

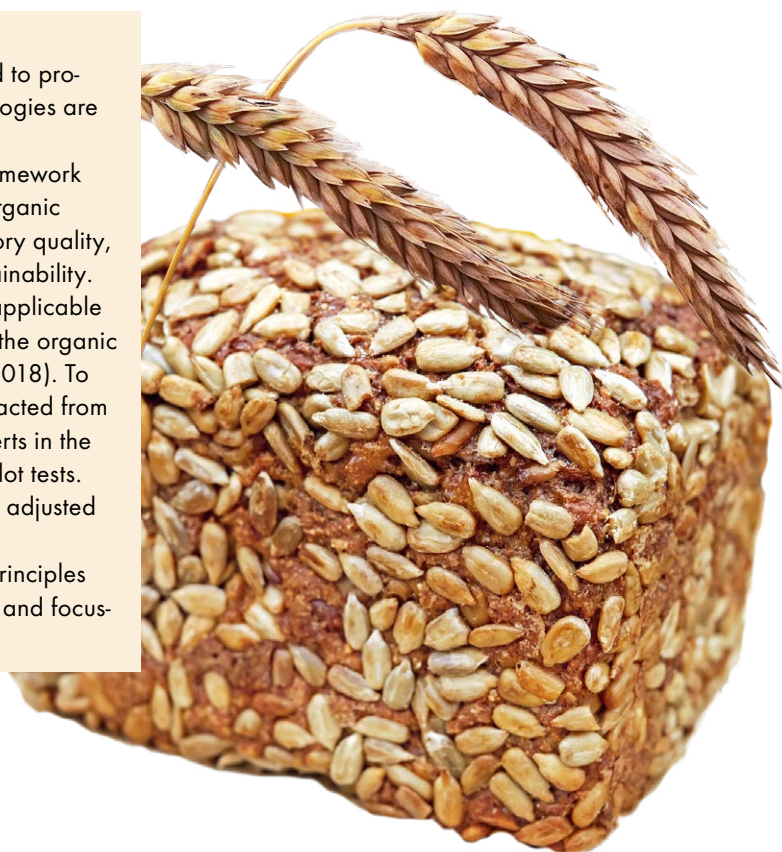
Assessment Criteria for Processing Technologies Based on EU Regulation 2018/848

Abstract

New technologies are continuously developed and used to process food. This raises the question whether these technologies are in line with the organic regulation for processing.

The ProOrg project developed a general assessment framework for the evaluation of food processing technologies for organic products. The framework focuses on three aspects: sensory quality, nutritional quality, as well as ecological and social sustainability. As part of the assessment framework, appropriate and applicable criteria were developed, based on the legal wording in the organic regulation of the European Union (EU regulation 848/2018). To develop the criteria, the relevant requirements were extracted from the legal text and discussed and condensed by the experts in the project team. The resulting criteria were then tested in pilot tests. Based on the results of the pilot studies, the project team adjusted and finalised the criteria.

This paper presents the criteria, which reflect the aims, principles and detailed requirements of the EU organic regulation, and focuses on processing methods.



Introduction

The market for organic products and the diversity of organic products on the shelves have dynamically developed in Europe over the last decade with an annual growth rate between 5 and 10 % per year. It is assumed that the growth will further increase significantly in the next years.

EU's Farm to Fork Strategy sets a target of 25 % of all farmland to be organic by 2030. This will require an annual growth rate of 11 to 12 %. In addition to the conversion of farmland to organic, consumption of organic products should increase by at least 10 % per year. Processing and trade companies must support this ambitious goal.

New food technologies are continuously developed and applied in food processing. As pro-

cessing companies usually process conventional as well as organic products, more guidance is needed to implement technologies supporting organic aims and principles at the company level than at the farm level.

This raises the question whether the technologies used to process organic products, based on existing regulations and guidelines, are in line with the organic principles. To assess this, an evaluation of existing and new technologies used to process organic food is required. Such technological topics are regularly discussed by the Expert Group for Technical Advice on Organic Production of the European Commission Directorate-General for Agriculture and Rural Development.



