Interreg
EUROPEAN UNION
North-West Europe
Quality Control of fresh Agro Products
European Regional Development Fund

NEWS
Spring 2018

VCBT organizes workshop on dynamic controlled atmosphere storage

In a dynamic workshop, the Flanders Centre of Postharvest Technology (VCBT) informed apple and pear growers on the latest developments in dynamic controlled atmosphere (DCA) storage. The workshop took place at the experimental station pcfruit in Sint Truiden, in the heart of the Belgian fruit growing area.

The workshop put growers in touch with industry and academia to provide them with a balanced view on the merits and possibilities of the different technologies. Ann Schenk from VCBT introduced the general principles of DCA storage and Pieter Verboven (KU Leuven) gave an overview of the most recent research results. The three major DCA technology providers Storex, Besseling and Van Amerongen in the Netherlands and Belgium were asked to present their specific implementation and solutions. During and between the different talks, questions were asked and lively discussions were held. It appeared that growers still had a lot of questions regarding these latest technologies.

The core of all DCA technologies is to measure an appropriate response from the fruit being stored to control the storage regime. In the QCAP project, a novel type of sensor will be developed that will provide a much more rich fruit response signal. Bert Verlinden from VCBT gave an outlook on this new sensing technology. At the end of the workshop, the growers took the opportunity to further discuss the benefits and drawbacks of each system with the presenters in a more informal way, with a glass of apple juice.

The Fresh Produce Centre brings QCAP and real-life cases together

The QCAP researchers are developing a new system to monitor the quality of fruits and vegetables during storage. There is a constant feedback loop with the sector via the Associate Partners. One of those partners is the Fresh Produce Centre, the trade association representing Dutch companies selling fruits and vegetables. Peter Verbaas, project manager of Food Safety and Supply Chain Quality Control, explains their role in the project and why QCAP is necessary for their members.

Peter Verbaas: *"This might be the start of a revolutionary method of monitoring quality."*

What are the Fresh Produce Centre's most important tasks?

"Our area of work is where the government meets the industry. On the one hand, we use our members' practical knowledge to formulate policy advice, and on the other we assess whether new legislation is feasible and effective. We also help in shaping the Collective Bargaining Agreement applicable to fruit and vegetable wholesalers, and develop tools to help our members better communicate the products' health benefits."

Why are you a QCAP Associated Partner?

"One of our areas of expertise is Logistics and ICT. We encourage developments that help the Netherlands maintain its unique logistics position within the supply chain for fruit and vegetables. The QCAP monitoring system is a great example of such developments. Instead of improving an existing product, QCAP develops a new system from scratch, based on scientific research. This might be the start of a revolutionary method of monitoring quality."

What do you contribute to the project?

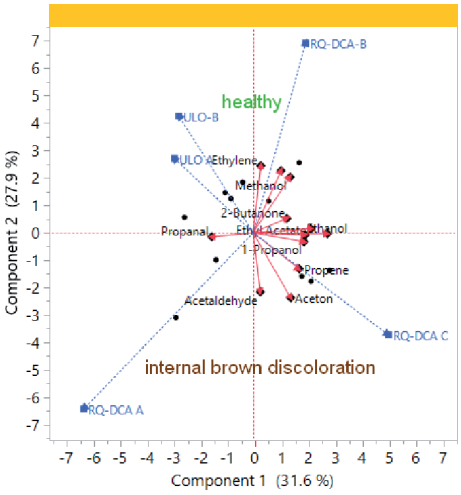
"We bring QCAP and real-life cases together: we evaluate whether the system meets the needs of our members and how we can implement it in existing systems. As we represent the entire sector, we investigate whether the technology can be implemented on a wider scale. We assess whether the technology can be used for monitoring the quality of other kinds of vegetables and fruit or whether we can use this technology to measure other chemical processes. Finally, we look into other potential applications of the technology in other parts of the supply chain, such as in shipping containers."

What would make QCAP a success?

"We would deem QCAP a success if we end up with a product that can easily and cheaply detect both chemical and microbial processes in large shipments of fruit or vegetables. That would guarantee our clients increased efficiency, as well as the ability to select the right products for specific markets. Alongside having an economic benefit, it would also be a significant step in reducing food waste."

VCBT and LWK present first QCAP results at CAMA

CAMA is an important international research conference on controlled and modified atmosphere storage of fruit and vegetables. Last CAMA conference was organized in Warsaw, Poland. A delegation of VCBT and LWK presented a QCAP poster and reported the first results of their Conference pear storage experiments.



Correlation between Volatile Organic Compounds (VOCs) and storage conditions.

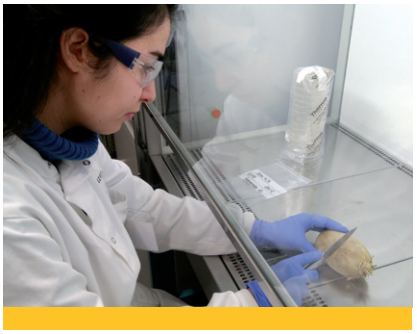
In the biplot figure, the different VOCs are denoted with red arrows and the different storage conditions with blue arrows. Arrows that point in the same direction are closely correlated.

