

**Development of a framework for the design of minimum processing strategies  
which guarantee food quality and safety -  
Principles, concepts and recommendations for the future**

U. Kretzschmar<sup>1</sup>, A. Ploeger<sup>2</sup>, O. Schmid<sup>3</sup>

**Key words:** Food processing, regulations for organic food processing, consumer perception, organic food

**Abstract**

*Principles of processing of organic and 'low input' food have been analysed in the EU funded QLIF project. A literature survey showed that some of the principles are generally accepted (e.g. the use of certified organic ingredients, a certified production chain and minimal use of additives), others are shared broadly (e.g. more careful processing methods, naturalness) and some principles are in discussion mainly in the private sector (e.g. environmental management concepts, social requirements, regional focus). Recent studies showed that consumer associate organic food with the following dimensions/attributes: health, high quality, the use of natural raw materials, welfare orientated animal husbandry as well as environmentally friendly land use and processing techniques. The challenge will be to consider such wider consumer perceptions and expectations, in particular when revising the EU regulation No 2092/91 on organic food and farming. In the current draft for revised regulation, agreed generally by the EU Council on 19-20 December 2006, some of these elements are included, but not all. How detailed such aspects should be regulated in implementation rules is seen quite differentiated by processors and non-processors which were asked in a Delphi Survey, depending on the different areas. At the EU regulatory level, the top priority mentioned was the minimal use of additives, followed by minimal and careful processing. Quality/sensory aspects, however, were not seen as primary objectives at the EU level, because companies should have the chance to develop individual sensorial profiles for their products. However, regarding the minimum use of additives this is clearly perceived to be an EU level issue. There is also a tendency to prefer additives of certified organic origin, both among 'processors' as well as 'non-processors' points of view. The challenge in the future will be to develop regulations with the right balance between authenticity, health orientation and convenience to maintain the confidence of consumers and credibility of the products in the use minimum and careful processing strategies permitted under organic farming standards.*

**Introduction**

This synthesis paper contains the final results of work done in a subproject on processing within the EU-funded integrated QLIF Project (Quality of Low Input Food).

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<sup>1</sup> Food quality and safety division, Research institute of Organic Agriculture, CH-5070 Frick, Switzerland, E-mail:[ursula.kretzschmar@fribi.org](mailto:ursula.kretzschmar@fribi.org), Internet [www.fribi.org](http://www.fribi.org)

<sup>2</sup> Department of Organic Food Quality and Food Culture at Kassel University, DE-37213 Witzenhausen, E-mail: [amp@uni-kassel.de](mailto:amp@uni-kassel.de)

<sup>3</sup> Socio-economics division, Research institute of Organic Agriculture, CH-5070 Frick, Switzerland, E-mail: [otto.schmid@fribi.org](mailto:otto.schmid@fribi.org), Internet [www.fribi.org](http://www.fribi.org)

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A special work package dealt with the 'Development of a framework for the design of 'minimum' and 'low input' processing strategies, which guarantee food quality and safety'.

### Materials and methods

The synthesis of this work is based on: a literature survey; a Delphi expert survey; an analysis of consumer studies and the relevant regulatory framework; and the elaboration of recommendations by the consortium involved in the sub-project.

Between October 2004 and May 2005 a two-step expert survey was conducted using the Delphi method. In the first round, 250 experts in 13 countries in Europe were involved, and were asked to respond to a standardised questionnaire. The Delphi expert survey was designed in such a way that the most important and currently discussed aspects regarding organic food processing were taken up. One hundred and twenty experts from 13 countries responded in the first round and 83 experts from 13 countries responded in the second round. The experts were chosen in such a way as to have a good representation of food processors from different sectors, with different field of activities. In the first round, 55% experts from food processing companies and 45% experts from non-processors (e.g. research, consultation, certification, consumer information, government agencies), and in the second round 46% experts from food processing companies compared to 54% experts from non-processors participated.

### Results

#### a) Literature survey on underlying principles of organic and 'low-input' food processing

The literature survey (Schmid et al. 2005) focused on the underlying principles of organic food processing. These were shown to be quite different depending on the type of product, the level/standard of processing and marketing concepts. Some of the principles are generally accepted (e.g. the use of certified organic ingredients, a certified production chain and minimal use of additives), others are shared broadly (e.g. more careful processing methods, naturalness) and some principles are under discussion mainly in the private sector (e.g. environmental management concepts, social requirements, regional focus).

