

## CONSUMER-ORIENTATION IN THE DEVELOPMENT OF FUNCTIONAL FOODS:

### A RESEARCH UPDATE

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### **Abstract**

Today's food business arena can be best characterised as a mainly technology-driven environment whose survival is constantly challenged by a highly consumer-oriented market, demanding the continuous development of evermore innovative products that meet expectations. The shortening of products' life-cycle and an increasing consumer demand for more food variety and quality has led to a pressing need for approaches that can help plan, structure and systematise food quality improvement and new product development in a consumer-oriented manner. This paper shows a research update on the issue of consumer-oriented food product development, with the focuses on research projects and findings relevant to the development of functional foods. The paper starts by presenting the concept of consumer-oriented new product development and its implications for the food industry. This introduction is followed by a simplified description of the product development process in a consumer-oriented framework, exemplified with the help of on-going research projects that specifically address the development of functional foods. These examples are also used to highlight the possibilities and pitfalls of the (consumer-oriented) development of functional foods.

### **Keywords**

Consumer-orientation, New Product Development, Consumer, Health, Functional Foods

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## 1. An introduction to consumer-oriented food product development

There are mainly two types of reasons why food companies develop and market new products – changes in the food chain environment and increasing profitability<sup>1</sup>. Upstream changes in the food chain, like product/process reformulation due to supplier, package or ingredient modification, are a common reason leading food companies into new product development (NPD). But downstream changes, such as modifications in the distribution channels, market introduction of a competing product or internationalisation, may also force product development. Finally, chain environment factors like the availability of new technologies (bringing production cost reductions or higher quality consistency), or restrictions imposed by governmental and supra-governmental legislation can also motivate product innovation<sup>1-2</sup>. In any of these situations, we are dealing with a *product-oriented approach* to NPD<sup>3</sup>, with companies trying to sell what was developed rather than developing what people want to buy. In this type of approach, the input of consumers in the product development process (if any) is limited to knowledge of whether or not consumers will buy the product or accept its production technology.

However, to gain more understanding of what consumers want, how these wants change and how they can be promptly satisfied is not only a factor of success for food businesses but ultimately one of mere survival. Given the current failure rates of NPD in the food area<sup>1-2</sup>, it appears that the food chain's economical sustainability will increasingly rely on its own ability to continuously develop innovative and differentiated new products with added consumer value. Companies who are able to anticipate or uncover consumer demand, deliver against this demand and communicate it effectively highly increase their chances of success<sup>4-6</sup>. This is particularly true in the current context of market's internationalisation and deregulation, where companies have to produce and sell foods to unfamiliar consumers and face increased competition<sup>4,7</sup>.

*Consumer-oriented new product development* is an integrated concept concerning the use of the current and future needs of consumers and its determinants, in the development of improved or innovative products/services with consumer added value<sup>4,8</sup>. The main principles of consumer-oriented New Product Development are:

- (a) the needs of consumers should be the starting point in the NPD process;
- (b) the goal of NPD should be the fulfilment of consumer needs and the realisation of consumer value rather than the development of products or enabling technologies *per se*;

(c) Only by identifying, anticipating and satisfying consumer needs can sales and satisfactory returns on investments be achieved; thus the measure of success of a NPD process should be the degree of fit between the new or improved product and consumer needs <sup>4,7</sup>.

By aiming at the structured and timely development of products and services better matching consumer needs, consumer-oriented NPD promotes the effectiveness and efficiency of the product development process, therefore promoting the social and environmental sustainability of food chains.

The key stages in the formulation of a consumer-oriented NPD approach are *need identification*, *idea development to fulfil the need*, *product development to substantiate the idea* and *product's appropriate market introduction*, communicating the need's fulfilment <sup>6</sup>. At their core is the ability to “translate” abstract consumer needs (e.g. healthy, convenient) into specific, quantifiable product attributes, in order to substantiate the fulfilment of these needs in a physical product (Figure 1). <sup>4</sup>

