

Foreword

Introduction

We stand today at the threshold of a new frontier in nutritional sciences. The concepts of food are changing from a past emphasis on survival, hunger satisfaction, absence of adverse effect on health, and health maintenance to an emphasis on the promising use of foods to promote better health and well-being, thus helping to reduce the risk of chronic illnesses such as cardiovascular disease, some cancers and obesity.

These new concepts are of particular importance in view of the benefits for health, consumer demand, the demand of the elderly population for an improved quality of their late life, the continuous increase in life expectancy, the increasing cost of health care, technical advances in the food industry, and the changing regulatory environment.

There is already a recognition that European research expertise must be at the forefront in understanding the role of food in the maintenance and improvement of human health and well-being, in the reduction of risk of major diseases and in improving the competitive position of the European food industry. The number of major research programmes designed to investigate and clarify the health-promoting value of foods and food components is forecast to continue to grow, particularly where serious debilitating diseases are concerned, e.g. heart disease, cancers and osteoporosis.

The most recent knowledge in biochemistry, cell biology and physiology, but also in pathology, supports the hypothesis that diet also controls and modulates various functions in the body, and, in doing so, participates in the maintenance of the state of good health necessary to reduce the risk of some of the diseases. It is such an hypothesis which is at the origin both of the concept of 'functional food' and the development of a new scientific discipline 'functional food science'.

Functional food science aims to (1) identify beneficial interactions between the presence or absence of a food component (whether a macronutrient, micronutrient or so-called non-nutrient) and a specific function or functions in the body, and (2) understand their mechanisms, so as to support hypotheses to be tested in protocols relevant for human studies. The demonstration, in human subjects, of a specific interaction with one or a limited number of functions in the body will support a specific, often well-defined, claim of functional effects or disease risk reduction. Functional food science is indeed part of nutrition science, where the objectives are to maintain health and improve well-being and to create the conditions for disease risk reduction, and it is, in this respect, quite distinct from the medical or pharmaceutical sciences, where the objectives are mainly to cure diseases.

A food is said to be 'functional' if it contains 'a food component (whether a nutrient or not) which affects one or more targeted functions in the body in a positive way'. It can

also include foods in which a potentially harmful component has (or components have) been removed by technological means.

European Commission objectives

An important objective is to improve the understanding of the role of food in the general health and well-being of the European consumer. Food can play a major role in maintaining and improving human health and well-being and in reducing the risk of major diseases. This will also lead to the design of special or tailored foodstuffs and ingredients for specific population groups or for specific health benefits. This will be an expanding area for the food industry in the future, and European industry, building on the considerable European research expertise, must be at the forefront here. This will involve multidisciplinary research projects combining the expertise of scientific partners, such as biochemists, nutritionists, the medical professionals and process technologists.

The food and drink industry ranks as a major European industry processing raw materials from agriculture, horticulture, fisheries and aqua-culture into the diverse range of quality foodstuffs which are produced throughout Europe. Research in this sector has the major objective to improve the competitive position of the food industry which is composed of leading multinationals and a wide range of small and medium-sized enterprises specializing in food throughout Europe.

ILSI Europe's role

In response to these critical developments, ILSI Europe has elaborated a project proposal for a European Commission Concerted Action aimed at establishing a science-based approach for concepts in functional food science. The goal of this concerted action is to establish a multidisciplinary European network to (1) critically assess the science base required to provide evidence that specific nutrients positively affect functions, (2) examine the available science from a function-driven point of view rather than a nutrient-driven one, and (3) reach consensus on targeted modifications of food and food constituents, and options for their application. This approach aims to provide key actors from Europe's food and agricultural industry, governmental and inter-governmental bodies and the scientific community with an opportunity to exchange ideas and interact on a neutral platform.

The project

The Functional Food Science in Europe (FUFOSE) project was submitted in March 1995, approved in November 1995 and was expected to attain its objectives over a period

of 3 years. Project management and coordination was especially provided by ILSI Europe. Overall guidance on scientific and organizational issues was ensured through a steering committee, comprising members from both industry and academia.

To attain the project objectives, the steering committee established individual theme groups (ITG) and organized a series of plenary meetings.

The project started with a first plenary meeting, Functional Food Science in Europe: State of the Art, held 2–4 April 1996 in Nice, France. Based on the results of this meeting, six areas in human physiology were identified to be reviewed by the ITG responsible for producing theme papers to critically review the science base of the concept. The final composition of the ITG included industry and non-industry scientists. A draft brief was prepared by the steering committee to be addressed by each ITG while reviewing the literature data:

- (1) characterize specific body systems, including state-of-the-art;
- (2) critically assess methodologies to characterize and quantify specific related functions;
- (3) identify and critically assess nutritional options modulating these functions;
- (4) evaluate potential safety implications related to these nutritional options;
- (5) identify the role of food technology in nutritional and safety aspects;
- (6) critically assess the science base required for providing evidence that specific nutrients positively affect functions;
- (7) identify areas where further research is required.

The resulting documents were scrutinized in a Second Plenary Meeting held in July 1997 in Helsinki, Finland, and revised by the ITG chairs to include the comments made. The final reports of the six ITG are published in this issue of the *British Journal of Nutrition*.

The papers need to be considered in the context of the entire project. They are not individual contributions and they form, all together, the reference to the FUFOSSE project. Some repetitions, overlaps and contradictions may still appear. Only by reviewing all six papers will the reader have a balanced overview of both primary and secondary effects of functional foods.

Consensus document

These ITG papers provided the building blocks for a more general consensus document *Concepts in Functional Food Science and Options for their Application*. The outline of this consensus document was prepared based on the recommendations of the ITG and the steering committee members. This outline was also reviewed by the participants in the second plenary meeting who provided comments to be taken into consideration. The topics that will be addressed in the consensus document include the following.

- (1) Introduction.
- (2) Scientific basis for functional food science.
- (3) Target functions in relation to health outcome.
- (4) Food technology.

- (5) Research needs.
- (6) Communication of the health benefits of functional foods.
- (7) Conclusions.

The expert group that undertook the elaboration of the text was composed of two ITG chairs and four members of the steering committee. The document is currently under review. The goal is to publish this consensus document also in the *British Journal of Nutrition*.

Food technology

A group of experts on food technology have also been selected to examine the impact and feasibility of food technology on functional food development. Relevant viewpoints are: safety, nutrition and consumer acceptance/sensory quality. This expert group has identified areas to concentrate on and terms of reference to be followed. Once the report is completed, it will be reviewed by the participants in the third plenary meeting. As soon as the comments are all taken into consideration, the paper will be published in a scientific journal.

Acknowledgements

We wish to thank, especially, all of the individual contributors to this FUFOSSE project for devoting their time and efforts within such a tight timeframe. Their commitment and dedication will be remembered as exceptional and highly enthusiastic. Authors and contributors can be assured of ILSI Europe's recognition and they will be paid tribute, as often as possible. Through their collaborative work they have participated in the making of ILSI Europe's history and the Institute is extremely grateful to all.

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