

Synthesis report

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

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WP: 4

IEG thematic area: Fruit quality; improvement of fruit handling/storage

Covered NUTS 3 regions: DE6 (Hamburg), DE8 (Mecklenburg-Vorpommern), DE9 (Niedersachsen), DEF0 (Schleswig-Holstein), DEE0 (Sachsen-Anhalt), DEA (Nordrhein-Westfalen), DE600 Hamburg, DE928 Schaumburg, DE932 Cuxhaven, DE933 Harburg, DE939 Stade, DEF09 Pinneberg, DE1 (Baden-Württemberg), DE2 (Bayern)
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ITH10 Bolzano-Bozen
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No. IEG members: *Total: 13*
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Document overview

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Synthesis findings.....

Summary for IEG dissemination

Annex: Scanning reports

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¹ If an EUFRUIT project partner, use EUFRUIT partner short name, if a contributing organization designate a partner short name

² Farm holder/grower, advisor/consultant, research institute/RSO, SME, NGO or other

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Synthesis findings

Following topics are identified:

Most of the research institutes are working on **DCA-storage systems** (Dynamic Control Atmosphere). Different DCA-systems are being researched. There is a distinction between DCA^{CF}, DCA^{ETH} and DCA^{RQ}. 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 Netherlands) are used or tested at the different institutes. DCA^{ETH} is another technology to determine the ACP by measuring Ethanol in the atmosphere of the storage room (Dynamic Control System, DCS, Storex, The Netherlands) or Ethanol plus Ethyl acetate and Acetaldehyde in the fruits using fruit samples (Lower Elbe Region, Austria). Finally the DCA^{RQ} technology uses the quotient between CO₂ production and O₂ consumption for measuring the ACP. There are the companies Van Amerongen from the Netherlands with the ACR system (Advanced Control of Respiration) and ICA Storage from Great Britain with their SafePod 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-Methylcyclopropan (1-MCP) and its effect on fruit quality (fruit firmness, acid content, effect of different physiological disorders,...) is still 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 registered in the future in the EU but also new formulations or indications like Harvista is in the interest of research.

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.

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 Pimprelle (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, ...).

Most of the institutes are working on **new apple varieties** sometimes also on other or even new fruit species. They try to determine the optimal harvest date and storage conditions (e. g. temperature and O₂/CO₂-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.

A quite new topic is the **Hot water treatment (HWT)** of apples to avoid fungi diseases of storage fruits. Research questions are the heat sensitivity of the different varieties (temperature and duration) and the influence of the production system, region, seasonal effects etc. on the intensity of heat damages. The question was whether this theme is a topic of WP 4 or better for WP 3 (avoid residues) or both.

Reducing **energy loss** was a theme of some researcher. 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 the main topics.

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 is **DCA-storage** (Dynamic Control Atmosphere). It is known that fruit quality maintain better under very low oxygen level. The problem is that too low oxygen level can lead to fermentation und thus to off-flavor and physiological disorders like internal browning. Nowadays different technologies are available to measure the lowest tolerated oxygen concentration. The effect of DCA on fruit quality and the comparison of different DCA technology are actually in the focus of research in the different regions.

A chemical method to maintain fruit quality is the treatment with **1-Methylcyclopropen (1-MCP)** after harvest. 1-MCP inhibit the production of the fruit own ripening hormone Ethylene and thus slow down the ripening process during storage. The effect of this chemical on postharvest fruit quality is still in focus of research.

Another big topic is still the theme **bruising** of apples and pears. The main research here is to look on the physiological background and for possibilities to avoid or reduce this problem.

Some of the 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 varieties** and other or even new fruit species.

A quite new topic is the **Hot water treatment** of apples after harvest to avoid fungi diseases of storage fruits by activating mechanisms of resistances.

Reducing **energy loss** in fruit storage was also a theme of some researcher.

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| 2016 - 2019 | Ongoing | Horizon 2020 | €1.8m | www.eufrin.org | |
| Geographical regions: | [copy list from page 1] | | | | |

Annex: Scanning reports

[Copy in scanning reports from IEG members]