

Best Management Practice Considerations for Alternative Feeding Operations

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The increasing popularity of the locally-grown foods movement has many producers investigating the production efficiency, management adaptability, and consumer willingness to pay for meat products produced from animals that were reared using all-natural and/or forage-based systems. For consumers who desire these products, several intrinsic characteristics (nutritional value, visual appearance, palatability) and extrinsic factors (price, origin, type of production system) influence their meat purchasing decisions (Grunert et al., 2004). The importance of consumer perceptions cannot be ignored, as the 2010 National Meat Case Study (Sealed Air Corporation, 2010) reflects the importance of information, and reported that from 2007 to 2010, on-pack nutrition labeling increased from 57% to 61% of products, and ground beef nutrition labeling increased 4 percentage points from 77% in 2007 to 81% in 2010. Furthermore, the top production claims, from the total percent of all meat packages, were minimally processed (27.2%), hormone free (15.5%), antibiotic free (4.7%), and vegetarian fed (3.9%) (Sealed Air Corporation, 2010).

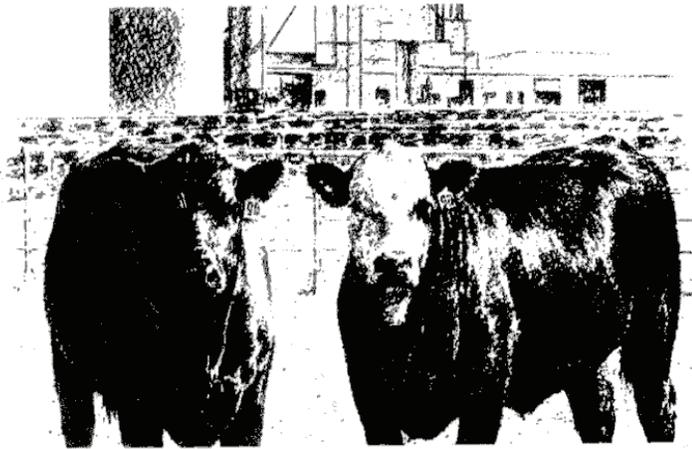
However, production systems and feedlot nutritional programs vary widely in the beef industry. Developing feeding strategies to produce economically viable and consumer acceptable beef is critical to the advancement of the added-value beef industry. The diversity of genetics in the dairy and beef industries necessitate that a variety of growing management programs be investigated, as well as varied finishing programs, as the appropriate market weight for a Holstein steer may be several hundred pounds higher than that of an Angus heifer. It is critical to realize that when considering the high-end consumer market potential, an animal's fat characteristics become important, and these vary with the consumer group being targeted. In the meat industry, consumer acceptance and desires are driving forces, and palatability refers to a consumer's overall perception of taste, tenderness, juiciness, flavor, and mouth feel. When considering the production of beef for the high-end or health-conscious consumer market, several factors become important: cost of production, the consumer segment being targeted, meat characteristics desired, fat characteristics of the product, and most importantly the access to meat processing and market outlets that will allow for the business to be profitable. For example, as Gwin (2009) points out, while there is a consumer market who desires grass finished beef, there are major structural issues for smaller scale producers including the scarcity of appropriate and accessible processing facilities, and the access to capital

to cover start-up costs during the early years of an operation.

Livestock production is an important component of a sustainable agriculture system. Forage-based livestock operations are economically profitable and can improve the environmental quality of the natural resource base used for agricultural production (Crosson et al., 2006). However, forage-fed, or grass-fed, animals do not fit into the commercial marketing structure of most large-scale processing facilities, and if a premium is desired, the producer must be responsible for the direct marketing of the animals to the end user, in most instances. However, direct marketing of meat, due to public health and safety regulations, must involve meat processors, and will demand that producers accept the responsibility of marketing their products to consumers. To be successful, producers exploring direct-marketing opportunities for their meat must first assess the willingness of local meat processors to provide products in the desired form, and in a timely manner.

For these reasons, most producers targeting the all-natural or local foods markets are using a growing diets, either on pasture or in confinement, and finishing diets that are still based on grains and grain byproducts. In these systems, the most critical management area is animal health. All-natural programs do not allow for feed-grade antibiotics to control internal parasites, improve efficiency, or reduce metabolic disorders, and they do not allow animals that have been treated with an injectable antibiotic to be marketed through their programs. Management for these markets starts with nutritional programs that boost the immunity of the calf, from the neonatal period through high-quality colostrum. This can have impacts on animal health, growth rate, feed efficiency, and marbling as an animal's passive immune transfer, at birth, may be an important factor in an animal's susceptibility of bovine respiratory disease (Galyean et al., 1999). Since respiratory disease impacts growth, meat characteristics, and marbling, management and nutrition practices that keep cattle from becoming sick is very important, because diagnosis of cattle with respiratory diseases is very difficult. Gardner et al. (1999) reported that lung lesions from respiratory disease at weaning were present in 33% of their steers at harvest. Steers with lung lesions had lower average daily gains, lighter carcass weights, deposited less internal fat and marbling, and had less tender steaks than animals without lung lesions. This emphasizes the need to carefully monitor individual cattle, and to manage cattle in a way that prevents disease outbreaks. Research at MARC (Wittum et al., 1996) found that 35% of 469 steers in one

