Changes in the nutrient quality of meat in an obesity context

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Introduction

Overweight or obesity is becoming the norm in both developed and developing countries, with overweight even exceeding undernutrition in many developing countries. Today consumers are becoming more aware of nutrition and the composition of food in the fight to combat malnutrition.

Meat is recognised as an important source of protein, vitamin B12 and essential fatty acids, as well as bio-available minerals such as iron, zinc and selenium. Unfortunately red meat is associated with high fat content and cholesterol raising properties. However, unknown by many is the fact that nutritional content of meat is non-homogenous and dynamic, and its fat content has decreased considerably during the last decades. Consumers can be educated to make informed choices, such as selecting a meat cut of a low fatness level, limiting the addition of basting sauces and marinades as well as sauces on the plate, and trimming visible fat prior to cooking, or on the plate.

Red meat in the diet

Red meat is recognised as a primary dietary component and forms an important part of a balanced and varied diet.[1,2] However, based on epidemiological studies, there is a significant correlation between obesity and high saturated fat intake from animal products.[3] This has led to a concern that total dietary fat intake should be restricted by consuming smaller portions, less frequently. It comes as no surprise that there has been a global trend towards white meat consumption compared to a stagnation in the demand of red meat (Figure 1).

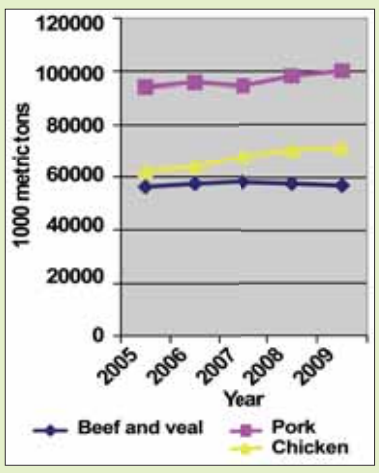

Figure 1: Changes in consumption of pork, chicken, beef and veal (1000 metric tons/year)[4]

Changes in fat content of red meat

Meat is a valuable food source, rich in many of the essential nutrients. Although red meat is generally classified as a high protein, iron and fat source, the nutritional compositions of foods, like meat, is non-homogenous and everchanging. The EuroFIR Consortium[5] has reported on the significant changes in the iron and fat content of meat over time. These changes are as a result of various factors, including soil and forage composition, environmental factors and post-slaughtering activities such as trimming and cooking methods. Figure 2 presents the recorded changes in the fat percentage of red meats from three countries over time.

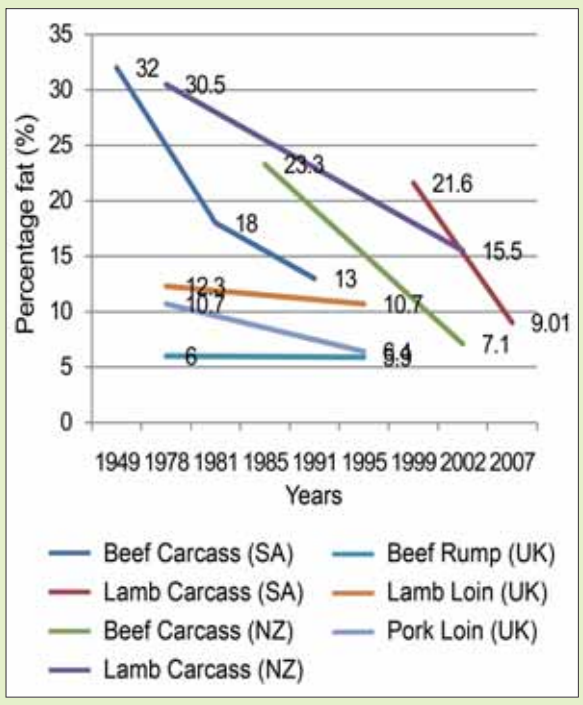

Figure 2: Changes in the fat percentage of red meat over time[9,10,11,12,13,14,15,16]

The nutritional composition of South African lamb is a good example of changes in food composition reported in national food composition databases. In the 1999 composition tables of South African foods the fat percentage of lamb is stated as 21.6%.[6] These values were derived from the United States Department of Agriculture Food Composition Database. In 2007 a study found that South African lamb contains on average only 9.01% fat, compared to the previously borrowed values of 21.6% published in the local food composition tables. The implication of these findings is that a product that was previously considered "unhealthy", based on its fat content, in fact is within the recommended low fat food range of below 10%.[7,8]

Selecting the right meat cut

Different cuts of meat also differ in composition. By carefully selecting meat cuts with a lower fat content the contribution of red meat to fat in the diet will also be lower. There are significant differences in fat content between cuts. Table 1 indicates the physical composition of selected cuts from beef, lamb and mutton from different age groups.

Table 1: Fat percentage (%) of selected South African lamb, mutton and beef cuts

Lamb and mutton[17]			Beef[16]			
Cut	Lamb	Mutton	Cut	Young animal (feedlot)	Young animal (grass fed)	Older animal (grass fed)
Flank	22.66	29.3	Thin flank	32.85	35.62	33.63
Loin	15.8	16.6	Prime rib	21.93	24.38	25.38
Shoulder	8.8	11.9	Chuck	16.00	16.53	19.02
Leg	7.8	8.0	Fillet	6.37	5.82	7.09

Fatty acid content of red meat

Fat percentage in food products are not just associated with empty kiloJoules and subsequent weight gain, but also with saturated fat intake and elevated cholesterol levels. However, not all fatty acids are responsible for elevated cholesterol. Table 2 indicates that although red meat is considered a cholesterol raising food, it in fact contains numerous cholesterol lowering fatty acids as well.

Table 2: Fatty acid composition of selected red meat carcasses

Fatty Acids	South African Mutton[17]	South African Lamb[15]	South African Beef[16]
Cholesterol-raising fatty acids*	**2.37**	**2.42**	**3.64**
C14:0 Myristic acid	0.22	0.46	0.37
C16:0 Palmitic acid	2.15	1.96	3.27
Cholesterol-neutral fatty acids			
C18:0 Stearic acid	1.91	1.16	2.99
Cholesterol-lowering fatty acids*	**3.63**	**3.22**	**5.40**
C18:1 Oleic acid	3.40	2.97	5.12
C18:2 Linoleic acid	0.22	0.25	0.24
C20:4 Arachidonic acid	0.01		0.04
Effect unknown			
C16:1 Palmitoleic acid	0.13	0.18	0.40
* **Calculated**			

Conclusion

The majority of the populations in most developed countries consume red meat, with developing countries increasingly so. It becomes evident that, even in the context of obesity, it is possible for consumers to gain optimal nutritional benefits and avoid excessive kiloJoule and fat intake when consuming red meat on a regular basis. Individual foods should not be considered the culprits in the increased obesity rates, but total diet, portion sizes, cooking and eating practices should all be considered. Red meat supplies meaningful amounts of iron, zinc and protein to the diet in a natural food matrix. In this context, and in line with healthy eating guidelines around the world, the moderate consumption of lean red meat can be recommended as part of a healthy, balanced diet.[18]

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