Process concept of the EU for the organic food chain

The organic regulation has built up a process concept along the entire food chain with specific regulations for each step of the food chain. However, the aims, principles and requirements set out in the regulation are not, in any case, very concrete.

Decisions taken by the competent authorities are often criticised by other stakeholders, for example the 2020 decision to allow the use of ion exchange and adsorbent resins to produce infant formula but prohibit them for other purposes. The project team assumes that this is partly caused by the lack of clear evaluation criteria to assess processing technologies.

Assessment framework based on the EU organic regulation

Organic processing is characterised by a number of principles in the organic regulation of the EU, including:

- Organic raw materials and a restricted list of additives and processing aids can be used.
- Processing should be done with care, preferably through the use of biological, mechanical and physical methods.
- The overall process needs to be certified and the use of processing methods can be restricted, if needed.

The objective of the ProOrg project is to develop a practical tool to assess processing methods based on the EU organic regulation. To do so, the project team developed an «assessment framework» to evaluate food processing technologies in the context of requirements for organic food.

During development of the assessment framework and implementation of practical tests in the course of the ProOrg project, it became clear, that there is a need for appropriate and applicable criteria for the assessment of food technologies, based on the legal wording in the organic regulation.

The term «food technology» refers to the ingredients, processing method and process flow used to produce a final food product. These three elements interact directly. The ingredients, including processing aids, are concretely addressed in the organic regulation via different requirements. Processing methods are only addressed more generally in the organic regulation.

Based on the aims, principles and detailed requirements in the EU organic regulation, this paper presents more concrete criteria for the evaluation of processing technologies with a focus on processing methods.

Health concerns are one of the key factors determining consumer purchasing decisions for food products. Related to health, the most desirable food attributes for consumers are freshness, naturalness, and minimal processing. Recently, the NOVA food classification, which categorises foods according to the extent and purpose of food processing, was proposed. NOVA classifies all foods and food products into four groups:



- 1) unprocessed or minimally processed foods;
- 2) processed culinary ingredients;
- 3) processed foods;
- 4) ultra-processed foods.

Could ultra-processed food be in line with the principles of organic production?

Even though it is well documented that primary production has more impact on the environment than processing, food processing activities and companies can have very relevant environmental impacts. Some of the impacts of food processing are not well evaluated. This is a limitation of the organic regulation, given the strong focus on environmental performance.

Criteria development

The criteria are based on the requirements set in the EU organic regulation (EU regulation 848/2018). The evaluation focused on the wording given in Article 3 «Definitions», Article 4 «Objectives», Article 5 «General principles», Article 7 «Specific principles applicable to the processing of organic food», Article 9 «General production rules», Article 24 «Authorization of products and substances for use in organic production» and Annex II Part IV «Processed food production rules» (see Annex I). Other corresponding regulations like EC Regulation 852/2004 (see Annex II) and other documents like the Farm to Fork strategy were consulted occasionally.

Aims of the discussion paper

The objective of this discussion paper is to provide clear criteria to assess food processing technologies, based on the legal requirements for organic food processing. It further aims to facilitate more uniform conditions and criteria for evaluating existing and new processing technologies in a more homogenous way amongst organic food chains in the EU. By doing so, the paper contributes to the assessment of processing technologies in line with the principles of the organic regulation and should help identify critical processing technologies and critical processing steps in a processing plant.

For the development of a framework to assess the compatibility of technologies with the requirements of organic regulation, the project team translated the regulatory wording into assessment «criteria», which are applicable to food technologies. The team chose to extract relevant requirements from the legal text. These requirements were discussed and condensed by the experts involved in the project team.



Evaluation criteria for processing technologies

The following criteria for organic food processing were developed by the ProOrg project.

1. Environmental performance

Based on the legal requirements in the organic regulation, the project team sees environmental criteria as a clear priority.

- 1.1 Technology should minimise the use of energy and natural resources, such as water, soil, organic matter and air.
- 1.2 Technology should protect the environment and the climate as much as possible, i. e. mitigate CO₂ emissions and waste.
- 1.3 Technology should substantially contribute to a non-toxic environment and not leave unhealthy residues on food.
- 1.4 Technology should contribute to long-term fertility of soils and high biodiversity.

