

FUTURE CHALLENGES FACING THE BEEF INDUSTRY

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INTRODUCTION

Today's beef producers face many future challenges which is not new to them. But, some of the problems are more serious since global problems now have more influence on the total beef system. Moreover, consumers are having a greater influence on the beef products they desire. This in turn is causing changes in beef production, processing, retailing and marketing.

The National Cattlemen's Association Task Force reported that in 1988, 6.7% of beef cow operators owned 45% of the inventory; 1.4% of the feedlots fed 71% of the cattle; and the four largest beef packers slaughtered 69% of the fed cattle, and merchandised 82% of the boxed beef (Pryor, 1990). This trend to larger and fewer operators in all phases of the beef business indicates that competing in the 1990's will not be easy and will require greater efficiency and use of the latest technology available.

Per capita consumption of beef increased 46% from the year 1959 to 1976 (Pryor, 1990). But, since then it has decreased to a level close to the level in 1959. Oklahoma studies by J.N. Trapp and J.E. Ekerd showed that consumer preference for beef, pork and chicken has not changed. Poultry consumption has increased at the expense of beef because of its lower price relative to beef. Therefore, beef production efficiency must increase, if beef consumption is to recapture some of its lost market.

EFFICIENCY THE KEY TO THE FUTURE

It is essential that beef producers become more efficient. Many are not concerned about efficiency because they can still produce more beef than the present market can absorb. This thinking carries over to some University Administrators who have decreased what is sometimes called "production research." As a result, the beef industry is not increasing production efficiency as much as is needed.

The U.S. auto industry felt the same way some years ago. They could produce more cars than the market could absorb, so production efficiency was neglected. Then foreign auto makers started making inroads into the U.S. sales market because their product was produced more efficiently and quality was also improved. This caused the U.S. auto industry to quickly re-evaluate their situation and to start increasing efficiency and quality of their cars. This was and will continue to be necessary to meet foreign competition and to survive as a viable industry.

The beef industry faces a similar situation and needs to push aggressive research and education programs to increase efficiency and quality of production.

The calf crop is still about 70 to 80% depending on whose estimate one uses. It should approach 95 to 100% or even higher as twinning is developed to a higher level of attainability. The objective should be to have first calf heifers breed back at the same rate as the older cows in the herd. A cow that does not calve may take the profit of 2 or 3 cows that do. Weaning weights of calves average about

40% of the cows weight and one should strive for 60 to 70% which is occurring with some cows including some in University of Florida herds (Cunha, 1989a).

It usually takes 8 to 9 lbs. of feed per pound of gain in the feedlot, but the goal should be 6 to 7 lbs. Seven pounds of feed per pound liveweight gain was accomplished consistently in the 1970's with young, healthy feeder cattle at the North Florida Research and Education Center at Quincy by F.S. Baker (1991).

Too many cattle have more than 0.5 inch (sometimes more than 1 inch) of rib-eye fat whereas choice cattle should be produced with 0.2 to 0.3 inches of fat over the rib-eye area. The goal should be to produce Yield Grade 2 carcasses and as many as possible in Yield Grade 1. Excess trimable fat greatly decreases production efficiency since fat contains about 90% dry matter whereas lean tissue has about 30% dry matter. This means it takes about three times as much feed to put on a pound of fat as it does a pound of lean tissue. So, no more fat should be put on than is necessary to optimize carcass and beef eating quality. This means slaughtering cattle at the optimal slaughter weight for the kind of cattle involved.

Efficiency should not be confused with overproduction. Efficiency means producing at maximum genetic potential and at the least cost possible. Moreover, the cattle should produce the kind and quality of beef desired by the consumer. The Florida Beef Cattle Improvement program is helping the Florida cattle industry but has not yet heavily penetrated the commercial herds (Sand, 1991). More producers need to take advantage of this program.

In 1950, poultry was selling for about 80% the price of beef. Today, poultry is selling at about 30% the price of beef. This has occurred because of the increase in efficiency of producing poultry as compared with that in

the beef industry (Cunha, 1989a). It is apparent, therefore, that in order for beef to meet the challenge of the poultry and other industries it must place greater emphasis on increasing efficiency.

In the future, the efficient beef animal is one that reproduces at a high rate, weans a heavy calf and performs to its full genetic potential at the least cost possible. Moreover, its offspring should have the correct combination of gainability, feed efficiency, cutability, eating quality and little or no excess fat. This will require the use of the latest technology as well as new findings as they occur. A few producers have already accomplished this, but the great majority have not. They need to do so in order to survive future competition and to retain their fair share of the consumer dollar.

