On the Value of Fats in Meat Products

by

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Whilst in developing countries human health is still impaired by hunger and malnutrition, in the highly developed countries, health is endangered by overfeeding. This is caused by affluence, a tendency to expect enjoyment and entertainment, or even debauchery. Over recent decades overfeeding has been encouraged by the increasing availability of food of improved quality for more of the population. This is facilitating on a wider scale than previously the pleasurable aspects of eating, which may be experienced either alone but particularly in company.

Overfeeding, namely excessive intake of calories is being particularly encouraged as other means of obtaining pleasure and satisfaction, not detrimental or even beneficial to health, are becoming less acceptable. People are now less prepared to enjoy the pleasures of the mind, and in the more materialistic sphere prefer experiences which do not require particular physical efforts. Overfeeding is further aggrevated by the decreasing effort required nowadays to obtain the daily needs of life. This need for less physical effort by itself, without increased food intake, can already lead to an unfavourable balance.

Contributing to the problem of overfeeding is the refinement of foods which is vigorously promoted by the industry, and the ease with which these products can be afforded by an affluent society. Only since a large part of the population has had access to a wide range of refined foods has eating generally become a substitute for the lack of experiences and enjoyments in other spheres.

The Frenchman distinguishes between the gourmet and gourmand. For the gourmet eating is ~~more~~ an epicurean exercise in fine tastes and he experiences the highest pleasure in recognising perfect qualitiy. Food requirements and food intake are balanced and he has obviously no need to compensate for the lack of other experiences. With the gourmand on the other hand, the glutton, food intake greatly exceeds his needs. He takes heed only of the "warning" never to eat more than he can possibly manage by force.

Of course there are always certain excuses and justifications for excessive eating. Big eaters are trained, often by their parents. There is also an element of habit. With constantly high food intake, which may be during a period of encreased need and thus justified, the body adjusts itself to large quantities. Later, when physical exercise and with it the requirements are reduced, there is still a yearning for large quantities of food. This is, however, not irreversible, as it is very well possible to readapt the body to smaller quantities. In doing this it would not really be helpful to add calory free bulk to the food and thus maintain large volumes. Such a measure would merely keep the body tuned to overnutrition, and would have only a very short lived effect on relieving hunger.

It is most regrettable that some nutritionists present gluttony as unavoidable and that some government authorities tolerate the practice of diluting food with water, air or other calory free substances for sale without price reduction under the label of a "calory reduced product". This is advantageous only to certain branches of industry and not to the consumer. We maintain that by such practice the consumer is misled and put to a serious economic disadvantage. Watering down food is only a pseudo-dietetic measure. Food containing 12 % protein and 30 % fat does not become "healthier" by being diluted and then containing only 8 % protein and 20 % fat. If one is supposed to eat instead of 12 g protein and 30 g fat only 8 g protein and 20 g fat, it is sufficient to eat only 66 g of the unadulterated food instead of 100 g of the commercial preparation. This saves the 50 % mark up on the price per nutritive unit. Obviously if watering down is not followed by an appropriate price reduction, the price of protein and fat in the altered product is in-

creased by the rate of dilution. This is particularly alarming with foodstuffs that are diluted with 100 % water (!), as this reduces the nutrients by half, and may even treble the water content. This is a particularly despicable example where blatent adulteration of food is resurrected and tried to be made respectable under the guise of "increased healthiness".

We recommend a different way of dieting. It should become desirable to be known as a gourmet, while it should be a social stigma to be known as a gourmand who has to compensate for inadequate experiences. One should learn to eat less but delicious and nutritious food. Such food is rich in protein and calories. Eating must not be considered a fill in for increased leisure time.

It is now obvious that in affluent countries most people should reduce their caloric intake. There is no doubt that overfeeding reduces life expectancy and encourages specific diseases. However, when reducing the calory contents of the diet it is most important that this is not done at the expense of those components that supply not only calories but also essential nutrients such as high grade protein, vitamins, certain fatty acids and trace elements. Unfortunately it is very difficult for the consumer to exercise critical and informed judgment on this subject, mainly for the following reasons:

1. The different groups of commercial interests representing the various products are understandably making appropriate efforts to win, defend or regain markets.

2. The consumer obtains his information on the relationship between nutrition and health almost exclusively from "prestige-literature" published by the industry to promote their products, which tends to be one-sided or even incorrect.