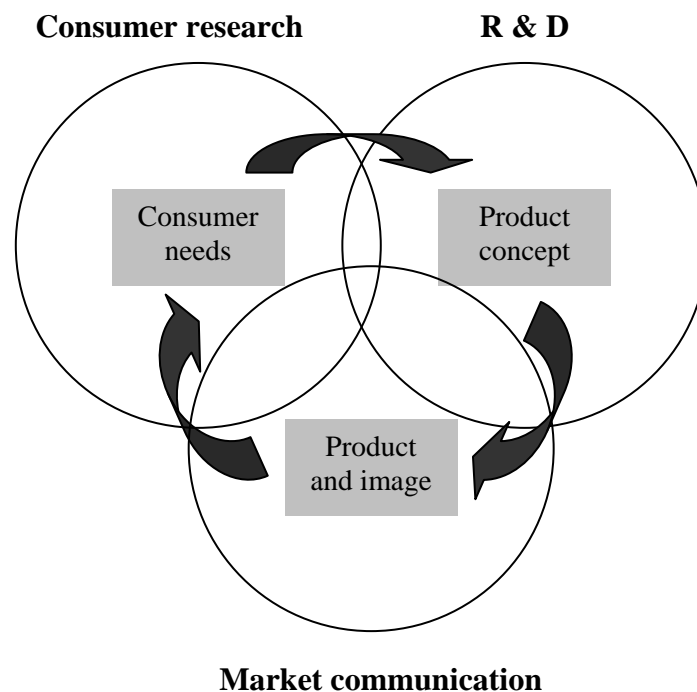


Figure 1 – Multidisciplinary cycle of consumer-oriented new product development. Block arrows indicate “translation” processes.

Ultimately, the practice of consumer-oriented NPD implies that a successful integration between the knowledge and efforts of both research and development (R&D) and marketing has been achieved. Such integration is, however, a notoriously difficult process in any organisation <sup>9</sup>. By encouraging cross-functional communication, multidisciplinary work and the development of a common language with a focus on user needs, consumer-oriented NPD contributes not only to the increase of the likelihood of success of new products, but also to the effectiveness of research in food science and technology.

## **2. Consumer-oriented product development: the case of functional foods**

### **2.1 Need and opportunity identification (idea development to fulfil the need)**

A basic vector for the success of a product development strategy is a user or consumer-oriented philosophy of seeking to understand consumer needs and desires <sup>6</sup>. The use of technology as a source of product ideas is crucial to successful product development, but the needs of consumers are, at least, an equally important source of product ideas. Moreover, it is vital for companies to have some knowledge of whether a certain concept or product is actually needed or wanted, or if consumers will accept the technologies necessary to produce it <sup>10</sup>. In other words, it is vital for companies to know whether a market need can become an actual market opportunity.

The food industry is actively following the developments of the functional-food market, which have their origin in a fortunate combination of events:

- The steady development of the necessary enabling knowledge and technologies (for example, in the fields of biotechnology and pharmaceuticals);
- The interest of governments and other institutions in cutting down on present and future health-care costs through the prevention of ageing diseases;
- An increasing awareness of the relationships between diet and health by consumers that is expected to motivate the large-scale consumption of health-promoting foods <sup>11</sup>.

The thought of asking consumers if they view health-promoting foods as desirable, or even necessary, has naturally not crossed many minds. It seems almost absurd to think that people may not be interested in products that actively prevent life-threatening diseases or can increase their well being. But what do the consumers actually think about the whole topic of health, diet and functional foods? Can their consumption behaviour be

easily influenced by the awareness of the relationship between diet and health? If that is so, how can we explain the relative failure of the attempts of health-professionals to persuade the western population to change its diet in order to prevent obesity and ageing diseases?<sup>12</sup>

Research results recently published in The Netherlands<sup>13</sup> point out that in spite of the potential attractiveness of functional foods for consumers, there are many aspects of these foods that can negatively influence the perception and the attitudes of consumers towards them. Some of these factors are the credibility of the claims and the producers themselves, the link between biotechnology and the production of functional foods, a certain artificial character associated with such foods, the price and a general lack of valid information about functional foods. Above all, consumers seem to ask themselves 'Is this something for me? Do I need to eat these foods to be healthy'? There is a general belief that all foods should promote health and that a balanced diet should be sufficient to prevent diseases and ensure long-lasting well being<sup>13</sup>. Therefore, and regarding the development of new functional foods, it may be wise to ask and actively try to answer the following questions:

- Is the concept or product desired? Is it seen as necessary? And by whom?
- Is the potential market segment big enough?
- Does the product actually deliver what it claims? Do consumers believe it?
- Can we make it in a near future? What technologies must we use? Will potential consumers accept these technologies?
- Is the added value big enough to persuade people to integrate the product in their normal diet?

