



# Production of White Cabbage

## Control of Quality and Safety in Organic Production Chains

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This leaflet provides a practical overview for producers and others involved in white cabbage production and packaging, of what can be done at these steps to improve the quality and safety of organically produced cabbage, in addition to certification and general food safety requirements. Other leaflets cover production of other commodities and separate leaflets aim at consumers and retailers.



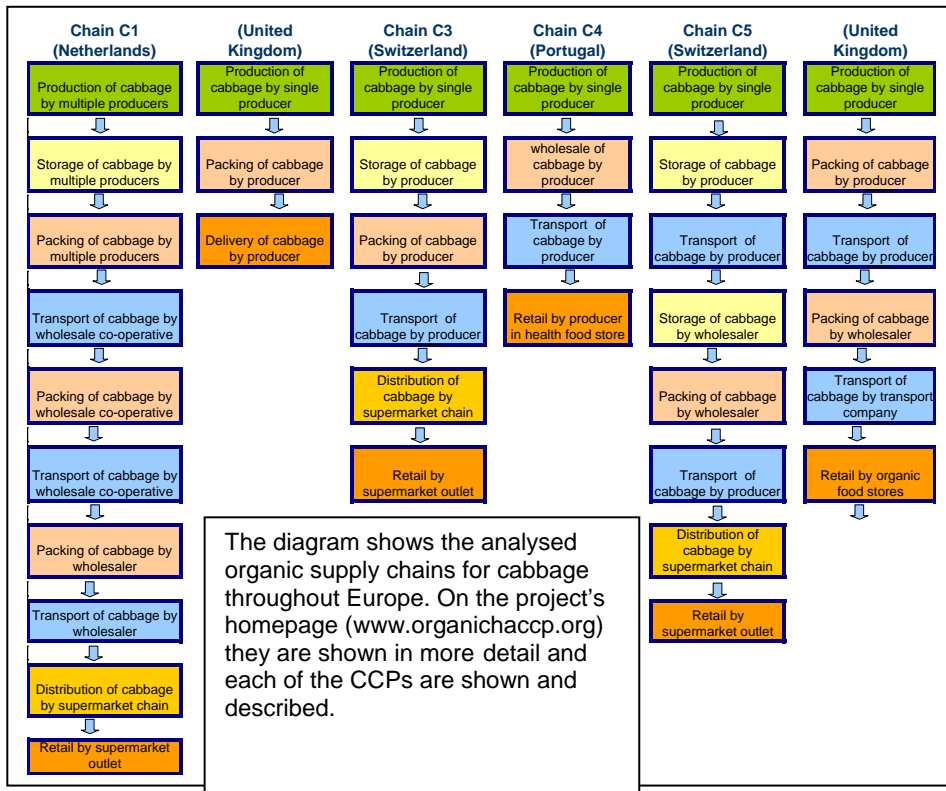
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## The Organic HACCP Project leaflets

This is no. 11 of a series of 14 leaflets comprising information on how control of quality and safety can be further improved in organic supply chains across Europe. The Organic HACCP project has reviewed studies of consumer concerns and preferences in relation to organic production systems and collected information about typical production chains for 7 commodities in regions across Europe. For each of the criteria listed below, the information was analysed to identify Critical Control Points (CCPs), defined as the steps in supply chains where the qualities of the final product can be controlled most efficiently. CCPs were identified using methods developed for Hazard Analysis by Critical Control Points (HACCP), a standard procedure to prevent food safety risks. The new aspect is thus to improve how consumer concerns are addressed, through the use of the CCP concept for a wide range of criteria, not only safety.

1. Microbial toxins and abiotic contaminants
2. Potential pathogens
3. Natural plant toxicants
4. Freshness and taste
5. Nutrient content and food additives
6. Fraud
7. Social and ethical aspects

## Overview of the chains examined for cabbage



## Variety selection

### Important issues to control at this step

The variety is very important for texture, taste and shelf life of cabbage. However, varieties with very good taste and texture often do not store well nor give the highest yield.

### Specific problems for organic production

Some consumers of organic cabbages prefer to have a choice of traditional and/or local varieties with different tastes and uses, other than the modern sweet, crisp salad varieties that don't taste of much when cooked. However, the marketing and retail business demand large batches of uniform products, often only the sweet varieties.

Resistance to diseases and pests is very important for organic growers.

### Recommendations

- Select varieties well suited to relevant uses (in salads, cooked etc.) and low susceptibility to relevant diseases.
- If data from organic variety trials in the region are not available, try to organise small-scale trials by yourself or together with other organic farmers. Include testing of taste (after cooking if relevant) and resistance.
- Make arrangement with other organic producers to try to assist to cover large orders, when needed and possible.

