

Editorial

**DIETARY FIBRE – ACHIEVEMENTS, CONFUSION
AND CHALLENGES**

Next year it will be 50 years since the concept of dietary fibre was introduced. During the years passed, a substantial part of the consumers of the industrialised countries have got at least a vague impression of the importance of this group of constituents of our daily diet. Supply of consumer food products with a higher content of dietary fibre has increased, and consumers have in part changed their consumption pattern in favour of such products. However, the statistics show that in most of the industrialised countries, the average intake of dietary fibre is still far below the recommended level. Among epidemiological studies showing positive health effects, there are also numerous studies which for some reason indicate only weak health benefits for those having a higher than average intake of dietary fibre.

Initially, the concept of dietary fibre referred to plant cell wall components that are not digested in the upper part of human intestinal tract. Its chemical composition is heterogeneous, the main part being complex polysaccharides and lignin, but these can be accompanied, depending on the source, by a number of minor components such as minerals, vitamins, antioxidants and plant estrogens. Dietary fibre has thus also become an indirect measure of the degree of refinement of plant foods. Later, a number of other chemically related compounds, either isolated from natural sources or semisynthetic, have been included in this concept, and some definitions also include resistant starch in the same category.

Meanwhile, the research performed has given tools for a deeper understanding of the beneficial effects of dietary fibre and its components. Proofs or indications have been obtained relating to more than a dozen diseases or physiological effects starting from the commonly known effects on constipation, blood cholesterol, post-meal glucose and insulin, to satiety, irritable colon, prebiotic action and reducing risk of colon cancer. In a part of these, the principal contributing factor has been shown to be the viscous soluble fibre fraction, in a number of others all soluble and fermentable fibres, and for some effects, the contributing factor is the insoluble fraction, either alone or synergistically with the soluble and fermentable fractions. In contrast to chemotherapeutically used compounds, data on the dose responses are variable. This is evidently, for a great part due to the fact that the effect in many cases depends not only on the concentration but also on the physical properties, which can be different in various preparations depending on the source and processing. Unfortunately, many

research papers still refer to the intake of total dietary fibre or total soluble fibre, giving no data that would enable to estimate the real content of the effective components and their physical properties.

Recent development has enabled and encouraged food industry, as a whole, to start developing functional foods rich in dietary fibre, but after the initial boom and despite optimistic prognoses, their market is developing slowly. Consumers expect to obtain real health benefits from these, but succeed in doing so very seldom. The main reason for it is probably in most cases too low doses and/or irregular intake. The latter is partly due to disadvantageous sensory properties of many fibre-rich food products. However, also an important reason is an insufficient or even misleading labelling or consumer information. Even the definitions are not clear and specific enough, which enable and allow misleading labelling.

When a consumer looks for means to achieve some specific physiological effect, say reduction of blood cholesterol, balancing post-meal fluctuations of blood glucose and insulin, or prolonging satiety after a meal, an information of the content of total dietary fibre is not sufficient. Even the next step in the labelling, giving the amount of soluble dietary fibre does not help, since only viscous sources of soluble fibre have these effects.

A straightforward way to avoid this confusion would be to introduce in the labelling also the concept of "viscous soluble fibre", which appears already in some research publications. Another alternative would be to return to the previous practice, where inulin, oligosaccharides and resistant starch were not included in the concept of "dietary fibre". A third alternative could be to abandon the use of the whole concept of dietary fibre, and start using chemical terminology, following the British model, which introduced the concept of "non-starch polysaccharides".

In consumer information, introducing each concept takes years to get the message through, and thus radical changes or moving backwards and forwards are not desirable. Instead, clarifying the definitions and informing which of the subcomponents does what would probably get through rapidly. The concept of dietary fibre and its introduction to the consumers are valuable assets in improving the nutritional behaviour of consumers, and should not be abandoned. However, the time is now ripe for the next stage, to inform the consumer not only about the total amount of fibre but also about its three subcategories.

The great gap between the recommended intakes and those really consumed still exists. One way to reduce this gap is to develop new and reasonably priced food products with a high content of dietary fibre but still acceptable or even attractive sensorially. This is a challenge for the food industry. Another way is to improve the motivation of the consumers for changing the consumption pattern. It will not be successful unless the consumer is ensured to get some real health benefit from it. This is not possible unless the daily doses are sufficient and the elevated intake is regular. On the other hand, although we already have a great number of clinical studies showing the physiological effects of various fibre sources, the majority of them are short-term

studies. For convincing consumers, health professionals and regulatory authorities we need more long-term studies, especially those where the effects of the fibre sub-categories can be distinguished.

In addition to the commonly known effects of fibre components on blood cholesterol and on relieving constipation, information on other possible benefits should be pointed out. Application of viscous soluble fibre sources in lowering glycemic effects of meals, especially of interest for diabetics and sportsmen, has not so far succeeded in large scale, and the professional societies are careful in recommending it. The main reasons seem to be partly inconsistent results in clinical studies, lack of long-term studies and doubts of long-term compliance of the patients when implemented. Another application of great potential is weight reduction. In many countries more than 50% of the adult population has overweight or is obese, a market large enough to be of interest. For this purpose, viscous soluble dietary fibre offers the benefit of enhancing satiety and thus reducing voluntary food intake. Again, the keys are technical and product development of reasonably priced food products, and long-term clinical studies.

The present recommendations of daily dietary fibre intake have been made more or less arbitrarily, without full scientific support. After the role of the various components has started to be clarified, the recommendations can be revised, and perhaps also given separately for each subgroup. For specific physiological effects, it does not suffice to give recommendations for single or daily doses in weight units only. Since the effect is dependent on physical properties such as solubility and viscosity, the doses should be defined based on these properties.

Although for the main effects of dietary fibre components, the mechanisms of action can be regarded as clarified, there is still much work to be done in implementing this knowledge to achieve the potential health effects, and in optimising the applications. Effects of the accompanying minor components are less known. We can expect that within a reasonable time frame this group of foods, earlier undervalued as a ballast group, will increase in importance both in normal food items and in functional foods.

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