OPTIMAL SLAUGHTER WEIGHT

Fortunately, it is cheaper to produce leaner beef than beef with excess fat. To help accomplish this, cattle need to be slaughtered at their "optimal slaughter weight." Table 1 provides a good example to show what happens when cattle are fed beyond their optimal slaughter point.

The data in Table 1 show that more than 3 times as much separable fat as separable lean tissue was being deposited in the carcass gain from the 126th to the 168th day in the feedlot. With fat requiring about 3 times as much feed as lean tissue, it is apparent why gains slowed down and why it is inefficient, costly, and undesirable to keep cattle in the feedlot beyond the time when there is enough fat deposited for optimum carcass quality as well as eating quality at the optimal slaughter point. This point will vary depending on the breeding make-up of the cattle, the kind of ration fed and the market requirements of the animals.

NEW BEEF PRODUCTS NEEDED

The poultry industry has led the way in new product development. They are available in attractive packages to satisfy the needs of all consumers, including those with a "beer pocketbook" and "champagne tastes" for animal products. The beef industry needs to develop new products of varying size, leanness, tenderness, shelf life, and cost to meet the needs of all consumers with varying tastes, family needs, religious preferences, and purchasing power. The lower priced parts of the carcass can especially be used to develop new restructured and appetizing beef products to fit the needs of the consumer with a beer pocketbook (Kaufman and Breidenstein, 1983).

In addition, new and innovative processing, packaging, and distribution methods need to be developed including those not requiring refrigeration. This would broaden the use of beef and especially in the developing countries where refrigeration is virtually non-existing and where the beer pocketbooks are the most numerous (Kaufman and Breidenstein, 1983).

Many U.S. industries are developing other sources of protein which are competing with the animal products market. Some are sophisticated industries with highly trained personnel using the latest technology, and generating some of their own, to develop new products. This challenge must be met with increased efficiency and with new beef products.

In creating new beef products, there should be cooperation between the University scientist, the private food industry and consumers to best ensure that the products developed will find a consumer market. The goal should be not to expect consumers to change, which takes a long time, but rather to change beef products to meet consumer needs.

INTERNATIONAL INFLUENCE

Agriculture is becoming more international and complex and there is need to think in global terms when planning ahead. In the future, markets will be increasingly international in scope. What is occurring abroad affects what happens here. So, the beef industry must be aware of the world situation and amenable to change when it is warranted. The beef industry is well positioned to compete but many changes will be needed to maintain and improve the U.S. position in efficiency and quality of production.

Foreign countries have access to the same scientific knowledge we do. With today's computer, electronic and communications technology, some of the advantages the U.S. used to have are diminishing. Some countries also have cheaper labor and other lower production costs. Foreign countries are becoming stronger competitors as their research and the application of new technology grows. So, the U.S. beef producer must be mindful of foreign competition and do everything possible to meet this challenge.

DEVELOPING INTERNATIONAL MARKETS

Foreign demand for U.S. beef is on the rise and there are indications it can continue expanding. This market would expand more if new low cost beef products not requiring refrigeration can be developed since refrigeration is virtually non-existent in the developing countries. But, many problems are involved in developing foreign markets which include export and import restrictions, quotas, fund availability and restrictions on its use, money exchange rates, agricultural subsidies in major food producing countries and a myriad of other factors which limit beef exports.

More expertise is needed by those involved in foreign market development. This

requires not only training in the food products involved, but foreign language capability as well as some expertise in the countries involved, their culture, food preferences, purchasing power and the kind of food products required to meet their needs.

John Lacey, President of NCA, stated some of the major markets for beef export expansion include Japan, Korea, Philippines and other Pacific Rim nations. Other possibilities include Mexico, Latin America and Eastern Bloc countries as well as others (Pryor, 1990). But, it will require a can-do attitude and expertise to sustain and increase these export markets.

IMAGE CORRECTION

The beef industry faces an image problem. Since 1950 they have had to live under the unfair accusation that consuming beef and other animal products is detrimental to human health because of the cholesterol and saturated fat they contain. This accusation has been repeated so often in the media that it has become accepted by the consuming public as factual. But, it is not true, and fortunately, the beef industry is now using their own funds to improve the unfairly tarnished image of its beef products. But, a long term effort is needed since it will take a long time to convince many consumers that beef is good for human health.

