



Production of Apples

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 apple production and packaging, of what can be done at these steps to improve the quality and safety of organically produced apples, in addition to certification and general food safety requirements. Other leaflets cover production of other commodities and separate leaflets aim at consumers and retailers.



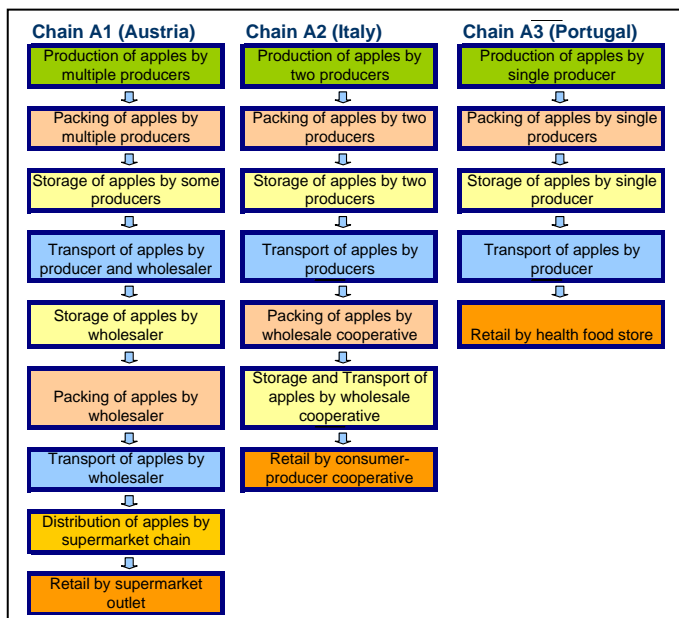
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The Organic HACCP Project leaflets

This is no. 13 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 apples



The diagram shows the analysed organic supply chains for apples throughout Europe. On the project's homepage (www.organichaccp.org) they are shown in more detail and each of the CCPs are shown and described.

Variety selection

Issues important to control at this step

The varieties are very important for the taste and appearance of apples. Also the transportation and storage qualities are determined by the choice of apple varieties.

The resistance to pests and diseases of a variety breaks down over time (tens of years), fastest if it is grown in large areas (monoculture) and diseases develop without control.

Specific problems for organic production

Many consumers of organic apples prefer to have a choice of old varieties with a wide range of different tastes and uses. However, resistance to diseases and pests is particularly important for organic growers, and the marketing and retail business demand large batches of uniform products.

Recommendations

- Choose apple varieties that are well adapted to the region to ensure optimal growing capacity.
- 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 and resistance.

Growing of apples

Issues important to control at this step

The amount and type of fertilisers as well as the date of application strongly influence apple quality parameters such as maturity, taste and resistance. High rates of nitrogen, entailing denser trees and higher humidity, favours pathogen development, whereas nitrogen supply in the lower end of the optimum range results in higher contents of secondary metabolites involved in colour, taste and defence.

Specific problems for organic production

The fungal disease apple scab, *Venturia inaequalis*, has traditionally been controlled by the use of copper salts, also in organic farming. The use of copper-based pesticides is a problem for the image of organic farming among consumers, and many retailers demand copper-free production. It has been banned from both conventional and organic farming in some Scandinavian countries and the Netherlands.

Spray drift in regions with small-scale apple production by less careful conventional farmers may result in contaminated fruit. It is the organic farmer who needs to take action to prevent any contamination of its products.

Recommendations

- Use only moderate amounts of organic fertilisers or nitrogen-binding plants, to promote apple quality parameters and resistance.

- Use none or less than the allowed amount of copper under normal conditions, to prepare for copper-free production in the future
- Develop replacement strategies including the use of resistant varieties, short rotation cropping (10-12 years), furthering of beneficial organisms as well as new combinations of organic compounds to compensate the loss of copper as plant protectant.
- Establish hedges or other barriers to protect the crop from spray drift from neighbours.
- Agree with neighbours on safety measures such as: spraying only under certain wind conditions or prepare agreement or contract with the conventionally producing neighbour guaranteeing careful spraying or agreement on spraying the last rows of the conventional field with agents allowed in organic production
- If pesticides can have drifted onto your apple trees anyway, get a crop sample analysed. If residues are found, then ask your conventional neighbour to buy the affected crop from you for the same price as organic + the cost of the analyses, or another solution that will motivate the neighbour to be more careful in the future.
- To avoid spread of fungi infections, regularly inspect the orchard and remove fruit mummies and infected shoots.

Harvest and storage

Issues important to control at this step

High temperature and/or low humidity during storage can cause rapid deterioration and promote storage diseases.

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

Specific problems for organic production

Organically grown apples are relatively variable in terms of size and colour, and therefore usually not sold in the "extra" quality class.

Often organically certified central facilities for storage are not available in the local area.

Some large-scale storage facilities are parallel operations, certified to handle both organic and conventional products. This gives a risk of accidental mixing with conventional apples or use of non-allowed agents.

Recommendations

- Make sure that the apples are stored with temperature and humidity control as soon as possible after harvest, and monitor conditions during storage according to best practice for the type of storage and apples.
- In parallel operations, use special trucks, sections and other equipment for organic material, and mark them clearly, e.g. by painting in different colours.
- If handling material from more than one farm, keep material from each farm as separate batches and include con-

tact information for the grower on the invoices when it is sold. Encourage the retailer to display the address and contact details of the producer, e.g. on the packaging.

- As far as possible label apples individually or pack them in nets or other sealed containers, to prevent the risk of mixing with non-organic material later in the chain.

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) was started to broaden and deepen the understanding of quality of organic food. QLIF is an Integrated Project in the European Commission's 6th 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 apples 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 (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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Bibliographical Information

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Printed versions can be ordered from the FiBL Shop at www.shop.fibl.org.

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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.

The Project Partners

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