Clearly there was - until 2006 - a lack of guiding principles and related criteria needed to make a decision about the various processing methods under discussion.

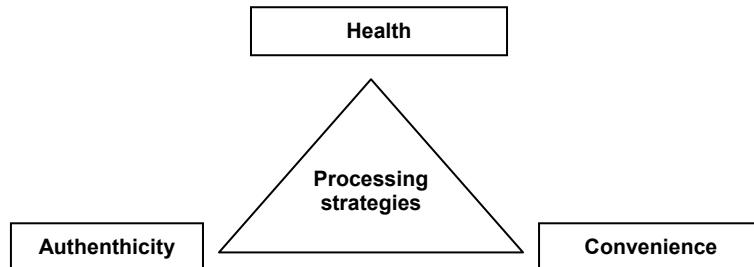
The report shows that the current EU Regulation 2092/91 covers a number of consumer perceptions such as certification system, traceability, minimal use of additives, labelling concepts and the use of organic raw materials. However, other consumer expectations such as careful processing, freshness, healthy nutrition and fair trade are not fulfilled.

#### b) Consumers perception towards processed organic foods: Food Quality in the triangle between authenticity, convenience and health.

Results from QLIF-subproject 1, which is dealing with the "Consumer attitudes towards the quality and safety of organic and low input foods" (Midmore et al., 2005), indicate, that consumer attitudes to organic food quality are often vague, unstable and link food to health, environment, ethics and identity. The literature surveys on organic consumer characteristics, consumer knowledge and product perception (Midmore et

al., 2005; Wier/Calverly, 2002; Woodward/Meier-Ploeger, 1999) emphasize that "merit good" features are associated with organic quality dimensions such as: use of natural raw materials; welfare oriented animal husbandry; environmentally friendly land use and processing techniques, contributing not only to individual benefits in terms of healthy eating, but also to social and environmental goals. The authors state that the most intangible aspects of quality perception are found in the emotional sphere.

On the other hand the development of the organic market shows a trend to more and more convenience and highly processed foods, because of lifestyle changes among consumers buying organic products (Michelsen et al, 1999; Hamm et al, 2004). Can these different concerns and expectations be addressed at the same time? Is it time to re-assess carefully the meanings of "natural" and "authentic" of organic foods in growing markets (Gallmann, 2000; Holt, 1993; Meier-Ploeger, 2002; Nielsen, 2000)?



The concepts of a natural (whole-food) and sustainable nutrition in the global organic food market are therefore currently under discussion. This includes the topics of authenticity of foods and health aspects of organic processed food. The question is, if technical developments in food processing as well as revisions of standards or EEC regulation 2092/91 could influence and develop organic food production systems towards: **(a)** shorter and local supply chains, **(b)** minimum processing, **(c)** the introduction of environmental management systems in organic processing companies. Such steps would be necessary to improve the match between the currently available organic processed foods, the current consumers perceptions and expectations towards such foods and the aims of EU regulation 2092/91!

#### c) Relevant regulatory framework

The new EU regulation 1924/2006 on nutrition and health claims of the EU Parliament and Council (Brussels 2006) focuses on authenticity, product quality and health.

In the revision of the EU regulation 2092/91 for organic food and farming, which was lively discussed since December 2005, principles and criteria for organic food processing were elaborated. In the version, that was generally agreed by the Council in its meeting in December 2006, but will still have to be ratified in spring 2007 a number of interesting elements can be found. The overall principles agreed, strengthen the focus on a system approach to organic farming, which is based on using system internal resources, instead of external inputs. If such inputs are used they should be preferably from organic production or natural or naturally-derived substances and only in exceptional cases synthetic products. The proposed processing principles for organic food require the use of organic inputs and restricting the use of food additives, non-organic ingredients, micro-nutrients and processing

aids. Substances and processing methods which may mislead consumers regarding the true nature of the product shall be excluded (e.g. reconstituted fruit juice with a claim "natural fruit juice"). Food, but also feed, shall be processed with care, preferably by use of biological, mechanical and physical methods. The proposed general rules for processed food require that "substances and techniques, other than by adding natural flavourings, that reconstitute properties which are lost in the processing and storage of organic food, that correct the results of negligence in the processing of these products or that otherwise may mislead regarding the true nature of these products shall not be used" (Brussels 2006). The criteria for authorisation of certain products/substances in processing are that these substances **(a)** are technologically needed, **(b)** are found in nature and **(c)** may only have undergone mechanical, physical, biological, enzymatic or microbial processes, except for cases in which products and substances from such sources are not available in sufficient quantities or qualities on the market. It is, however, currently unclear how exceptions from the production rules regarding additives and other substances will be handled.

