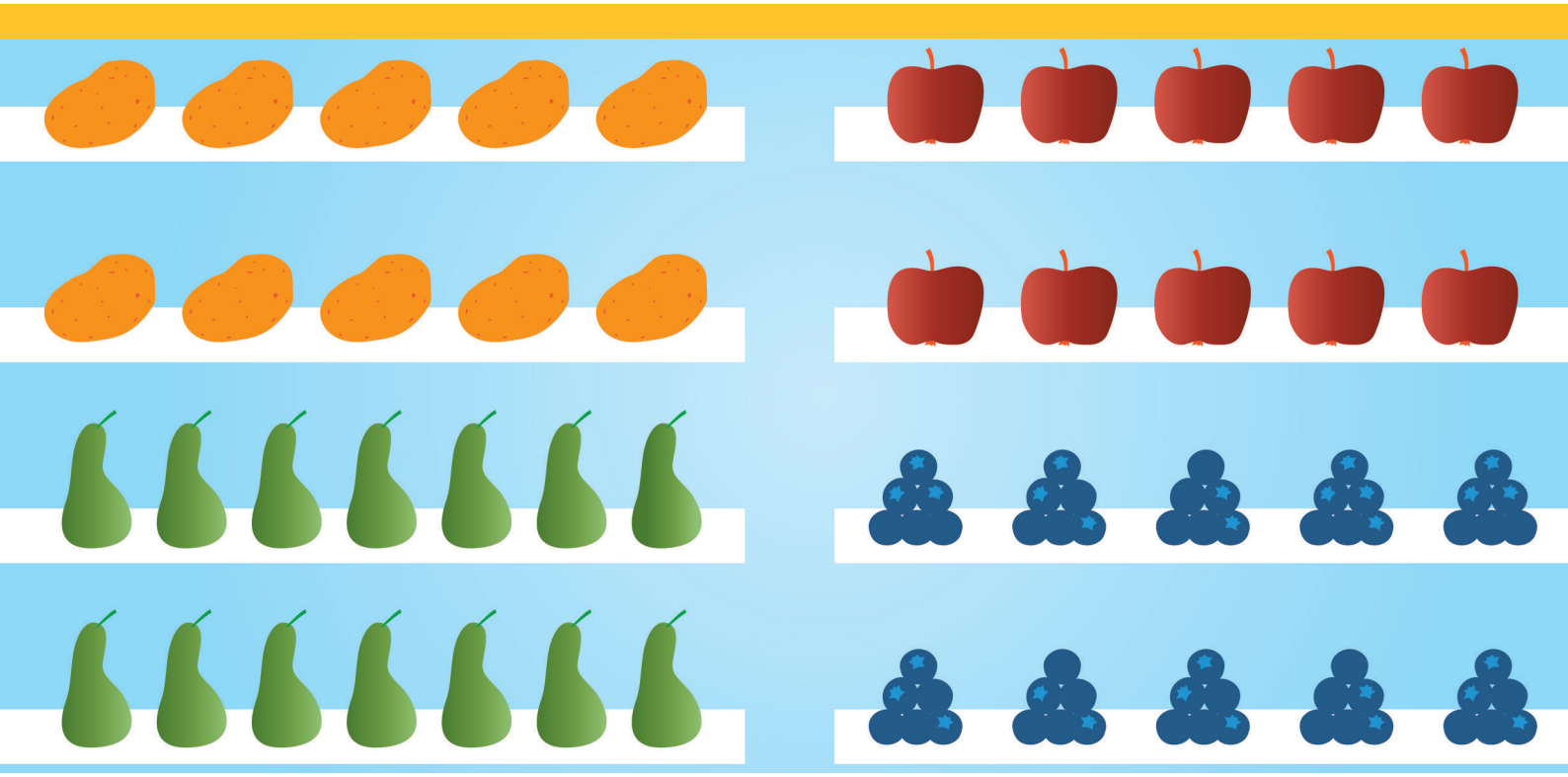
Interreg North-West Europe
Quality Control of fresh Agro Products
European Regional Development Fund

EUROPEAN UNION

NEWS
Autumn 2017



Towards an innovative storage monitoring system

A significant part of the fruit and vegetable production gets lost during the post-harvest process. Innovation stakeholders from the North-Western part of Europe are now joining forces to develop an affordable tool that could help farmers monitor the quality of their products in real-time. The new tool will contain a next-generation gas detector, which can measure eight different gasses released by the products. The QCAP project strives towards completing a prototype in 2019.

What gasses can be measured?

The detector will provide real-time information on gasses released during ripening (ethylene, CO_2), fermentation (ethanol, acetaldehyde, ethylacetate), damage (ethane) and rotting (methanol, acetone). Together, these gasses give very precise information about the state of the product.

How will the detector work?

A laser light is sent through an atmosphere sample. Depending on the gasses in the sample, it will absorb a specific color of the light beam. By measuring the light output, the exact gas mixture will be determined, up until one gas particle out of 10.000.000 particles. The challenge in this project is to gain a 'fingerprint' of different types of gasses.

Will the monitoring system be user-friendly?

The complex data from the detector will be transformed in one very simple signal, for example a green light if the quality of the products is

still excellent, and otherwise an orange or red light. In this way, the farmer knows exactly when to sell the product or how to adjust the storage atmosphere. The monitoring system will be tested and optimised together with farmers and storage facilitators.

For which products is the monitoring system designed?

