

Tenderness, Fat & Health

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The basic principle of the beef industry is to produce food for human consumption. The more food that is produced, the healthier is the beef industry.

For any food to have a wide popularity and to be a staple part of community dietary pattern, the food needs to be palatable, attractive prior to and subsequent to preparation, easy to prepare, at a reasonable cost to consumers, to be healthy food.

The beef industry has addressed these factors most particularly since the beginning of this century with the lead being taken in the USA with the introduction of grading of beef cuts for consumers and upgrading of inspection standards of carcasses at abattoirs. The goal was to provide a better package for consumers.

Social factors subsequent to health information from mid sixties has seen a perceptual change relating to the understanding of a "healthy food". As a result of research in to Coronary Heart Disease CHD "healthy food" now also means a food that is good for the health of the consumer.

Since the mid sixties mortality from CHD has fallen in Australia, New Zealand and United States by 30 - 50% at the same time mortality in some European and Asiatic countries has risen by up to 100%.

The beneficial changes have resulted from a number of factors, such as smoking reduction, reduced fat intake, improved medical care and so far little recognised factor - better handling of food products, especially meat products.

The management of the food chain involving beef cattle includes: food intake of cattle - grass fed, supplemented by grain fed management of disease handling of cattle for slaughter abattoir techniques hanging and conditioning techniques.

These factors are significant irrespective of breed type. For the consumer, the breed types add further variables for disposition and nature of fat in particular.

Tenderness and consumer satisfaction has been approached in the USA on the basis of fat marbling, with marbling being required, according to age to achieve labelling as "US CHOICE". It has long been recognised that slaughter, abattoir and conditioning processes also have a great effect on tenderness.

Taste is another factor which is not necessarily associated with tenderness and is due to the fat composition of the meat and changes to fat in conditioning and cooking.

Consumers expect tasty tender beef and social pressures produce a further expectation that the food will be healthy. Producers and processes must meet these demands in order to support and expand the industry.

The fat content of beef is probably the most critical factor for the industry. Taste is certainly a fat "factor". Tenderness is seen to be related to marbling. Healthiness of beef is also perceived as related to fat.

Beef received adverse publicity from the mid sixties as a high fat, high cholesterol food. This position has changed and much attention has been given to trimmed lean meat as a healthy food, this has not done a lot for the marbled meat group.

Research has not demonstrated a significant difference in the composition of fats from similar positions on carcasses of varying breeds - the fat compositions do however vary with cuts.

It has been shown that cattle feed intake of unsaturated fats does lead to a higher proportion of unsaturated fat in meat - no statistics are available to indicate if some breeds are better at utilising and converting than others. Research needs to be undertaken on this subject.

What can be postulated is that the post mortem changes in the fat content of meat is more significant than the actual fat composition.

So if we are looking to provide consumers with healthy food, we need to address handling, abattoir and conditioning techniques as well as cooking in order to reduce the oxidation processes that occur naturally in fat after death.

Oxidation of fat and autolysis effects are time related. The older the greater the accumulation of Lipid oxidation products (LOPs) and Cholesterol oxidation products (COPs). These are the dietary products implicated in the production of CHD. The fresher the meat the more healthy. Old hung meat has more LOPs and COPs, particularly if subject to air movement and room temperature.

The post mortem changes can be reduced by chilling, freezing or fixing of preserving techniques and smoking.

Unfortunately tenderness and flavour have been produced by hanging and conditioning, whilst reducing at the same time the healthy status of the product.

If conditioning is eliminated a healthy product may be produced which is not acceptable for tenderness or taste to the consumer.

A compromise solution is the current answer, with good abattoir techniques and use of very low temperature conditioning on beef with moderate fat

content. A new approach is being researched which may result in significant changes in the industry.

Post mortem electrical carcass stimulation is being investigated with a view to producing tender meat from lean beef. The electrical stimulation interferes with the normal processes which result in toughening of meat. This process will not alter the taste of the product, in consequence it would seem that top quality beef for tenderness, flavour and healthiness will be fresh beef with moderate intramuscular fat content.

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