Beef produced today is much different than 40 years ago and is much lower in fat, calories and cholesterol. During the past few years, there has been a 10% drop in fat in ground beef, which accounts for 40 to 45% of total U.S. beef consumption (Savell and Cross, 1988). Hamburger is now available with 15, 20 or 30% fat. Many supermarkets are now trimming outside fat to about 1/8 - 1/4 inches (Cunha, 1989b). There has been an approximate 25% decrease in the amount of separable fat in retail cuts in the last 2 years (Savell and Cross, 1988). During the 30 year

period from 1950 to 1980, fed cattle produced 75 lb. more edible beef per head (Kaufman and Breidenstein, 1983). These are only a few examples of the changes already apparent at the retail markets on reducing the fat level of beef. This is very helpful to U.S. consumers who are becoming more health conscious and weight oriented. They can enjoy beef, still limit their calorie intake and provide high nutritional value in their diet.

While considerable progress has been made, there is still more needed for increasing leanness and decreasing the fat level in beef.

CHOLESTEROL

From cholesterol the body makes essential substances such as sex hormones, adrenal cortical steroid hormones, bile acids and vitamins. In addition, all body cells must be constantly supplied with cholesterol to form their cell membranes.

Some scientists feel that dietary cholesterol may be only 10 to 20% of the body's daily supply (Mann, 1977). Between 600 mg. to 3,000 mg. of cholesterol are synthesized and metabolized per day in humans. The average daily cholesterol intake is between 400 mg. to 500 mg. per person (CAST, 1985).

Except for a small percentage of the human population, the body controls cholesterol synthesis and increases it if the diet cholesterol intake is low and reduces it if the diet cholesterol intake is high. Those humans whose body systems cannot control cholesterol synthesis and make too much cholesterol (primarily in the liver) should seek the advice of their physician who can prescribe medicine to reduce cholesterol synthesis. About one in 500 children are heterozygous for high cholesterol levels (Mann, 1977).

In two excellent review papers on cholesterol studies throughout the world, Dr. G.J. Brisson of the University of Laval in Quebec concluded that based on population and

mass studies there was no significant correlation between diet cholesterol and blood cholesterol (Brisson, 1986; 1987). A recent study by M.F. Muldoon suggests that people who lower their cholesterol excessively do not necessarily live longer (Haney, 1990). Some of them seem to become more likely to die from accidents, suicides, murders and other violent tragedies. This finding needs more verification.

Recent evidence indicates that a high blood level of HDL (the good lipoprotein) may reduce the risk of coronary heart disease (ACSH, 1982). It appears that if HDL is high in the blood, higher levels of cholesterol can be tolerated. Many physicians now like to see a certain ratio between HDL and cholesterol. Research is needed on this ratio, the factors affecting HDL levels, and the role of HDL and cholesterol on human health. Recent studies indicate that the role of cholesterol in human health is not as clear as previously thought and more research is needed to clearly identify its role.

SATURATED FAT

When saturated fats are mentioned, the perception is that beef contains only saturated fat. But, the saturated fat level in beef is only 48% - the remainder is unsaturated fat.

Contrary to public opinion, vegetable oils rank as one of the primary sources of saturated fats in the food supply. For example the saturated fatty acid level in palm oil is 49%, 60% in cocoa butter and 86% in coconut oil. Data from the U.S. food supply indicate that the contribution of fat from 1965 to 1985 from animal sources has decreased 22%, while that from vegetable sources has increased 68% (Luke and Call, 1988).

Oleic acid, a major unsaturated fatty acid component of beef fat has been reported to have a cholesterol lowering effect (Grundy, 1986). A 1988 report in the New England Journal of Medicine indicated that stearic acid,

a saturated fatty acid high in beef, does not increase the cholesterol level and may actually decrease it (Luke and Call, 1988). Stearic acid comprises about one-third of the saturated fatty acids in beef. Basic research is needed with beef fats involving the saturated and unsaturated fatty acids in the ratios contained in beef. These studies are needed to arrive at the true picture of beef fats in human health.

Unfortunately for the beef producer, the news media, which is not scientifically trained, keeps telling the consumer that saturated fats are harmful and therefore beef consumption needs to be decreased. An important challenge ahead is to obtain the research facts on beef fats and their effect on human health.

