



Natural Beef: Consumer Acceptability, Market Development and Economics

A Community Based Demonstration to Evaluate the Efficacy of Direct Marketing of Forage Fed Beef

A Community Based Food System Introduction:

The feeding of high energy, grain based diets to beef animals prior to marketing is a relatively new phenomenon. Prior to World War II, beef was primarily finished on forage. Beef animals were developed relatively slowly on forage based diets, were significantly older at slaughter, and aged post-mortem to enhance tenderness (Taylor, 1994). The majority of these animals were marketed through small, community based packing plants, with the financial rewards for the production and marketing of the product remaining in the local economy.

Significant advances in the production of grain resulted in a massive surplus of feed grains. Concurrently, rising consumer incomes provided additional disposable income and a greater consumer demand for a high quality, palatable beef products. These factors, along with other technological advances, led to the development of a massive feedlot industry in the United States, and a packing and distribution system designed to accommodate large volumes of grain fed cattle.

Presently, the cost of feed grains has dramatically increased resulting in exorbitant costs of grain for cattle fed high concentrate diets. Due to the rising cost of concentrate based diets, there has been a renewed interest in evaluating forage fed beef. The literature on feeding cattle indicate that beef carcasses do not normally attain the USDA Choice quality grade, when finished on forage (Carpenter et al, 1969). Flavor, overall palatability and tenderness of forage finished beef is less desirable than that of grain finished beef when evaluated by trained sensory evaluation panels (Bowling et al., 1977; Wanderstock et al., 1948; Wheeling et al., 1975). However, Bowling et al (1977) demonstrated no differences in cooking loss, juiciness or cooking time, when forage and grain fed beef had similar levels of marbling. Additionally, Savel et al (1975) found that tenderness of lower quality grades can be made comparable to the Choice grade, via mechanical (blade) tenderization.

It is interesting to note that all of these data pertaining to palatability characteristics of forage fed beef were done utilizing trained sensory evaluation panels rather than consumers. There are very few studies evaluating the flavor of forage fed beef by consumer panels (Bidner, 1975; Malphrus et al., 1962; Schupp et al., 1976). Schupp et al (1976) reported that a consumer panel could not determine a difference in flavor of beef from animals fed a grass diet, a combination of grain and grass, or a traditional grain feedlot diet. In addition, the research regarding forage feeding and acceptability of the resulting product predates the growing consumer emphasis on natural, lower fat products.

Currently, producers in Wisconsin are demonstrating the potential for increased use of pasture in finished cattle (Beef, 1996). Berry et al (1973), reviewed the known practices of forage feeding beef in order to reduce grain consumption. However, all of these approaches involve use of concentrates (grain) in conjunction with the pasture/forage feeding. In Missouri, SARE has funded projects which demonstrate the favorable economic returns of forage feeding (ANC94-21 and LCN94076). These studies occur on perennial pastures with stockpiled forage and do not address potential market development. This study evaluated the efficacy of finished cattle on extensive annual rangelands, and focused on characterizing and developing a potential market for Northern California producers who have limited marketing alternatives.

Indeed, over the last twenty years the beef packing industry has become highly concentrated with over 70% of the industry owned by three corporations (USDA, 1995). This has resulted in significant concern regarding the potential for monopolistic control of pricing and supply to both producers and consumers. Small, local packing facilities have been eliminated from rural communities. Additionally, the concentration of cattle in semi-confinement (feedlots) has raised issues regarding waste management and water quality.

Because of packer consolidation, the small and mid-size family rancher has limited marketing options. This factor, coupled with other severe economic pressures, has caused an exodus of producers from the business. Ranchers often find themselves in the real estate business, selling small parcels of the ranch as Aranchesettes. This certainly disrupts a stable base of family ranches to sustain the community, as well as negatively impacting wildlife habitat, air, and water quality.

Concomitantly, beef has lost significant market share to poultry and pork, since the mid 1970's (USDA, 1995). The decline in demand can be attributed to numerous factors including changing lifestyles, an awareness of fat in the diet and rising concerns regarding unnatural products, such as anabolic steroids and antibiotics. Forage fed beef may offer an alternative to those consumers who have reduced or eliminated beef from the diet as a direct result of those concerns.

At the present time, there are no major beef packing facilities in Northern California and the supply of feed grains is limited. Yet there is an abundant supply of feeder cattle that are purchased from California producers (for a significant discount), and then sent to the midwest for the feedlot phase, processing, and then shipped back to California for retail. This is an inherently inefficient, energy expensive process, which requires significant investment in fossil fuels. Development of a natural beef market would create more direct and beneficial links between ranchers and consumers and significantly reduce resources used to move food between production and consumption.

Establishment of a Rancher to Consumer Natural Beef Market would potentially address many of the health concerns of consumers, environmental concerns regarding the feedlot industry, significantly reduce the energy use by the beef industry, and protect open space by reducing the economic incentive to subdivide land. In addition, the local community will benefit by retaining jobs and financial capital. The diversity of the northern California population, where the urban/rural interface provides a dramatic contrast, provides a logical site to determine the potential for development of a community based, natural beef market.