## Crop management and harvest

### Issues important to control at this step

High rates of nitrogen supply favour disease development, whereas relatively low nitrogen supply appears to result in better product quality (taste and resistance to rot), but also smaller size (yield).

Cabbage may be consumed raw, so any contamination with pathogenic bacteria must be prevented.

### Specific problems for organic production

Cabbage needs a lot of nitrogen and some varieties have long growing periods, where it can be difficult to ensure optimal N supply during the entire period.

On some farms, spray drift by less careful conventional neighbours may result in contaminated produce. It is the organic farmer who needs to take action to prevent any contamination of his/her products.

## Recommendations

- Carefully match the crop rotation, fertiliser use, soil conditions and type of variety (early or late) to ensure a steady, sufficient, but not excessive supply of nitrogen. Record this and the resulting yield and quality, and compare notes from previous years when planning the next year.
- Let plants continue growing as catch crops after harvest.
- If overhead sprinklers are used for irrigation, do not use water from open reservoirs (where birds have access).
- Apply indirect measures to avoid pests and diseases: the use of resistant varieties and netting; the provision of habitats for beneficial organisms; the use of trap crops - intercropping or along the field margins; the adaptation of crop rotation (do not grow cabbage right after or near other cruciferous crops).
- Establish hedges or other barriers to protect the crop from spray drift from neighbours. Promote merging of small areas with organic fields including exchange of land.
- If pesticides can have drifted onto your field, get a leaf sample analyzed. If residues are found, either i) ask your conventional neighbour to buy the affected cabbages from you for the same price as organic and cost of the analysis, or ii) agree with neighbours on safety measures such as spraying only under certain wind conditions with well maintained equipment, or using only substances allowed in organic farming on part of the conventional field.

## Storage and packaging

### Issues important to control at this step

Information to consumers on who has produced and packed a product and when it was harvested, shows willingness to take responsibility, allows calculation of food miles and freshness and reduces the risk of fraud.

Correct temperature (1-4 °C) and humidity (95-98%) during storage is important to preserve quality.

### Specific problems for organic production

Sometimes organically certified central facilities for storage and packaging are not available in the local area.

Some large-scale storage and packaging facilities are parallel operations, certified to handle both organic and conventional products. This gives additional options for the producers, but also a risk of accidental mixing with conventional cabbages or use of non-allowed agents.

### Recommendations

- Individual labelling of each head before storage prevents accidental mixing at later steps of the chain.
- If possible, use stickers or nets rather than plastic film for labelling/packaging. Include the name and address of the producer on labels, preferably also date of harvest.
- Include information about the variety (name, suitability for cooking, salads, storage etc.) on the label or other info.

- Monitor temperature and humidity during storage.
- Provide (truthful!) information about the production facilities and ideals, e.g. on a website, with a link on the label.
- Monitor and document both organic and non-organic activities (input-output reconciliation) when relevant.

## Overall Recommendations

Ask the companies and persons in charge of the other parts of the chain for their results when they assess the final product quality. It is in their interest as well that you use such feedback to improve your procedures. Formal collaboration agreements can ensure that quality and safety is controlled at every step of the supply chain, and that the costs of this are shared fairly among the participants.

## Continuation in the QLIF project

The work of Organic HACCP identified several areas in which more research is needed to improve the control of quality and safety of organic products. In 2004 the project QualityLowInputFood (QLIF, [www.qlif.org](http://www qlif.org)) was started to broaden and deepen the understanding of quality of organic food. QLIF is an Integrated Project in the European Commission's 6<sup>th</sup> Framework Programme with 31 participants in 15 countries. QLIF is a 5-year project aiming to provide research and development on quality, safety and efficiency of organic and other low-input farming methods in Europe.

The following topics relevant for production of white cabbage will be investigated in QLIF:

- Studies of relations between different aspects of food quality, consumer perceptions and buying behaviour (Consumer expectations and attitudes, 2004-2007).
- Development of cost-effective methods to improve quality and productivity (Effects of production methods, 2004-2008, and Crop production systems, 2004-2008).
- Development of HACCP procedures for control of quality and safety in organic supply chains and training courses for advisors (Transport, trading and retailing, 2006-2008).

### Editorial Notes

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Printed versions can be ordered from the FiBL Shop at [www.shop.fibl](http://www.shop.fibl).

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### About Organic HACCP

The main objectives of this Concerted Action are to assess current procedures for production management and control in organic production chains, with particular reference to the characteristics valued by consumers, and from this to formulate and disseminate recommendations for improvements.

The 2-year project started in February 2003. The results of the project, including a database of Critical Control Points in the analysed chains, are available on the project website [www.organichaccp.org](http://www.organichaccp.org).

### The Project Partners

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