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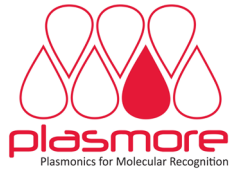Confagricoltura

THE CIRCLE
FOOD & ENERGY SOLUTIONS

PROJECT DETAILS

PROJECT TITLE: photonic system for Adaptable muLtiple-analyte Monitoring of fOod quality

ACRONYM: h-ALO

START DATE: 01/01/2021

DURATION: 36 Months

TOPIC: ICT-37-2020 | Advancing photonics technologies and application driven photonics components and the innovation ecosystem

EU CONTRIBUTION: 4,239,432 Euro

CONTACTS

PROJECT COORDINATOR
Stefano Toffanin
E-mail: stefano.toffanin@cnr.it

DISSEMINATION MANAGER
Isella Vicini
E-mail: isella.vicini@warranthub.it

https://h-alo.eu/

h-ALO

photonic system for Adaptable muLtiple-analyte Monitoring of fOod quality

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THE PROJECT

The EU-funded research and innovation project h-ALO aims to develop a cutting-edge **bio-chemical photonic-based sensor** enabling the on-site early detection of microbiological and chemical contaminants **in the farm-to-fork local food chains**.

h-ALO combines micro-nanotechnologies for optical sensing based on **nanoplasmonics, advanced biorecognition, micro-engineered surfaces and microfluidics** for the realization of an **ICT monitoring analytical instrumentation** that aims at outperforming current commercially available portable tools for contamination detection.

The h-ALO sensor will offer unique advantages in terms of sensitivity, portability, and multiplex capabilities and its adoption will help local food producers and small retailers to assess quality and safety of their products in a fast, reliable,

THE h-ALO SENSOR

Photonic sensor:

The h-ALO sensor is a tool to bridge the gap between local food production chains and food safety/quality monitoring.
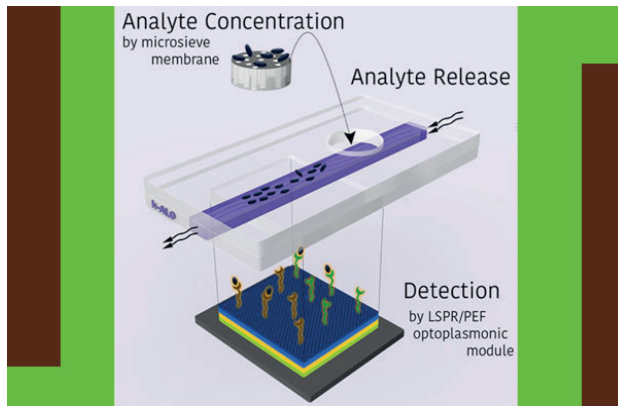
Integrative sensor system:

- a disposable cartirdge including a **microsieve membrane for analyte pre-selection**, concentration and treatment;

- a reusable cartridge for the **multimodal photonic detection** through reusable **nanoplasmonic biofunctionalized sensing surface**;

- a static part devoted to electronics, readout and containing the data-management unit.

KEY INNOVATIONS

Multiplex-analyte recognition

Simultaneous detection of both microbiological and chemical contaminants

High sensitivity and low limit-of-detection

Through the combination of an analyte pre-concentration and a multi-modal detection scheme

Miniaturization and integration

On-site analysis and flexible use

Preparation protocols

Adaptable for a wide range of agri-food chains.

Measurement automation

Reliable for on-site use by non-expert food operators

Advanced data management

Mobile-phone connectivity and cloud-based sharing capability

CO-CREATION WITH END-USERS

End-Users such as owners of small/medium sized farms, local producers of organic and craft food, and on-site food vendors will be **consulted** by project partners **to co-create** the list of target analytes and to support the validation of the h-ALO prototype.

h-ALO FOOD VALUE CHAINS

The h-ALO sensor will be demonstrated in 4 real-setting farm-to-fork short value chains. The use of the sensor will be demonstrated in real-setting applications focusing on short selected local and organic food chains such as **aquaponics, organic honey, craft-beer,** and **raw milk**.

AQUAPONICS

ORGANIC HONEY

RAW MILK

CRAFT BEER

BENEFITS

To ensure high quality and safety standards at lower costs

To meet consumers demand

To store data in a cloud-based system

To strengthen local farm-to-fork food production chains