



Consumer Experience Links To Acceptance (CROSSENZ)

Sensory properties, such as texture, play a major role in consumer perceptions of food product quality. However, many ingredients traditionally used to improve food structure, like emulsifiers and thickeners, are now regarded negatively by consumers. The use of enzymes could bring new structures and textures to food products by promoting cross-linking between food components. The CROSSENZ project looked to develop new enzymatic products, evaluate their potential for use in the food industry and assess their acceptability to the consumer and industry. The project showed that direct consumer experience of new food technology can increase acceptability.

Enzyme engineering for food structure

The “mouth-feel” and other textural and sensory properties of food are an essential component of its perceived quality. Food structure is particularly important in baking, dairy and processed meat products. The significance of textural properties has further increased with the trend towards low-fat, low-calorie and low-additive content products. Traditionally, food structure has been improved by using ingredients such as emulsifiers or thickeners. However, consumers tend to take a rather negative view of many of these ingredients.

One potential new food structure technology is to use enzymes. These natural ‘catalytic’ molecules are able to transform components in the food into functional ingredients during food processing and manufacturing. Enzymes can produce a variety of cross-linking between proteins and/or certain carbohydrates either directly or indirectly to engineer new food structure and texture. The main scientific goal of the CROSSENZ project was to develop new enzymes, understand the nature of their cross-linking

function and correlate this with food structural and sensory properties. The goal was also to elucidate consumer’s and food industry’s perception towards the developed technologies.



Consumer attitudes

Consumer attitudes are of utmost importance when new technologies are developed and implemented into food production. Consumers are not usually aware of details of food production, and many consumers are not aware of the use of enzymes. However, consumers may form attitudes to certain food production technologies, including use of enzymes, when they become confronted with information about it, and these attitudes may prevent them from buying products where these technologies have been used. The way in which these sceptical attitudes enter the formation of intentions to buy products produced using enzymes produced in different ways, and especially the possible trade-off of a negative attitude towards the production method with additional sensory benefits, is presently not well-understood.

New enzymes, new attitudes

Currently, only a few enzymes are being used for food structure engineering – of which microbial



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transglutaminase is the most widely known. Researchers involved in the CROSSENZ project have focused their studies on novel oxidative enzymes obtained from edible plants and natural microbes that can cross-link food proteins and carbohydrates.

A number of different oxidative enzymes able to cross-link both proteins and carbohydrates in the food matrix were discovered. Several potential cross-linking enzymes were identified and their suitability for cross-linking on both protein- and carbohydrate-based materials was explored. The mode of action of the enzymes was determined and their suitability in different dairy and baking applications was studied. The enzymes show potential for improving the strength of different protein-based networks, for example, in bread quality or for improving the texture of dairy products.

The consumer-acceptance studies have provided an interesting asset for enzyme development work. The study investigated how consumers form attitudes towards enzyme production methods and price. It showed that attitudes towards the use of enzymes in food production are fairly neutral, whereas attitudes towards use of gene technology in food production and enzymes produced by use of gene technology are more negative. A second study investigated whether product experience has an impact on attitudes towards enzymes used in processing. In blind tasting tests in three countries, the enzyme products were consistently preferred to the non-enzyme product. Studies in the food industry showed that acceptance of the technology is closely linked to an individual company's policy towards GMOs, the relevance of the functionalities for their products and cost-benefit analyses both in their production process and the market.

Tasting is the key

The novel enzyme technology can bring about improved textural product features, especially in low-calorie, low-fat products. This should make such products more palatable. In general, the CROSSENZ project has generated new concepts for food

structure engineering that can have an impact on food quality across the market.

The work on consumer perception shows product tasting can positively change consumer attitudes towards new technology. Consumers who tasted products that had been improved using enzymes clearly developed positive attitudes towards the use of modern technology in food production compared to a group who did not taste the products.

More information

Project website: <http://crossenz.vtt.fi/>
Prof. Johanna Buchert, VTT Biotechnology,
PO Box 1000, 02044 VTT Finland.
Email: johanna.buchert@vtt.fi

Project Essentials

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