SOME FAT NECESSARY

Texas A & M studies indicate that a minimum level of 3% chemical fat in the ribs and loins of cattle is necessary to ensure acceptable palatability in beef (Smith, 1988; Savell and Cross, 1988). There is a distinct decrease in palatability with fat levels below 3% chemical fat. They also contend that, in terms of nutritional merit, the maximum level of intramuscular fat that should be in rib and loin cuts is 7.3%. A "window of acceptability" (3 to 7.3% intramuscular fat) is thus created that considers diet-health-nutrition as well as flavor, juiciness and tenderness factors. This window of acceptability provides two thresholds of chemical fatness associated with progressive increases in palatability at approximately 5% chemical fat (midpoint of the small amount of marbling) and at approximately 7.3% fat (at the lower end of the moderate amount of marbling).

The new USDA grade "Select" (which replaced the Good grade) contains 3 to 4.27% intramuscular fat. This provides beef at the lower end of the fat level for those most concerned with calorie and fat intake. The level of 4.28 to 7.3% chemical fat would provide

"Choice" beef. This provides the consumer with flexibility in choosing beef which best meets their diet, health, nutrition, calorie and fat level needs (Smith, 1988; Savell and Cross, 1988).

It is assumed that the average consumer eats only about 50% of the fat left in the meat that is ready for cooking at home (Kaufman and Breidenstein, 1983).

Decreasing the fat content in beef must not be carried to extremes and to the point where it decreases eating quality. It is recommended that breeding and selection programs include carcass quality information and eating quality tests if at all possible. This would especially be important to conduct on the offspring of sires that are to be used via artificial insemination on a large number of females. One example of this program has been followed by the Alto "Bud" Adams ranch in Ft. Pierce, Florida, which began in about 1950 with his Braford herd of cattle. As the owner kept the best prospective sires (based on production factors) for his Braford herd, he bred them to a limited number of females and evaluated their offsprings' carcass and eating quality. While waiting for the results, which took some time, he froze their semen. When the results were in, he then used only the best bulls with regard to carcass quality as well as eating quality. This is the kind of program needed to ensure lean beef with optimum carcass and eating quality to meet consumer needs.

BEEF CONSUMPTION

The average beef consumption per person in the U.S. is 2.46 oz. which includes 0.39 oz. of processed beef (Breidenstein, 1984). Higher figures are sometimes seen, based on a carcass weight basis, but only about 55% of the beef carcass is consumed. This 2.46 oz. of beef supplies 63 mg. of cholesterol or about one-fifth of the American Heart Association (AHA) recommendation of 300

mg. of cholesterol daily intake (Williams, 1987). Even the heavy beef eater takes in less cholesterol than the AHA recommended level.

The average consumption of all red meat (beef, pork, lamb and veal) daily (4.2 oz.) supplies about 5% of the diet calories as saturated fat. The goal of the AHA and other health groups is that no more than 10% of the diet calories should come from saturated fat. The average consumption of all red meats (4.2 oz.) provides 10% of the calories from fat in the diet. The goal of the AHA is that less than 30% of the diet calories should come from fat. So, the average beef consumer is well below the top levels of cholesterol, saturated fat, and calorie intake set by the American Heart Association. Even the heavy beef eater should meet these guidelines.

From 1950 to 1978, beef consumption in the U.S. doubled while deaths from heart disease decreased 30%. During this same period, the rate of cancer deaths decreased and the life span of Americans increased. The only definite relationship of diet to heart disease is obesity which is caused by eating too much regardless of the kind of food consumed. Moreover, research has shown that obese humans produce 20% more cholesterol per unit of body weight (CAST, 1985). Dr. George V. Mann, an outstanding authority on human health, believes that no diet therapy has been shown effective for the prevention or treatment of coronary heart disease (Mann, 1977). It is apparent that coronary heart disease is a complex matter and blood level cholesterol is at best an imperfect index of the risk of coronary heart disease (Mann, 1977).

Beef is highly nutritious with high quality protein as well as essential minerals, vitamins and other nutrients. Moreover, it contains vitamin B₁₂ which is so essential to health and which plant products lack. In addition, beef gives pleasure and satisfaction to eating.

It is time for the beef industry to stop

apologizing for its products and continue to pursue the offensive with scientific facts, research and education programs financed by their own funds which is presently being done. To be effective, however, their programs must be continued on a long term basis since changing diet perceptions requires considerable time and effort.

