DETERMINING WHETHER FAT CONSUMPTION FROM LEAN AND MARBLE STEAKS ARE WITHIN RECOMMENDED DIETARY GUIDELINES

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Introduction

Meat, particularly, red meat has been associated with unfavourable publicity about its negative effects on human health due to its contribution to high levels of dietary fat and, consequently, saturated fatty acid intakes (Langesen and Swinburn, 2006). This publicity has persisted despite in New Zealand there being a reduced incidence in deaths associated with coronary heart disease. The meat industry over the last ten years has, however, undergone considerable change, both in the production of lean animals and trimming fat from retail meat cuts. The question is 'Have these changes resulted in a reduction in fat intake by consumers and have the changes been sufficient to satisfy the dietary guidelines recommended by nutritionalists?'.

The objectives of this research was to determine

(i) whether production management practices in the red meat industry have changed and had an impact on the supply of fat into the human food chain.
(ii) whether processing or retail trimming procedures have changed and contributed to a reduction in the supply of fat into the human food chain.
(iii) the amount of dietary intake of fat from steaks, varying in fat content, consumed by human volunteers.

Materials and Methods

Information in this study was obtained for lamb and beef, which represent the majority of red meat consumed by the public in New Zealand, in the following three areas:

Lamb information was obtained from a major processing company on the changes in their stock purchased and processed from 1988 to 2002.
A line of lambs with the same carcass weights, but with different external fat covers over the 12th rib, were subjected to commercial boning out procedures to yield market ready retail cuts. The yield of retail cuts and 'waste' fat were measured.
A consumer trial was conducted whereby two 2.5 cm thick *M. longissimus dorsi* (LD) steaks, A and B were presented to volunteer consumers. Steak A had a high level of external fat and steak B, a low level of external fat. The consumers were requested to return to the laboratory, in pre-packaged pre-paid containers, any fat trimmed off the steak before or after cooking the steak and any residual fat left in the pan after dry grilling the steak. All steaks provided to the consumers were pre-tested for tenderness and had kg F values between 4.5 to 5.5 kg F (tender steaks).

Results and Discussion

Lamb carcasses in New Zealand are graded according to their carcass weight and fat cover over the 12th rib. YL lambs (9.0-12.5 kg carcasses with fat cover < 6 mm fat) are considered to be lean lambs. In 1988, only 15% of the lamb kill was YL lambs. By 2002, the percentage of YL lambs had increased dramatically to 42% of the lamb kill reflecting changes in lamb schedule prices which rewarded farmers producing leaner animals and the changes in breed and management practices by producers responding to the schedule prices. The pricing policy and producer practices resulted over a 14 year period in a 173% increase in leaner or low fat animals being supplied to the market.
The boning out of large lean lambs (YM, 17.5 kg carcasses < 6 mm fat) and large fat lambs (PM, 17.8 kg carcasses > 6 mm but < 12 mm fat) showed that both carcasses yielded 50% of their weight as prime retail cuts. However, 15.7% of the carcass weight of the PM lambs was trimmed off as fat and discarded whilst only 9.6% of the carcass weight of the YM lambs was discarded as fat. These results illustrate that modern boning procedures trim up to 16% of the carcass weight of 'an overfat' lamb to meet the specifications of lean lamb cuts required by retailers and consumers. This move to large lean animals promotes a reduction in the supply of fat into the human food chain and the diet.
A total of 86 low external fat covered steaks (13-22% external fat) were paired with 86 high external fat covered steaks (22-31% external fat) and assessed in pairs by 43 separate individuals. Fat cover and intramuscular fat was determined by image analysis. In the case of the high external fat covered steaks, 52% of the individuals discarded more than 20% of the weight of the steaks as fat. Only 2% of the individuals actually retained and consumed the fat. In the case of the low external fat covered steaks, only 9% of the individuals discarded more than 20% of the weight of the steak as fat.

The results indicate that consumers do not tolerate a high fat cover on steaks and will discard the fat either before or after cooking the steak. In contrast, consumers do tolerate and will consume low levels of external fat cover.

Intramuscular fat levels varied independently of the steak fat cover. It was calculated that the fat consumed from the external fat cover and intramuscular fat by the 43 individuals consuming the high external fat covered steaks was 16.5 g fat/200 g steak and from the low external fat covered steaks was 7.9 g fat/200 g steak. The intake of 7.9 to 16.5 g fat/200 g steak is well within the recommended dietary fat intake of 75 g for a 2200 calorie diet.

Conclusion

Red meat has a legacy of providing undesirable high levels of fat which may impact on the well-being and health status of the community (Higgs, 2000). The meat industry has been accused of not responding to the needs of the community and that the industry contributes, in some way, to an increase in human metabolic disturbances which manifest themselves as clinical disorders such as coronary heart disease.

This report shows that the red meat industry has responded in a responsible way to the consumer demands for a healthy product. At the producer level, schedule prices and stock management changes have led to at least 45% of the lamb kill being lean animals in New Zealand. This trend is continuing. At the processing/retail level, boning procedures have changed and resulted in more fat being trimmed from carcasses to produce low fat trimmed retail products. At the consumer level, fat is trimmed from steaks prior to or after cooking. The net result is that the consumers consume 7.9 to 11.5 g fat/200 g steak which is well within the dietary guidelines of 75 g fat per day. The whole supply chain has contributed to a reduction in the availability of dietary fat to consumers which, when combined with additional trimming by individuals at cooking or dining, has led to a considerable reduction in dietary fat intake from red meats.

A conclusion and a recommendation to the industry is that trimming any external fat to a 2 mm fat thickness, before eating, will ensure that the consumer has a satisfactory eating experience whilst delivering a healthy product which provides fat well within the recommended daily intake of 75g/day.

References

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