3. The consumer organisations and representatives lack the financial means for presenting a balancing counterweight.

4. Only in a few countries is it not permitted to refer to health aspects when advertising food.

5. Some branches of the food industry have been relying on the high nutri-

tional value of their products and have been neglecting promotion completely. This tends to cause an unbalanced image in the minds of consumers.

The latter applies particularly to meat. Until recently the meat manufacturing industry has not found it necessary to inform the public adequately on the values of meat, relying mainly on the high esteem in which meat has been held by nutritionists and consumers alike. Only the campaign against meat products in the last few years has alerted the meat industry and caused it to collect evidence proving that meat protein together with its accompanying substances develop and encourage in man in a particular way muscular strength, ability to coordinate and concentrate, initiative, efficiency and leadership.

A comparatively favourable amino acid composition which may be found in other proteins is not necessarily proof of equal value. Here we only have to think of iron. So far the iron content of a food product has determined its value regarding this element. Spinach which has been praised as a most valuable source of iron is the most typical example. Only recently has it been shown that iron from spinach is only poorly resorbed, in contrast to iron from meat which is resorbed better than from any other source. Meanwhile it has become apparent that in man adequate supplies of iron are ensured best with meat. This also explains the iron deficiencies known in lacto-vegetarians.

The campaign against meat originated from the fact that meat contains not only meat protein, but also fat. There are indications that deficiencies of polyunsaturated fatty acids which in animal fats are not particularly abundant can under certain conditions encourage particular diseases of the circulatory system. These may develop when a low fat diet, especially with fats containing little unsaturated fatty acids, is combined with other adverse factors such as smoking and susceptiblity to stress. Although not everybody agrees on this, we can nevertheless assume that the diet should contain a certain amount of polyunsaturated fatty acids. The requirements are said to be between 3 and 7 g linoleic acid per day. This is easily available in a mixed diet

without emphasis on fats rich in linoleic acid per day. However, with an extremely low fat diet, it can become critical.

This leads to the seemingly paradoxical situation where the same industry that supplies the fats with high contents of polyunsaturated fatty acids is interested in having the dietary recommendations altered towards an overall reduction of fat. On the other hand, this would then justify the need for the preference of fats with high contents of polyunsaturated fatty acids. This gives some indication of the background of the campaign against meat products.

In meat products protein is accompanied by fat, which especially ensures palatability and an agreeable texture. This fat is of course added to the total fat of the meat product. Meat fat in meat products like milk fat in milk products has thus a specific "protein-accompanying" function, and also adds specifically to the taste of the products. Neither in meat products, nor in milk products is animal protein accompanied by vegetable fats. It is therefore understandable that the industry with interests in the sale of vegetable fats is interested in reduced consumptions of meat and milk products. The less protein-accompanying fat is consumed, the more plant fats can be sold. And the less protein and fat are consumed, the more room is left for carbohydrates, which in turn have to be made palatable by "carbohydrate-accompanying" fats. Of the fats available those of vegetable origin with high contents of polyunsaturated fatty acids would then of course be preferred.

These tendencies were already reflected in recommendations that our diet should be composed of 15 % protein calories, 25 % fat calories, and 60 % carbohydrate calories. Some scientists claimed that with this composition animal fats alone can supply all the linoleic acid required. In contrast we maintained that a ratio of 15 % protein calories, 40 % fat calories, and 45 % carbohydrate calories is a diet of at least equal value. Calories from carbohydrates have no advantage over calories from fat as far as overweight is concerned. On the other hand a limit of 25 % fat makes it difficult to ensure an adequate supply of protein, particularly protein that also contains resorbable iron. The supply of polyunsaturated fatty acids may then also be margi-

nal, requiring supplementation preferably of course with fats rich in poly-unsaturated fatty acids. Following this,experts, who previously had advocated the ratio of 15-25-60, confirmed that the ratio of 15-40-45 is of equal value, especially in view of the recent claim that large amounts of carbohydrates may be more detrimental to health than was previously thought. At that stage general agreement seemed to have been reached that the minimum requirement is 15 % protein calories, leaving 85 % for non protein calories.

Nevertheless the "Allied Interests of Vegetable Fats and Carbohydrates" has gained ground again. In its Report on Nutrition 1972 (p. 53) the German Society for Nutrition has reduced its recommended requirments for protein calories to 12 %, with a total requirement of 2660 calories, alloting 60 % to carbohydrates. The present consumption, according to this report, is 3000 total calories (not counting alcohol) and approximately 40 % fat calories and 45 % carbohydrate calories, which is exactly the ratio which had been generally agreed upon as being at least as favourable as the ratio 15-25-60. Furthermore with this ratio of 15-40-45, it is easier to design a palatable diet.