RESEARCH SUPPORT NEEDED

A 1975 National Academy of Science study concluded that if all U.S. farmers in 1975 were using only 1950 farming practices that food prices would be two to three times as high as they were in 1975 (NRC, 1975). This is cited to indicate the value of research and to indicate that today's beef industry practices may not be adequate 5, 10 or 15 years from now. Some may not be adequate next year. Therefore, a continuous flow of new technology is needed to enable the beef producer to compete effectively.

As production efficiency increases beyond a certain level, new problems arise and new answers are needed. The program which was adequate for an average level of productivity is not adequate for the top producer who is already encountering some problems. Unfortunately, because of fund limitations, much University research is conducted with average level productivity herds which means some of the information obtained may not be adequate for the high level producer. These high level producers can assist the Universities by making some of their breeding available to improve University herds and thus make their research findings more applicable to them.

One very important research area needed is beef cattle genetic mapping. This could identify genes that influence marbling, muscling, tenderness and other traits of importance in beef production.

ACTIVIST PROBLEMS

The beef industry now faces outside groups which make it more difficult to operate. These groups are involved with animal rights, food safety, anti-red meat, chemical residues, environment and a myriad of other concerns. They are well organized and financed and many of their untrue statements are repeated so often in the media that they become accepted by the general public as factual. These groups are not going away, rather they are increasing, and their programs must be met. The big challenge ahead is how best to do it. Unless something is done and the activist groups are allowed to continually frighten and mislead the public and poison the climate of opinion and reason, they will turn back the clock. The result will be higher priced food for all Americans.

The American Medical Association started a counter-campaign in October, 1990, noting that science and medical research may come to a halt if they did not take their heads out of the sand. Some activist groups have torn down fences and committed acts of violence and vandalism on California farms (Keaton, 1990). One activist group is advising their members to work toward eliminating cattle and sheep from grazing in public lands with a slogan "Cattle free by '93." One group stated that cows are easy to hunt and kill. These groups are not aware that about 85% of the nation's grazing lands are not suitable for farming. It is important that we use land that is too rough, too high, too dry, too wet and largely inaccessible to graze cattle or sheep to produce food. Moreover, the use of these animals is beneficial to wildlife in these areas since water, minerals and other supplements are also available to the wildlife. Beef and sheep are walking protein factories harvesting forages without using fossil fuel.

It is apparent, from these and other reports, that state and federal legislators need to enact laws to prevent acts of violence,

vandalism and destruction of property and animals which has been occurring. Unless this is done, medical research with animals and food production may become a high risk activity.

Farmers were among the nation's first animal welfare and environmental advocates. It makes little sense for farmers to mistreat their animals since it would decrease their productivity and profitability. Moreover, they were following environmentally sound practices before activist environmental groups were in existence. There are many who believe these activist groups have a secondary agenda that goes back to vegetarianism. They don't believe in meat and would like to see animals removed from public lands and eventually from private lands as well.

Dr. Robert Sheuplein of FDA recently stated that the amount of carcinogen resulting from the use of animal drugs is about 1000 times less than the naturally occurring carcinogens in foods. It is also estimated by many scientists that at least 1000 people die daily from lung cancer attributed to smoking. Yet, activists groups disregard these facts and continue to over-react to the use of safe chemicals in the food system which have been thoroughly tested by University and other scientists and approved by FDA and other regulatory government agencies.

SUMMARY

It is apparent from this discussion that the beef industry faces many challenges in the future including becoming more efficient and further improving carcass quality and eating quality of its products. It is also apparent that beef has an important place in the human diet without exceeding American Heart Association guidelines on cholesterol, saturated fat and fat intake. Moreover, recommendations on decreasing dietary intake of total fat, saturated fat and cholesterol are not enough by themselves to reduce the risk of developing

coronary heart disease (Mann, 1977). But, they are important and until more scientific information is obtained it is best to limit total fat and calorie intake, keep blood cholesterol at a reasonable level, avoid obesity, avoid stress as much as possible and keep physically fit by work or exercise. Moreover, diabetes and smoking increase the incidence of heart disease and should be avoided if at all possible.

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Table 1. Results of three gain periods of a finishing trial with British bred cattle and their crosses (Palmer et al., 1971).

Days In Feedlot In Three Periods ^a			Cattle Gain During Each Period, lb.	Separable Lean Tissue, %	Separable Fat Tissue %
1	-	84	129.7	57.7	35.4
84	-	126	86.3	36.9	54.0
126	-	168	60.7	22.7	71.6

^a One third of cattle slaughtered at end of each period. The cattle weighed 475 lb. at initiation of trial.