required to buy the beef. The steaks were taken from the same strip loin as the taste sample. A reference price of \$7/lb was given prior to auctions.

An nth price Vickery auction (n = 2, 3, or 4) determined the purchase price, or the amount the winner(s) paid, for the steak. This auction procedure encourages participants to bid what they truly value the meat to be.

Results and Discussion

Although there were no differences in shear force between the pairs, consumers rated domestic beef significantly higher ($P < .01$) than Australian grass-fed beef for desirability of flavor, juiciness, tenderness, and overall acceptability (Table 1). The largest sensory difference for the Australian and domestic pair was flavor. Consumers' comments frequently included reference to off-flavors and off-odors, possibly due to the longer aging periods for the Australian samples. The diet of the animal also influences the flavor of beef. Due to the overwhelming predominance of corn-fed beef harvested in Nebraska packing plants, the domestic strip loins were assumed to be corn-fed, possibly influencing the preferred flavor of the domestic steaks. Even though marbling score was matched as closely as possible, the average percent fat for Australian samples was 2.46% less ($P < .01$) than the average domestic samples, which may have influenced higher juiciness scores for domestic samples.

Consumers placed a significantly higher ($P < .01$) value on domestic samples than Australian samples. On average, consumers were willing to pay \$3.68/0.45 kg for domestic steaks, while Australian steaks were valued at \$2.68/0.45 kg. When consumer preference was defined as the highest overall acceptability score within a pair, a majority of the 273 consumers preferred domestic to Australian grass-fed samples. More consumers favored domestic (64.5%) than Australian grass-fed (19.0%) beef; while 16.5% of the consumers preferred neither sample. Consumers were willing to pay significantly for their preference, whether Australian grass-fed or domestic samples (Table 2).

Ratings for desirability of domestic beef flavor, tenderness, and overall acceptability were significantly higher ($P < .005$) than Canadian beef (Table 1). The difference in value between domestic and Canadian samples was not as great as between domestic and Australian samples. Consumers valued domestic beef at \$3.95/0.45 kg, while \$3.57/0.45 kg was the average bid for Canadian samples. When consumers were divided according to preference (Table 2), 44% of the consumers preferred the domestic samples, while 29.3% favored the Canadian samples; 26.7% of consumers had no preference. Consumers were willing to pay significantly more for their preference.

Conclusions

United States consumers favor domestic beef compared to Australian grass-fed or Canadian beef. Overall acceptability ratings and willingness-to-pay for domestic beef were significantly higher than Australian and Canadian beef samples. Different feeding regimes of the countries, various aging periods, or cattle breed may impact the flavor and overall acceptability for Australian grass-fed and Canadian samples. Since a steady supply of corn-fed beef is available to most consumers in the United States, consumers may have become accustomed to and prefer the flavor of corn-fed beef.

Table 1. Taste panel ratings^a for domestic, Australian, and Canadian strip steaks matched by shear force and marbling

Comparison	Flavor	Juiciness	Tenderness	Overall Acceptability
Australian	4.58 ^c	4.49 ^c	4.38 ^c	4.34 ^c
Domestic	5.67 ^b	5.20 ^b	5.17 ^b	5.37 ^b
Canadian	5.64 ^c	5.36	5.37 ^c	5.49 ^c
Domestic	5.94 ^b	5.53	5.67 ^b	5.79 ^b

^a Taste panel scores were based on an eight-point hedonic scale, where 4 = slightly undesirable, 5 = slightly desirable, and 6 = moderately desirable.^{b,c} Means within a column and a comparison with different superscripts differ ($P < 0.01$).Table 2. Bids from consumers^a with different preferences for domestic, Australian grass-fed, and Canadian steaks

	Preference		
	Australian (\$/0.45 kg)	Domestic (\$/0.45 kg)	No Preference (\$/0.45 kg)
Australian	3.53	2.03	3.12
Domestic	2.15	4.26	3.05
Difference	1.38	-2.23	0.07
Significance	.01	.01	.85

	Preference		
	Canadian (\$/0.45 kg)	Domestic (\$/0.45 kg)	No Preference (\$/0.45 kg)
Canadian	4.57	2.85	3.67
Domestic	3.20	4.48	3.92
Difference	1.37	-1.63	-0.25
Significance	.01	.01	.29

^a Consumers ($n=40$) who bid \$0 for all samples were removed from the bid data set. Preference based on overall acceptability ratings.