There is no reason of any significance to the consumer to disagree with the realistic ratio which he has chosen. The only thing we have to do is to encourage a reduced overall intake, but we should not attempt to persuade him to adopt a less accustomed and less palatable diet which only favours certain commercial interests. Such an attempt is, however, made to some extent in the report mentioned by the statement that too much protein is consumed. Carbohydrates are claimed to be insufficiently represented, although in another part of the report it is mentioned that too much sugar is consumed and that cereal products contribute the largest proportion of calories. No doubt one could question, from the socio-economic point of view, the wisdom of maintaining an intake of protein calories in excess of what is required to maintain and renew the body substance and whether animal protein, because of its favourable contents of amino acids, should be given such a pronounced preference. In this respect it has to be considered, however, that the value of meat protein and its accompanying substances is based, as

already mentioned, not merely on its essential amino acids. In addition to vitamins and trace elements we have to consider also the non protein nitrogenous substances specific to meat which are, in a particular way, responsible for human activity and efficiency.

It would surely not be in the public interest to allow the reduction in the general efficiency, alertness and activity of the population which would be caused by a reduction in protein consumption. Regression to a state of inertia typical of a protein deficient population is unthinkable. To return to the main subject, meat fat has in meat and meat products a predominantly meat protein accompanying function. It plays a significant part in the formation of the characteristic taste of meat products. This is accomplished, firstly, by making the physical properties of the product such that it is easily chewed and conditioned for contact with the taste buds,and this makes for agreeable consumption by the individual. Secondly, it introduces original meat fat specific taste substances and in certain meat products it also supplies the nutrient basis for fat metabolising organisms, and with this it produces secondary meat fat specific aromatic substances.

Therefore meat fat stimulates meat consumption by contributing to the agreeable taste of the product. Fat is thus directly and indirectly involved in providing the population with meat protein and valuable meat protein accompanying substances. This meat fat which has this protein accompanying function but is not in a discrete from has been given the same derogatory designation of "hidden fat" as protein and carbohydrate accompanying fats in other products. The designation and the concept of "hidden fat" originated from the fact that fats that accompany other nutrients appear in the tables for nutritional requirements not specifically under fats but under food designations like meat and milk. In furture, integrated nutrient accompanying fats should be classified as "escort fats" especially as many of these fats (e. g. the fatty tissue of bacon found in salami) are not at all hidden. The concept of "escort fat" does not imply any judgement on nutritional value. It does not imply whether or not, in an individual case, the total meat fat is meat protein accompanying with the function of facilitating palatability and agreeable consumption.

It must be emphasised that fat contents over a certain necessary amount cannot be considered as improving consumption but rather as having meat protein replacing functions just as with water, foreign protein and carbohydrate. Thus when additional meat fat is used for "stretching" meat products, this does not add to the value of the meat fat compenents. On the other hand it should be realized that meat fat in meat products, just as with water, carbohydrates and foreign protein, may also lower the cost of the product and thus may also give the financially weaker population layers wider access to meat products and thus to meat protein. Unfortunately meat fat is frequently used only to lower the cost of raw materials but not the consumer price.

This brings us to the question of how much fat is needed to give meat products the physical properties necessary for agreeable consumption by the individual. No general rule can be made. It depends on the individual products. In any case there is no justification for recent unbalanced statements made by some scientists censoring sausages with a fat calory component of 80 % whilst failing to add that the remaining 20 % consists of protein calories. This sort of presentation is misleading because with a person who is not specifically informed it gives the impression that in such products there is 80 % of fat by weight and that the weight ratio between fat and protein is 4 : 1. However, when the calory percentage is calculated into weight percentage such products may turn out to contain a great range of protein and fat percentages, depending on water content. Realistic examples would be for protein 12,2 - 17 %, and for fat 21,5 - 30 %, with a fat protein ratio of 1,76 (80 : 9,3 = 8,6; 20 : 4,1 = 4,87; meat fat/meat protein = 1,76). In this example the meat fat content is considerably below the optimum for agreeable consumption. In view of this it is astonishing to read the following complaint in a recent journal (KOSMOS 6 (1973), 249):
"Legislation permits in nearly all types of sausage and cheese a fat calory content of up to 70 %".