Description

Based on the organic regulation, all environmental topics are highly relevant for the evaluation of processing technologies and are therefore a focus of the assessment criteria.

Environmental aspects are very well assessed in production but rarely implemented at the processing stage. To meet the principle of organic food production this aspect needs to be considered, too.

A number of these criteria, for example energy use, are highly relevant for processing technologies and can be assessed directly at the processing level.

Others aspects, like biodiversity, soil fertility and climate protection, can only be assessed when taking the whole production process into account. This means the impact of the technology on the overall production process needs to be considered.

2. Processing and product quality

The second set of criteria refers to characteristics of the technologies (e.g., methods and recipes), which impact the product quality. Some elements were also identified to address consumer expectations.

- 2.1 Technology should avoid or minimise the use of external inputs (additives, processing aids, functional ingredients and similar products).
- 2.2 Technology should be applied with care, preferably through the use of biological, mechanical and physical methods and shall comply with the principles of good manufacturing practice.
- 2.3 Technology should be based on processing methods, which guarantee that the organic characteristics and qualities of the products are maintained through all stages of organic production.
- 2.4 Technology should ensure the integrity (as defined in the organic regulation) of organic production at all stages of the production.
- 2.5 Technology should facilitate the production of a wide variety of high-quality food. Other issues like sanitation (e.g. HACCP concept) should be considered to comply with general food regulation.
- 2.6 Technology should not mislead consumers regarding the true nature of the product.



Description

The legal text clarifies that the use of additives, such as flavours and supplements, should be minimised. Preference should therefore be given to technologies working without or helping to minimise the use of additives (e. g. homogenisation instead of using a stabilisation agent).

Biological, mechanical and physical methods are highlighted in the organic regulation. Therefore, preference should be given to these methods in the assessment.

All technology used should protect «the true nature of the product». This means, the integrity of the raw material must be protected during processing. The quality should be maintained (e. g. minimise the loss of vitamins and inactivation of enzymes) or improved, for example, through biological processes such as the creation of new healthy substances like lactic acids and other nutrients and/or elimination of undesirable substances like phytic acid).

The overall nutritional quality of the final product must come from the initial raw materials (no supplements).

The overall goal is to keep the maximum of the healthy compounds and to avoid undesired compounds (acrylamide, trans-fatty acids, furan) or nutritional losses.

At the sensory level, it is expected that an organic product must deliver a higher quality product compared to a comparable non-organic product. One target of the regulation is to provide a wide variety of high-quality foods. Possible restrictions need to be assessed for the potential to limit the variety of high-quality organic food offered. This means that for the evaluation of a processing technology, the following guiding questions need to be answered:

- Are all ingredients needed to get the final product?
- Is exactly the same product needed in organic and conventional?
- Can the consumer accept a product which has seasonal variations?

Further on in the organic regulation, it is made clear that misleading the consumer should be unequivocally avoided. The «true nature of a product» is ensured when properties are not reconstituted (e. g., loss of colours due to colouring agents) or when results of negligence (e. g., unnecessary loss of flavours during processing) are not corrected.

Technologies should be avoided that create or support expectations that the final product or its sources are higher quality or based on better technologies than those that are actually applied.

3. Socio economic aspects

The third set of criteria relates to socio-economic aspects. It is important that organic principles and policies are adapted to traditions and local situation to promote diversity in organic food and the food supply in general. Local products, recipes and traditional dishes must therefore be encouraged in organic food processing.

- 3.1 Technology should encourage short distribution channels and local production
- 3.2 Technology facilitates food varieties adapted to food and eating traditions and local production situations.
- 3.3 By evaluating technologies, local impacts should be considered, such as:
 - the ecological balance and climate,
 - stages of development (status of organic market, economic development).

Description

The regulation introduces socio economic criteria by giving preference to technologies, which encourage short, robust distribution channels and local production. This can be relevant, for example, for the accessibility of the technology to small-scale operators. In other cases, overall production concepts need to be considered in order to identify the effect of a technology on a short value chain or local production. It is also made clear that preference should be given to those technologies adapted to local conditions and needed for traditional food processing and/or to facilitate eating traditions. In the assessment process, this needs to be understood as an approach for the regional or local level.

