

## Synthesis report

### [WP4 Fruit quality; improvement of fruit handling/storage]

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**Document overview**

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## Synthesis findings

### Following topics are identified:

Most of the research institutes are still working intensive on **DCA-storage systems** (Dynamic Control Atmosphere). Different DCA-systems are being researched. There is a distinction between DCA<sup>CF</sup>, DCA<sup>ETH</sup> and DCA<sup>RQ</sup>. CF stands for Chlorophyll Fluorescence. This is the most popular method to determine the Anaerobic Compensation Point (ACP). Different sensors like HarvestWatch (Satlantic Inc., Canada), ApplePAM (Walz GmbH, Germany) or Fruit Observer (Besseling Groep B. V., The Netherland) are used or tested at the different institutes. DCA<sup>ETH</sup> is another technology to determine the ACP by measuring Ethanol in the atmosphere of the storage room (Dynamic Control System, DCS, Storex, The Netherland) or Ethanol plus Ethyl acetate and Acetaldehyde in the fruits using fruit samples (Lower Elbe Region, Austria). Finally the DCA<sup>RQ</sup> technology uses the quotient between CO<sub>2</sub> production and O<sub>2</sub> consumption for measuring the ACP. There are the companies Van Amerongen from the Netherland with the ACR system (Advanced Control of Respiration) and Storage Control Systems Ltd from Great Britain / USA with their SafePod/LabPod system on the market. The effect of DCA on fruit quality (positive/negative effect on firmness, acid content, physiological disorders,...) and the comparison of different DCA technology is actual in the focus of research in the different regions.

**1-Methylcyclopropen (1-MCP)** and its effect on fruit quality (fruit firmness, acid content, effect of different physiological disorders,...) is also in focus of the different researcher. But also the aim to save energy by increasing the storage temperature after 1-MCP treatment is a research topic. New 1-MCP products that maybe will be registrated in the future in the EU but also new formulations or indications like Harvista is in the interest of research.

In general, **energy saving** e.g. by using new cooling technologies like EC fans (*e*lectronically *c*ommutated fans) or better airflow throw the stacks of big boxes is more and more in the focus of some researchers. Especially the effect of temperature, ventilation, placing boxes in the storage room (distance, space between boxes, walls and evaporators) and technical changes in room design are main topics. At the same time, the aim is to **reduce water loss** of the stored fruits knowing that the energy or heat input leads to more cooling and more cooling leads to more water loss.

Most of the institutes are working on **new apple and pears varieties**. They try to determine the optimal harvest date and storage conditions (e. g. temperature and O<sub>2</sub>/CO<sub>2</sub>-level) and also the compatibility of these new varieties to 1-MCP und the usefulness of a treatment. Actual e. g. Kanzi (Nicota), Migo (Cepuna), Sweet Tango, Natyra, Rockit and different red flesh varieties are in focus of the tester.

To **avoid food loss by rotting** is a big theme in postharvest research. Measuring specific volatiles that are related to specific storage diseases, using new metagenomics determination and Hot water treatment (HWT) are examples of new diagnostic and control technologies that could help to reduce microorganism infections or the use of chemical pesticides in pre- and postharvest.

One big topic is also **bruising** of apples and pears. They are looking for technology to measure objectively bruising e. g. to determine the sensitivity of different fruit varieties. The physiological background of the development process of bruising and naturally the possibilities to avoid bruising or assistance for the fruit grower (videos for picking personal, optimization of the grading machines, handbooks ...) is also still in focus.

**Extending the storage life and shelf-life of plums and cherries** seems to be a growing point of interest of some working groups. Improvements in fruit and stem quality through reducing cracks, diseases, accurate assessment of harvest maturity, forced cooling systems and better storage solutions are important aims.

Some of the research institutes are testing different **fruit quality analyzing technologies**. On the one hand there are the destructive measurements methods and instruments like the Pimprenelle (e. g. Setop, France) or a lot of new un-destructive analyzer or devices e. g. using near infrared (NIR) measuring technologies to determine chlorophyll content (DA-meter, ...).

## Summary for IEG dissemination

**Project title:** EUFRUIT: European Fruit Network

**Keywords:** storage, fruit quality, postharvest

**Summary:** Most of the research institutes are working on technical but also chemical methods for a better maintenance of fruit quality after harvest. The actual most interesting technology to maintain fruit quality are **DCA-storage** (Dynamic Control Atmosphere) and postharvest treatment with **1-Methylcyclopropan (1-MCP)**. **Reducing food loss** (e.g. due to fungi infections or bruising) as well as reducing **energy loss** in fruit storage were also themes of some researcher. Other research institutes are testing different **destructive and non-destructive measuring technologies** of fruit quality. Most of the institutes are working on storage of **new apple and pear varieties but also of different stone fruit cultivars**.

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<b>Project period:</b>	<b>Project status:</b>	<b>Funded by:</b>	<b>Total budget:</b>	<b>Project web page:</b>	
<b>2016 - 2019</b>	<b>Ongoing</b>	<b>Horizon 2020</b>	<b>€1.8m</b>	<b>www.eufrin.org</b>	
<b>Geographical regions:</b>	[copy list from page 1]				

## Annex: Scanning reports

[Copy in scanning reports from IEG members]