The proposed principles, rules and criteria for substances to be used in organic processing reflect to a high degree the concerns of consumers as well as those of processors (see below). The principle of authenticity is clearly stated, but without using the term as well as the principle of care in the processing of food. The minimum use of additives, mainly from natural origin, remains one of the key issues, whereas environmental objectives are mentioned, but not defined as rules. Social rules are missing. Much will depend from the planned implementation rules, which the EU Commission will elaborate for 2009, when this new regulation should be put in force.

d) Approaches Used in Organic and Low Input Food Processing – Impact on Food Quality and Safety. Results of a Delphi survey from an expert consultation in 13 European countries.

One focus of the survey was to narrow and clarify definitions which are often used to characterise organic food processing. Based on the feedback from the experts, we can conclude that instead of a final definition of the terms 'careful processing' and 'authenticity', a more elaborated definition of the production methods, as well as good labelling would be more helpful for the producers, as well for the consumers. The intent of the two principles/terms of 'careful processing' and 'authenticity' would then be addressed indirectly.

An important question was 'Which aspects should be regulated' on an EU regulation level and which ones should be addressed at other levels (national, private company or label level) or should not be regulated at all. The feedback from the experts was quite varied, depending on the food processing area they were working in.

At the EU regulatory level, the top priority mentioned was the minimal use of additives, followed by minimal and careful processing. Quality/sensory aspects, however, were not seen to be primarily an issue that would need to be regulated at the EU level, because companies should have the chance to develop individual sensorial profiles for their products. We can conclude, based on the feedback from the food processing specialists and processors in the Delphi survey, that for the future revision of EU Regulation 2092/91 a more differentiated approach is necessary.

Which criteria are important for an organic product to be successful in food markets? For most experts the most important criterion is the sensory quality. The second most important criterion is the minimal use of additives and processing aids and the third most important criterion is the freshness, followed by authenticity.

In general, most of the experts expect special processing methods to be used in the production of organic food. But when experts were asked more specifically what processing methods would be appropriate for organic food, they found it difficult to select those methods that are usable/suitable or not usable/suitable. However the use of additives was clearly seen as an issue that needs to be regulated at the EU level. There was also a tendency to prefer additives of certified organic origin both from the processors' and 'non-processors' points of view.

#### e) Code of Practice

The expert consultation has shown that there is a lack of clear guidance for operators on how to translate given regulations into practices at the company level. A 'code of practice' for the organic food sector is seen to be a good instrument which would eliminate the need for describing all the issues in detail in EU Regulation 2092/91. A number of problems which occurred in the last years were caused by insufficient implementation of the rules of EU Regulation 2092/91. Guidance is needed on the management level, but also for inspection/certification bodies, if more responsibility is given to the operators (Beck, A. 2005).

### **Recommendations**

The final recommendations for the development of organic food processing are addressed to different groups of actors. The following examples are to highlight possible activities:

- a. Recommendations for the European Commission: Minimising the use of additives (maintain a restricted list); defining and promoting careful processing and the authenticity of food; revising the regulations for organic food and farming based more on principles, support for research projects.
- b. Recommendations for competent national authorities: national code of practice for organic food processing through initiating platform structures; support for research projects.
- c. Recommendations for the private sector: new labelling concepts; food safety prevention and monitoring; sensory quality improvement; environmentally friendly processing techniques.

It is important that there be an ongoing debate regarding how it might be possible to respond better to consumer expectations while maintaining the principles of authenticity of organic food production.

### **Conclusions**

The results of this research program will provide a good basis for the further discussion in this area. One conclusion is that further research is needed from the experts' point of view, in particular on careful processing, minimal use of additives, and practical concepts of authenticity. The development of a code of practice would be a good practical instrument for the implementation of the existing regulation in practice as well to test and implement planned modifications (Beck, A. 2005). The challenge is to find a good balance between authenticity, health orientation and convenience.

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