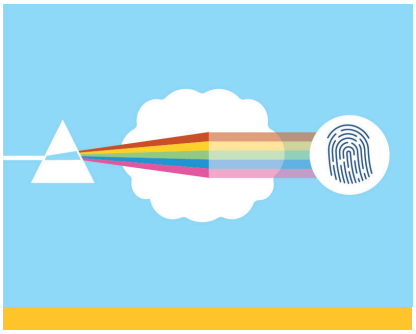
Initially, the system will be applied to the storage of apples, pears, blueberries and the potatoes, which represent a large part of agro-food sector in North-West Europe. Nevertheless, it can be used for other fresh products.

How affordable is the system for farmers?

The return on investment is estimated at two to three years for an average storage room. The durability of the system is expected to be 10 years. Therefore, the product will have a significant economic value for the agro-food sector.

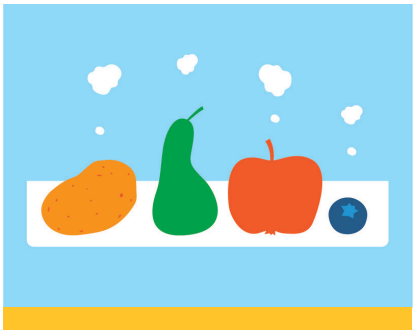
From sensor to monitoring system

The QCAP consortium will develop a high tech gas detector and will validate it in a complete monitoring system.



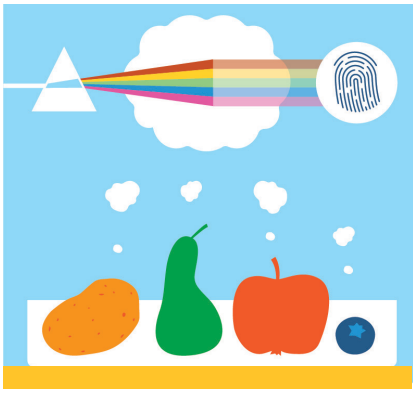
Low-cost sensor prototype

The project aims for a gas sensor that is able to detect eight chemical compounds simultaneously. Therefore, a new laser is required, with a broad spectrum and a very high intensity. Moreover, the light pathway and the detection method will be optimised. The goal is to make a very selective, but also an affordable detector system.



Selection optimal storage conditions

Which gases are produced by which products? And how do they represent the product quality? This is essential information to be able to convert the sensor data into useful information about the quality of the products. The project will map the gas release in potatoes, apples, blueberries, and pears during multiple degradation processes.



System integration and validation

In the end, the sensor will be connected to a computer-controlled monitoring system, producing easy-to-use information about the fruit quality. The farmers will receive notifications describing the quality as excellent, good or less good. On the basis of that information, they can decide whether they need to sell the product or adjust the storage atmosphere. The QCAP project will develop this complete monitoring system and will test it in real-life storage systems.

Consortium partners

The QCAP project is based on a fruitful collaboration between knowledge institutions and specialised private partners contributing with their technological know-how, experience in business development or network in the agro sector. It consists of 12 complementary partners and associate partners. The associate partners participate as an advisory organisation or help to make the connection with the end users.

Radboud University (RU), Nijmegen, The Netherlands (coordinator)

- Detector design and development

Flanders Centre of Postharvest Technology (VCBT), Heverlee, Belgium

- Operational conditions in storage rooms for apples, pears and berries
- System validation facilitators in Belgium

Landwirtschafskammer Niedersachsen (LWK), Oldenburg, Germany

- Operational conditions in storage rooms for apples and blueberries
- System validation

Cranfield University, Cranfield, UK

- Operational conditions in storage rooms for potatoes
- System validation

NKT Photonics, Southampton, UK

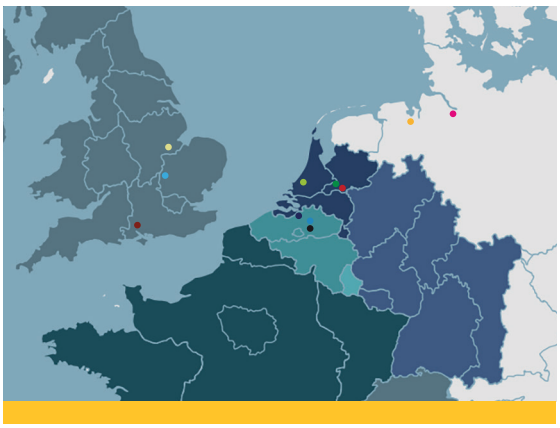
- Light source
- Sensor development

Sensor Sense B.V., Nijmegen, The Netherlands

- Detector development and validation
- Business case development

STOREX, Stekene, Belgium

- System validation
- Operational conditions in commercial storage rooms



Associated partners

- Association of Belgian Horticultural Cooperatives, Leuven, Belgium
- Fresh Produce Centre, Zoetermeer, The Netherlands
- DLO-Food and Biobased Research, Wageningen, The Netherlands
- Fruit Advisory Service of the Altes Land, Jork, Germany
- Produce World Group Ltd, Peterborough, UK

Meet the researchers

QCAP Kick Off Meeting, October 2016 at Radboud University

New laser opened door to ultrasensitive gas sensing

Project partner NKT Photonics is the leading supplier of lasers with a broad light spectrum. Used by many of the most innovative companies within bio-imaging, semiconductor inspection and scientific instrumentation, these lasers can replace multiple single line lasers. NKT Photonics has now released a new product which extends this spectral range into mid infrared. The laser emits more than 450 milliwatts of power in the infrared spectrum. This opens up new applications in gas sensing, such as those targeted by the QCAP project. The new MIR Super K is all-fiber based, and as a result is stable and maintenance free, compact and portable. The laser output is delivered via a fiber which allows for great flexibility for integration into sensing systems. This system will be the basis of the mid-IR laser technology provided by NKT Photonics to other partners in the QCAP project.

Contact
Radboud University
Heyendaalseweg 135
6525 AJ Nijmegen
The Netherlands

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