There are a few on-going research projects that try to obtain answers to some of these questions. One of these projects aims to capture and measure the relevant perceptions, emotions and experiences of consumers regarding health and foods through a creative process<sup>14</sup>. Another investigates the possibility of mapping out in the same perceptual space the consumers' evaluation of ideas for new functional foods along with the experts' evaluation of the scientific and technological feasibility of these ideas<sup>15</sup>.

## **2.2 Product development to substantiate the idea**

By taking the consumer needs as the starting point for the NPD process, the practice of consumer-orientation in food product innovation explicitly demands the reversal of the

structure of food production chains. That is, the consumer is no longer the mere end-point of the production chain, but becomes actually its 'raison de être', its driving force. Moreover, consumer-orientation implicitly stresses the need to for a chain-oriented approach to product development, which considers the whole food supply chain from consumers, through processing up to the breeders in one integrated concept<sup>16</sup>. In order to substantiate the ideas generated from consumer needs into actual products, food companies need, therefore, to put increased emphasis on establishing quantitative relationships between consumer needs and product characteristics in an integrated, food chain approach<sup>17,18</sup>.

The possibility of using Quality Function Deployment (QFD) – a set of planning tools facilitating the market introduction of new or improved products/services by structuring and controlling the development process from idea to market– in the consumer-oriented development of foods has been investigated in the last years<sup>18</sup>. QFD aims at replacing informal, intuitive decision-making processes in NPD by a structured methodology that compiles all relevant information and company expertise available in an integrated manner. At the core of the QFD methodology lays the explicit demand for the quantification of the relationships between consumer needs and product characteristics. However, QFD does not give the product development team any indication of what relationships do exist or how they look like. The application of QFD in food product development is therefore highly depend on the development of chain-wide mathematical models establishing and quantifying such relationships<sup>18</sup>.

A line of research intending to investigate the application of predictive modelling of health aspects in food production chains has been recently initiated<sup>19</sup>. This research proposes that in order to get a realistic estimation of the health effects of bio-active compounds from foods, a quantitative approach throughout the entire production chain is an absolute requirement to obtain reliable intake data. The researchers have demonstrated, *via* the mathematical modelling of the dynamic changes in the concentration or structure of glucosinolates found in *Brassica* species, that many steps of the food production chain of vegetable products can have a large influence on the final intake of health protective compounds<sup>19</sup>. Future research in this area involves the expansion and optimisation of the mathematical models and the use of the resulting data to build a chain-information model that can help streamline the consumer-oriented development of foods with health benefits<sup>20</sup>.

### **2.3 The appropriate market introduction of the product**

Once a new product has been developed, a communication process is required which makes the consumers aware of the product's existence and demonstrates how the characteristics of the product satisfy their needs (Figure 1) <sup>4</sup>. Especially in the case of the development of functional foods, an effective communication process is crucial for success. If consumers do not understand or appreciate the need to change their food consumption, they will not accept this change or behave accordingly to it in a consistent manner. To achieve this, consumers have to strongly believe in the health benefits to be gained by introducing a new product in their diet. If functional foods and its enabling technologies are to be successfully introduced in the market, the technological know-how behind them has to be translated in understandable and acceptable terms for the consumer. Consumers must be given the opportunity to make choices based on credible and widely available information <sup>10</sup>. Institutions related with public health can play a major role in this process by explicitly or implicitly supporting the claims displayed by the new products.

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### **References**

- 1** - Fuller, G.W. (1994). *New food product development: from concept to marketplace* (pp. 225-247). Montreal: G.W. Fuller Associates, Ltd.
- 2** - Best, D. (1991). Designing new products from a market perspective. In E. Graf & I.S. Saguy, *Food product development: from concept to the market place* (pp. 1-28). New York: Van Nostrand and Reinhold.
- 3** - Schiffman, L.G. & Kanuk, L.L. (2000). Consumer motivation. In *Consumer Behavior* (pp. 1-13, 63-93). Prentice-Hall International: Upper Saddle River, NJ.
- 4** - Van Trijp, J.C.M., & Steenkamp, J-B. B.M. (1998). Consumer-oriented new product development: principles and practice. In W.M.F. Jongen & M.T.G. Meulenberg, *Innovation of food production systems: product quality and consumer acceptance* (pp. 37-66). Wageningen: Wageningen Pers.