Finally, the regulation stipulates that the stage of development (e. g., local organic market status, local economy, etc.) should be considered. This requires a strong understanding of local contexts and market development. The adoptability and accessibility of the technology to different situations is therefore important to fulfil this requirement.

During the assessment, flexibility is required when benchmarking the socio-economic criteria.

Imprint

Publishers

Research Institute of Organic Agriculture FiBL
Ackerstrasse 113, Postfach 219, CH-5070 Frick, Switzerland
info.suisse@fibl.org, www.fibl.org

AöL - Assoziation ökologischer Lebensmittelhersteller e.V.
Untere Badersgasse 8, D-97769 Bad Brückenau, Germany
kontakt@aoel.org, www.aoel.org

CREA
Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria
Via Po, 14-00198 Roma, Italia
crea@crea.gov.it, www.crea.gov.it

ITAB - Institut de l'agriculture et de l'alimentation biologiques
149, rue de Bercy, F-75595 PARIS cedex 12, France, www.itab.asso.fr

Authors: Alexander Beck (AöL e.V.), Ursula Kretzschmar (FiBL), Flavio Paoletti (CREA), Rodolphe Vidal (ITAB)

Language editing: Laura Kemper (FiBL)

Layout: Sandra Walti (FiBL)

Photos: Dominic Menzler © BLE, Bonn; pages 2-5; Pixabay; p. 1

Acknowledgments

The paper was produced by the ProOrg project, funded by Core Organic <https://www.coreorganic.org/>. The authors acknowledge the financial support for this project provided by transnational funding bodies, being partners of the H2020 ERA-net project, CORE Organic Cofund, and the cofund from the European Commission.



Disclaimer

The opinions expressed and arguments employed herein do not necessarily reflect the official views of the CORE Organic Cofund. Neither CORE Organic Cofund nor any person acting behalf of the CORE Organic Cofund is responsible for the use which might be made of the information provided in this practice abstract.

Annex

Annex I: Legal text from Regulation (EU) 848/2018

Article 3: Definitions

4. «Preventive measures» means measures that are to be taken by operators at every stage of production, preparation and distribution in order to ensure the preservation of biodiversity and soil quality, measures for the prevention and control of pests and diseases and measures that are to be taken to avoid negative effects on the environment, animal health and plant health;
5. «Precautionary measures» means measures that are to be taken by operators at every stage of production, preparation, and distribution to avoid contamination with products or substanc-

es that are not authorised for use in organic production in accordance with this Regulation, and to avoid the commingling of organic products with non-organic products;

Article 4: Objectives

Organic production shall pursue the following general objectives:

- a) contributing to protection of the environment and the climate;
- b) maintaining the long-term fertility of soils;
- c) contributing to a high level of biodiversity;
- d) substantially contributing to a non-toxic environment;
- e) contributing to high animal welfare standards and, in particular, to meeting the species-specific behavioural needs of animals;

- f) encouraging short distribution channels and local production in the various areas of the Union;
- g) encouraging the preservation of rare and native breeds in danger of extinction;
- h) contributing to the development of the supply of plant genetic material adapted to the specific needs and objectives of organic agriculture;
- i) contributing to a high level of biodiversity, in particular by using diverse plant genetic material, such as organic heterogeneous material and organic varieties suitable for organic production;
- j) fostering the development of organic plant breeding activities in order to contribute to favourable economic perspectives of the organic sector.

Article 5: General principles

Organic production is a sustainable management system that is based on the following general principles:

- a) respect for nature's systems and cycles and the sustainment and enhancement of the state of the soil, the water and the air, of the health of plants and animals, and of the balance between them;
- b) the preservation of natural landscape elements, such as natural heritage sites;
- c) the responsible use of energy and natural resources, such as water, soil, organic matter and air;
- d) the production of a wide variety of high-quality food and other agricultural and aquaculture products that respond to consumers' demand for goods that are produced by the use of processes that do not harm the environment, human health, plant health or animal health and welfare;
- e) ensuring the integrity of organic production at all stages of the production, processing and distribution of food and feed;
- f) the appropriate design and management of biological processes, based on ecological systems and using natural resources which are internal to the management system, using methods that:
 - (i) use living organisms and mechanical production methods;
 - (ii) practice soil-related crop cultivation and land-related livestock production, or practice aquaculture which complies with the principle of the sustainable exploitation of aquatic resources;