This complaint is particularly irrelevant because when this 30 % protein calory sausage is calculated into weight percentage a typical result would be 14,6 % meat protein and 15 % meat fat (70 : 9,3 = 7,5 x 2; 30 : 4,1 = 7,3 x 2;

meat protein/meat fat = 1,0). Homogenised sausage (e. g. Fleischwurst) with this composition would be rejected by the consumer as being too dry. Even coarse inclusions of lean ham would leave it far below the optimum for agreeable consumption. A cynic might query whether it is perhaps intended to reorientate sausage to 15 % protein calories, 25 % fat calories and 60 % carbohydrate calories. In this case one might, for instance, read in a recipe book of the meat industry:

Take,
for "Fleischwurst" (meat sausage):
50 kg Bread (57, 5 % carbohydrate, 6, 8 % protein)
23 kg Meat with 15 % fat
27 litres Water

Such a "meat" sausage standardised to the ratio of 15-25-60 could well be produced. The only question is who would eat it, quite apart from the taste, in a country where people are used to eating meat and bread separately. And yet it should be said here that there still exist sausages whose fat content is so high that their protein calory content is below the total dietary requirements. When the consumer eats sausages he expects to have a protein food. The meat industry would be in a regrettable position if the consumer had to be informed that certain sausages should be eaten only together with steak or lean cottage cheese in order to avoid protein deficiency.

In a special position, however, are sausages which are intended for spreading on bread. Spreads must consist either of pure fat (butter, margarine, lard) or contain a large amount of fat. The reason for this is twofold, firstly, a carbohydrate conditioning function and secondly to ensure spreadability. Sausages intended as spreads must therefore not be compared with other meat products but with other spreads. Liver sausage, for instance, with 40 % fat and 10 % protein ranks with certain soft cheeses regarding its value at the very top because it contains not merely pure fat but in addition a considerable proportion of valuable protein.

Now to a different matter which is causing us great concern. In the last few years unsaturated fatty acids have been excessively emphasised in advertis-

ing as promoting health. These advertisements suggest that all polyunsaturated fatty acids are equally beneficial to health, without metioning that there are considerable differences amongst the various polyunsaturated fatty acids regarding their effectiveness in reducing blood lipid levels. The polyunsaturated fatty acids in vegetable fats must be converted in the body into arachidonic acid. Arachidonic acid which occurs originally in certain animal fats is much more effective than, for instance, linoleic or linolic acid.

Cis-cis-linoleic acid is only about three-quarters as effective as arachidonic acid and linolic acid is only one-sixteenth as effective. The other isomeric forms of linoleic acid which are found particularly in industrially processed vegetable fats are even ineffective. For this reason future statements on polyunsaturated fatty acids should be related to their effectiveness, for example, arachidonic acid equivalent.

Unfortunately so far there are no exact records of comparative arachidonic acid equivalents. Particularly high amounts can be expected, in animals, in the fat of fish and shellfish and then in decreasing order in chicken, rabbits and pigs. Ruminants will rank low on this scale. Amongst vegetable oils safflower oil, sunflower oil, maize oil and soyabean oil will be in a prominent position.

It will be particularly interesting to find that the fat of internal organs such as liver, brains and heart, not only contain a relatively high amount of cis-cis-linoleic acid but also a substantial amount of arachidonic acid.

Therefore meat products which contain internal organs will accordingly contain higher arachidonic acid equivalents. Naturally, in normal meat products the arachidonic acid equivalents will never be as high as in some vegetable fats. It will eventuate, however, that the fat of meat products play a substantial role in supplying arachidonic acid equivalents. On the other hand there are indications that with excessive polyunsaturated fatty acids disturbances of human health may occur, particularly when there is a relative deficiency of vitamin E. The effects are a tendency to premature aging and disturbances of reproduction. We have recently commenced systematic examinations of the fat, not only of various parts of carcases and meat products, but also fats of various bread spreads, as a basis for evaluation

of fats.

Currently when fats are discussed it is only in terms of the following properties - calories, fat soluble vitamins and essential fatty acids. It is, however, indispensable to evaluate fats also according to their accompanying functions. The attempt to evaluate fats only according to their content of polyunsaturated fatty acids must be strongly resisted. First of all it is necessary to deduct ineffective polyunsaturated fatty acids and to calculate the remaining polyunsaturated fatty acids according to their arachidonic acid equivalent. Even then one should not overemphasise the establishment of value scales, as the requirements of arachidonic acid equivalents are met without difficulty in a reasonably mixed diet. For this reason fats should be preferably evaluated according to their other functions, for instance, to accompany other nutrients (carbohydrates and protein). This will then show that meat fat as used in meat products is much more desirable than is claimed or wished for by some interests.