- 5** - Kohli, A. K., & Jaworski, B.J. (1990). Market orientation: the construct, research propositions, and managerial implications. *Journal of Marketing*, 54 (1), 1-20.
- 6** - Urban, G.L., & Hauser, J.R. (1993). Design and marketing of new products, 2<sup>nd</sup> ed. (pp. 1-162). Prentice-Hall, Inc.: Englewood Cliffs, NJ.
- 7** - Grunert, K. G., Harmsen, H., Larsen, H.H., Sorensen, E., & Bisp, S. (1997). New areas in agricultural and food marketing. In B. Wierenga, A. van Tilburg, K.G. Grunert, J-B. E.M. Steenkamp & M. Wedel, *Agricultural marketing and consumer behavior in a changing world* (pp. 3-30). Boston: Kluwer Academic Publishers.
- 8** - Grunert, K. G., Baadsgaard, A., Larsen, H.H., & Madsen, T.K. (1996). Market orientation, product development and competitive advantage. In *Market orientation in food and agriculture* (pp. 1-18). Boston: Kluwer Academic Publishers.
- 9** - Griffin, A. & Hauser, J.R. (1996). Integrating R & D and marketing: a review and analysis of the literature. *Journal of Product Innovation Management*, 13, 191-215.
- 10** - Meulenbergh, M.T.G., & Viaene, J. (1998). Changing food marketing systems in western countries. In W.M.F. Jongen & M.T.G. Meulenbergh, *Innovation of food production systems: product quality and consumer acceptance* (pp. 5-36). Wageningen: Wageningen Pers.
- 11** – Louwes, A.C.M. (1997). Voedings- en farmaceutische industrie naderen elkaar. *Voedingsmiddelen en Technologie*, 58 (6), 20-21.
- 12** – De Graaf, C., van der Gaag, M., Kafatos, A., Lennernäs, M., & Kearney, J.M. (1997). Stages of dietary change among nationally-representative samples of adults in European Union. *European Journal of Clinical Nutrition*, 51 (Suppl. 2), S47-S56.
- 13** - Dagevos, H. and Stijnen, D. (2001). Consumenten-in-zicht: plussen en minnen van functional foods. *Voedingsmiddelen en Technologie*, 34 (4), 34-36.
- 14** – Sijtsma, S., Linnemann, A.R., Gaasbeek, T. van, Dagevos, H. and Jongen, W.M.F. (2001). Measuring the affective aspects of health perception related to product attributes. Paper submitted to the 4<sup>th</sup> Pangborn Sensory Science Symposium to take place in Dijon, France in July 2001.
- 15** – Kleef, E. van, Lans, I. van der, Luning, P., Trijp, H. van and Jongen, W.M.F (2001). A new integrated approach for opportunity identification in new product development (in preparation).
- 16** – Linnemann, A.R., Meerding, G., Meulenbergh, M.T.G. and Jongen, W.M.F (1999). Consumer-oriented technology development. *Trends in Food Science and Technology*, 9 (11-12), 409-414.

**17** - Saguy, I. S. & Moskowitz, H.R. (1999). Integrating the consumer into new product development. *Food Technology*, 53 (8), 69-73.

**18** – Costa, A.I.A., Dekker, M. and Jongen, W.M.F. (2000). Quality Function Deployment in the Food Industry: A Review. *Trends in Food Science and Technology* (in press).

**19** – Dekker, M., Verkerk, R. and Jongen, W.M.F. (2000). Predictive modelling of health aspects in the food production chain: a case study on glucosinolates in cabbage. *Trends in Food Science and Technology*, 11 (4-5), 174-181.

**20** – Benner, M. and Verkerk, R. (2001). Glucosinolaten in kant-en-klaarmaaltijden. Kennismanagement bij productontwikkeling. *Voedingsmiddelen en Technologie*, 34 (4), 34-36.