- (iii) exclude the use of GMOs, products produced from GMOs, and products produced by GMOs, other than veterinary medicinal products;
- (iv) are based on risk assessment and the use of precautionary measures and preventive measures, where appropriate;
- g) the restriction of the use of external inputs; where external inputs are required or the appropriate management practices and methods referred to in point (f) do not exist, the external inputs shall be limited to:
 - (i) inputs from organic production; in the case of plant reproductive material, priority shall be given to varieties selected for their ability to meet the specific needs and objectives of organic agriculture;
 - (ii) natural or naturally-derived substances;
 - (iii) low solubility mineral fertilisers;
- h) the adaptation of the production process, where necessary and within the framework of this Regulation, to take account of the sanitary status, regional differences in the ecological balance, climatic and local conditions, stages of development and specific husbandry practices;
- i) the exclusion from the whole organic food chain of animal cloning, of rearing artificially induced polyploid animals and of ionising radiation;
- j) the observance of a high level of animal welfare respecting species-specific needs.

Article 7: Specific principles applicable to the processing of organic food

The production of processed organic food shall be based, in particular, on the following specific principles:

- a) the production of organic food from organic agricultural ingredients;
- b) the restriction of the use of food additives, of non-organic ingredients with mainly technological and sensory functions, and of micro-nutrients and processing aids, so that they are used to a minimum extent and only in cases of essential technological need or for particular nutritional purposes;
- c) the exclusion of substances and processing methods that might be misleading as regards the true nature of the product;
- d) the processing of organic food with care, preferably through the use of biological, mechanical and physical methods;
- e) the exclusion of food containing, or consisting of, engineered nanomaterials.

Article 9: General production rules

6. Preventive and precautionary measures shall be taken, where appropriate, at every stage of production, preparation and distribution.

Article 24: Authorisation of products and substances for use in organic production

4. The authorisation of the products and substances referred to in paragraph 2 for use in the production of processed organic food or for the production of yeast used as food or feed shall be subject to the principles laid down in Chapter II and to the following criteria, which shall be evaluated as a whole:
 - a) alternative products or substances authorised in accordance with this Article or techniques compliant with this Regulation are not available;
 - b) it would be impossible to produce or preserve the food or to fulfil given dietary requirements provided for on the basis of Union legislation without having recourse to those products and substances;
 - c) they are to be found in nature and may only have undergone mechanical, physical, biological, enzymatic or microbial processes, except in cases where products or substances from such sources are not available in sufficient quantities or qualities;
 - d) the organic ingredient is not available in sufficient quantity.
5. The authorisation of the use of chemically synthesised products and substances, in accordance with paragraphs 1 and 2 of this Article, shall be strictly limited to cases where the use of external inputs referred to in point (g) of Article 5 would contribute to unacceptable impacts on the environment.

Annex II Part IV: Processed food production rules

In addition to the general production rules laid down in Articles 9, 11 and 16, the rules laid down in this Part shall apply to the organic production of processed food.

1. General requirements for the production of processed food
 - 1.1 Food additives, processing aids and other substances and ingredients used for processing food and any processing practice applied, such as smoking, shall comply with the principles of good manufacturing practice (1).
 - 1.6 Products, substances and techniques that reconstitute properties that are lost in the processing and storage of organic food, that correct the results of negligence in the processing of organic food, or that otherwise may be misleading as to the true nature of products intended to be marketed as organic food, shall not be used.

Annex II: Legal text from Regulation (EC) No 852/2004

Article 2: Definitions

- m) «Processing» means any action that substantially alters the initial product, including heating, smoking, curing, maturing, drying, marinating, extraction, extrusion or a combination of those processes.
- o) «Processed products» means foodstuffs resulting from the processing of unprocessed products. These products may contain ingredients that are necessary for their manufacture or to give them specific characteristics.