The idea of the QCAP project is to sense multiple Volatile Organic Compounds (VOCs) produced by stored fruit, to optimize the storage process and avoid losses. The project partners LWK and VCBT are involved in the first step: the identification of the volatile compounds produced and their concentration range during various degradation processes. For their research, they harvested pear fruit and stored it for nine months in several conditions. Then the storage atmosphere was sampled and the volatile organic compounds in the storage atmosphere were determined.

Statistical analysis revealed which VOCs were associated with which storage conditions. The results show for example that the volatiles acetaldehyde, acetone and propene are mainly correlated with storage conditions that suffered from storage disorders, while for instance ethylene and methanol were more associated to healthy pear fruit. This means that these volatiles can be used as indicators for fruit quality. When monitored in storage rooms, information about the VOC concentrations can therefore be used to optimize the storage conditions, to avoid losses and maintain better fruit quality.

The research will be published in the scientific journal Acta Horticulturae, as part of the proceedings of the CAMA conference. In a next step, the measurement procedures need to be further optimized, so the methods can be up-scaled to commercial rooms.

Cranfield University investigates gas emissions from potatoes



With more than 28 million tons produced in North-West Europe in 2017, potato is one of the main food crops in the world. In order to ensure year-round availability, potatoes often spend more time in storage than they do in the field. Therefore, maintaining optimal storage conditions is crucial in preventing the development of diseases, as well as sprouting and cold-induced sweetening of the potato tubers. Project partner Cranfield University is working on the identification of Volatile Organic Compounds (VOCs) produced by potato tubers during storage. The main objective of this study is to identify those VOCs that are associated with potato rots, sprouting and sweetening, and could be used as indicators in an early detection system for storage management.

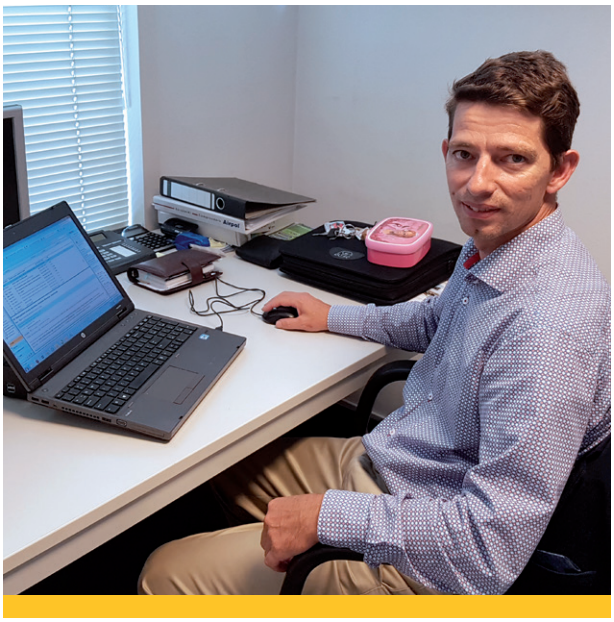
The first phase of the study is at lab scale, using air samples from boxes filled with potatoes and stored in conditions that imitate the commercial storage conditions. The analysis of these air samples has resulted in the identification of a long list of compounds that are produced during potato storage.

The next challenging part is now focusing on linking the presence of individual VOCs to the action of fungi and bacteria and the physiological processes that lead to sprouting and cold-induced sweetening. This information will then be used to set the parameters of the real-time interactive storage sensor system that is being developed in the QCAP project, in order to be able to identify what problems might be about to occur in the storage facility based on the VOCs that are detected.

Once a prototype of the new sensor system has been developed, it will be validated at Cranfield, first by being installed in one of their lab-based cold storage rooms, and subsequently at a commercial potato storage facility. The system validation will include the collection and analysis of air samples from the same room. This will ensure that the new sensor can detect the same VOCs and at the levels that are detected by the more sophisticated lab equipment.

Meet Eugène Rokx,
Area Export Manager at Storex

What is your expertise?
"Storex is specialist in controlled atmosphere (CA), a technology successfully applied to extend storage and improve shelf life of fruits and vegetables. We manufacture nitrogen-generators, CO2-scrubbers, O2/CO2-analysers, CA climate control systems and supply additional CA-equipment like valves, breather-bags, etcetera. These products are available worldwide. Storex is the market-leader in CA-innovations with inventions like ethanol-measurement for DCA-storage, VSA-technology for nitrogen gas production and double vessel CO2-scrubbers."



Eugène Rokx

Why do you participate in the QCAP project?
"To provide the best CA-technology, Storex always invested in research, development, and the implementation of these innovations. Therefore, we consider ourselves as a perfect match to evaluate and validate the applied technology in the QCAP-project."

What is your most important challenge in this project?
"The laser technology to measure gas compositions and concentrations is already successfully applied in the medical sector and especially on laboratory level. The challenge for QCAP is to develop a system which provides us detailed information about the quality of fruits stored under specific conditions. This system should be easy to install in existing storage facilities, easy to maintain and to operate under harsh conditions and the user interface should provide the operator clear and uncomplicated information about the status of the product."

Contact

Radboud University
Heyendaalseweg 135
6525 AJ Nijmegen
The Netherlands

Frans Harren
f.harren@science.ru.nl
+31 24 365 21 28
www.nweurope.eu/qcap