The objectives of this demonstration/research are to:

1. Determine the consumer acceptability of forage fed, blade tenderized beef, developed on California rangelands without exogenous anabolic steroids, or subclinical use of antibiotics.
2. Characterize the demographics of the potential market in Northern California.
3. Determine the economic feasibility of the development of a natural beef market, emphasizing costs and returns to producers in contrast to current marketing systems.
4. Develop a rancher to consumer marketing plan for Natural Grass Fed Beef.

Procedures: A pilot study was conducted in the summer of 1996 to evaluate consumer acceptance of grass fed, tenderized beef. Three groups of 10 cattle (n=30), were delivered to the California State University, Chico Meats Lab for processing. Cattle were individually identified, weighed and filmed in order to facilitate tracking of the product. The cattle represented different sexes, breed types and live weights (Table 1).

Table 1. Sex, weight and breed distribution of the Forage Fed cattle.

Group	Live wt	Breed	Sex
1	912	Ang x Hereford	Heifer
2	1031	English X	Steers
3	1023	Beefmaster	Heifers

Subsequent to a 24 hour chill, carcasses were graded using standard USDA methodology for quality and yield (USDA, 1989). Additionally, cattle were scored for lean color, fat color and lean texture (Table 2).

Table 2. Fat color, lean color and lean texture scale.

Fat Color	Lean Color	Lean Texture
1 = White	1 = Pink	1 = Very Fine
4 = Yellow	8 = Very Dark Cherry Red	5 = Very Coarse

Subsequently, the carcasses were delivered to Jack's Wholesale Meats in Red Bluff for processing to the retail level. Wholesale cuts were tenderized using Ablade tenderization, a mechanical tenderization procedure. All product that was not tenderized was ground into 90% lean ground beef.

Samples of each carcass were transported to the UC Davis meats lab for tenderness evaluation by use of a Warner-Bratzler Shear Force technique (AMSA, 1978) and by myofibrillar fragmentation.

Retail product was merchandised through Jack's Meats at Red Bluff, and via e-mail to the campus community in Chico. As the product was purchased, consumers were asked to complete and return a survey evaluating the palatability of the beef.

Results

USDA grades, weight and carcass traits for the three groups of cattle are reported in Table 3.

Table 3. Carcass traits of forage fed beef.

Group	Live Wt.	C. Wt.	Dressing%	12th Rib fat	%KPH	YG Marb. QG	
1	912	484	53.1	.11	9.1	.8	1.8
2	1031	597	58.0	.12	12.0	1.3	1.5
3	1023	496	48.5	.11	10.4	.4	1.5

Literature Cited:

AMSA, 1978. Guidelines for cookery and sensory evaluation of meat. American Meat Science Association and National Livestock and Meat Board, Chicago, IL.

Beef. *All the way on grass*. p. 14. June, 1996.

Bidner, T. D. 1975. A comparison of forage finished and grain finished beef. Proc. 28th Annual Recop. Meats Conf., Am. Meat Science Assoc., p. 301. National Livestock and Meat Board, Chicago.

Bowling, R. A., G. C. Smith, Z. L. Carpenter, T. R. Dutson and W. M. Oliver. 1977. Comparison of forage finished and grain finished beef carcasses. *J. Anim. Sci.* 45:209.

Carpenter, J. C., Jr., R. H. Klett and S. Phillips. 1969. Producing slaughter steers with temporary grazing of crops and concentrates. *LA Agr. Exp. Sta. Bull.* 643.

Malphrus, L. D., Edwards, R. L., Kropf, D. H., and Marbut, M. 1962. Consumer preference for beef produced on grass and grain or in a drylot---A comparison. *Bull.* 499, S. Carolina Agric. Exp. Station, Clemson.

Savel, J. W., Z. L. Carpenter and G. C. Smith. 1975. Mechanical tenderization of three kinds of beef. *J. Anim. Sci.* 42:252 (Abstr.).

SARE, 1996 Project Highlights.

Schupp, A. R., T. D. Bidner, W. McNight, J. Carpenter, and D. Smith. 1976. Consumer acceptance of forage finished and limited grain finished beef. Phase I. Res. Rept. 503. Louisiana State Univ., Baton Rouge.

Taylor, R. E. 1994. *Beef Production and the Beef Industry*, 2nd edition. MacMillan Publishing Co., New York.

USDA. 1989. Official United States Standards for Grades of Carcass Beef. Agric. Marketing Service, USDA, Washington, DC.

USDA. 1995. *Livestock and Poultry Situation and Outlook Report*. Washington, DC.

Wheeling, M. R., B. W. Berry and J. A. Carpenter, Jr. 1975. Effects of breed and forage vs. grain feeding on beef palatability

and shelflife. Proc. West. Sect. Amer. Soc. Anim. Sci. V:26.

Wanderstock, J. J. and J. L. Miller. 1948. Quality and palatability of beef as affected by method of feeding and carcass grade. Food Res. 13:291.

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