study were treated for a respiratory disease episode between birth and harvest. In their study, 78% of treated cattle had lung lesions at harvest, and 68% of untreated cattle had lung lesions at harvest. While both groups had high percentages of lung lesions, the authors concluded that if an animal was sick enough to be identified as having a respiratory illness and treated, performance reducing lung damage had already occurred. If a calf gets a respiratory disease, tissue damage occurs, and nutrients are diverted from lean growth and marbling toward repair of the damaged tissue. Therefore, to insure that an animal's health and management history did not limit its ability to deposit marbling or to grow to its potential, individual animal identification, management, and marketing should be practiced.



Pre-weaning programs are becoming standard in alliance programs, but many cow-calf producers do not have appropriate confinement facilities to contain, and manage, calves for long periods of time. The ultimate goal of a weaning management strategy should be to avoid stress on the calf, as stress increases sickness. In recent years, fence-line pasture-weaning strategies have allowed producers to wean calves on pastures, in a familiar environment. In this weaning management strategy, calves and cows have nose-to-nose contact, as well as visual and auditory access, but suckling is not possible. A great deal of research has been done with fence-line weaning over the past 15 years, and one of the major findings is that the calves are more attached to their dams than the dams are to their calves, as long as the dams have visual contact. Therefore, what a producer must have is a good fence that calves won't try to go through, and one that will not cause damage to them, if they do. Woven wire would be the first choice, with good high-tensile fence being the second choice. However, barbed wire would not be recommended. Also, since calves tend to walk the perimeter of a field after weaning, smaller fields work better than larger fields. A weaning pasture of approximately 5 acres is satisfactory. Boyles et al. (2007) conducted a trial to evaluate weaning management strategies and the ultimate impact on calf health. Three weaning strategies were investigated: 1) weaned at trucking, 2) weaned 30 d before trucking and

confined in drylot, and 3) weaned 30 d before trucking and pastured with fence-line contact with their dams. Steers from the drylot weaning strategy lost 0.6 kg/d the first week in the feedlot, whereas steers from the truck weaning and pasture-weaning treatments gained 0.5 and 0.4 kg/d, respectively ($P = 0.01$). Weaning effects on incidence of morbidity also were detected ($P = 0.03$), with only 15% of the pasture weaned calves requiring treatment for respiratory disease. This incidence was doubled for truck-weaned calves and nearly 2.5 times greater for calves weaned in drylot' (Boyles et al., 2007).

Grass finishing systems present unique problems in areas of the United States that deal with keeping cattle growing during the winter without access to pasture. If cattle are not gaining weight, then the connective tissue in the muscle becomes mature, and the meat becomes tougher. The reason this occurs is that the main component of a muscle's connective tissue is collagen, a protein. Proteins are constantly broken down (catabolism), and re-built (anabolism), and the maturity of the connective tissue is the result of these two processes. If an animal's growth slows, then the protein turnover slows, and the age of the collagen in the muscle is older. This is one of the reasons why meat from grass-fed cattle is sometimes found to have a higher Warner-Bratzler shear force than meat from grain-fed cattle. Usually, grain-fed cattle are growing at a faster rate resulting in more soluble collagen, as well as their being harvested at a younger chronological age which results in less collagen cross-linking, resulting in more tender meat products. Nevertheless, there are consumers that prefer this type of sustainable rearing system and thus have a preference for forage based food animal products (Umberger et al., 2002, Umberger et al., 2009). Umberger et al. (2002) reported that 23% of participants in a consumer panel preferred grass fed beef and would have been willing to pay a high price for this type of product. Once again, this is a production system that necessitates a targeted marketing approach.

One of the management issues with all-natural beef production is finding those products that result in an enhancement in animal health with a corresponding improvement in feed efficiency, but which comply with the non-antibiotic claims in the product. When producing beef for all-natural markets, one of the major nutritional concerns is the inability to use ionophore antibiotics such as Rumensin® or Bovatec® to improve feed efficiency and reduce lactic acidosis. However, there are products on the market that can replace some of the efficiencies lost when ionophores are not used. Amaferm® is an all-natural product that has been reported to stimulate the growth of, and lactate uptake by, *Megasphaera elsdenii*, the predominant lactate utilizing ruminal bacteria, potentially providing a means to reduce the economic losses associated with feeding high-concentrate diets that are caused by lactic acidosis. (Waldrip, H.M. and S.A. Martin. 1993). When digestibility is enhanced, and lactate in the rumen is decreased, an improvement in feed efficiency may result. Amaferm addition to the diet resulted

in a 7.2% improvement in feed efficiency in steers fed a 76% dry corn diet in a 150 day finishing study (Zerby et al., 2011). One of the management issues with all-natural production is finding those products that result in an enhancement in animal health with a corresponding improvement in feed efficiency, but which comply with the non-antibiotic claims in the product.

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