In addition to nutrition demands, the modern consumer also considers food as a source of pleasure, means to express values in life, and means to maintain well-being. This is a challenge both for the food industry and food authorities. The consumers wish convenience and enjoyment in their eating patterns, but at the same time they want healthiness in an easy way. Finland is a pioneer country in developing new alternatives for constructing a healthy diet.

The Finnish concept of connecting food and health is inspired by the famous North Carelia project which was initiated by the fact that on certain geographically areas of Finland especially the middle-aged males’ mortality rates due to cardiovascular diseases was statistically extremely high. The extensive research programs started in the 70’s to tackle the problem and the main targets were the high blood pressure, high levels of HDL-cholesterol, overweight and smoking. Most of the reasons were clearly diet originated and due to extensive dietary counselling a slow but steady change towards the changing of eating habits began.

In the first generation of new “healthier” food products both the butter-substituting spreads rich in poly-unsaturated fatty acids and salts with lower sodium content came to the market. Fat-free milk also now is the most commonly used milk in Finland. Later on in the 90’s especially the spreads and other fat containing food products were developed further with improved ingredients such as plant sterols and stanol esters. They were among the first to have product-specific cholesterol-lowering claims, and are now in wide use internationally.

A much more rapid break-through happened with the sugar alcohols and especially xylitol in the prevention of the dental caries in Finland in the late 70’s and early 80’s. The kids in the day-care were soon recommended by the Finnish authorities to have a piece of xylitol-containing chewing gum after every meal and snack. Gradually the use of xylitol has then spread to most continents.

The market entrance of the Lactobacillus-containing dairy products started in the 80’s first with fairly moderate health claims, but by late 90’s they finally reached the summit expressions such as “products containing life-saving bacteria”. Hand-in-hand with these products developed also the convenient, single serve bottles. The health effects of the probiotic strain LGG are now reported in hundreds of scientific articles, and the use of this lactic acid culture in the health food market is global.

The health food research focus moved in the 90’s further on to include dietary fibre and many bioactive plant phytochemicals. The interest in the health benefits of grains has already led to production of oat bran ingredients rich in viscous high-molecular beta-glucan, enabling production of foods...
with cholesterol-lowering and slow glycemic properties. Oat ingredients also are suitable for celiac patients. The health benefits of whole grain rye have been widely demonstrated, and include improved insulin metabolism and gut health.

At VTT, three research programs have been conducted in this area in 1996-2004. The program “Tailored Technologies for Future Foods” (TTFF) was conducted in 2001-2004 and it continued the VTT approach to exploit biosciences for specific processing and tailored product quality attributes. The program focused at the use of bioprocessing and combined processes to improve the sensory quality, health effects and safety of food. A key area was the development of enzyme technologies for tailoring of food structures and careful optimisation of the health benefits of foods. The program also aimed at understanding consumer food choice and the demands for future foods. Specific research teams worked on enzymatic modification of food materials, seed factory, microbial viability technology, bioencapsulation, structure engineering, physiological functionality and consumers and sensory quality.

The research results include enzymatic tailoring of rye, oat and high-fibre wheat bread texture, process-induced increase of rye bioactivity and design of cereal flavour. Enzymatic structure engineering concepts included also search for novel cross-linking enzymes, and their use in proteinaceous food materials. Starch-based microcapsulation aimed at controlling stability of bioactive components. Enzymatic extraction of berry juice and especially phenolic compounds was developed, and berry phenolics were studied as selective inhibitors of the growth of intestinal pathogens. Methods for assessment of digestibility and gut bioconversions in vitro were developed. New technology was developed to produce plant-derived compounds in cell cultures, and also to increase and assess viability of probiotic bacteria. Germination was used as a tool to modify seed structure and composition for novel food applications. Consumer perceptions of functional foods were studied as well as perception of troublesome eating among the elderly.

In Finland the interest in food and health is continuing. Two national technology programs in this field funded by The National Technology Agency of Finland (Tekes) were just completed. The Finnish National Fund for Research and Development (Sitra) now has identified nutrition as one of its focus areas. The objective of Sitra’s Nutrition Programme is to generate major public health benefit and develop significant new business in the field of healthy nutrition. The Programme will focus on development projects relevant to weight control. Weight control involves substantial economic and public health potential. The goal is to put Finland in the forefront of healthy nutrition.

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