photonic system for Adaptable muLtiple-analyte Monitoring of fOod quality

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**.

The h-ALO sensor will detect selected micro-organisms, pesticides/antiparasitics and heavy metals which are relevant for selected farm-to-fork food chains such as aquaponics, organic honey, craft-beer, and raw milk.

THE h-ALO 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.

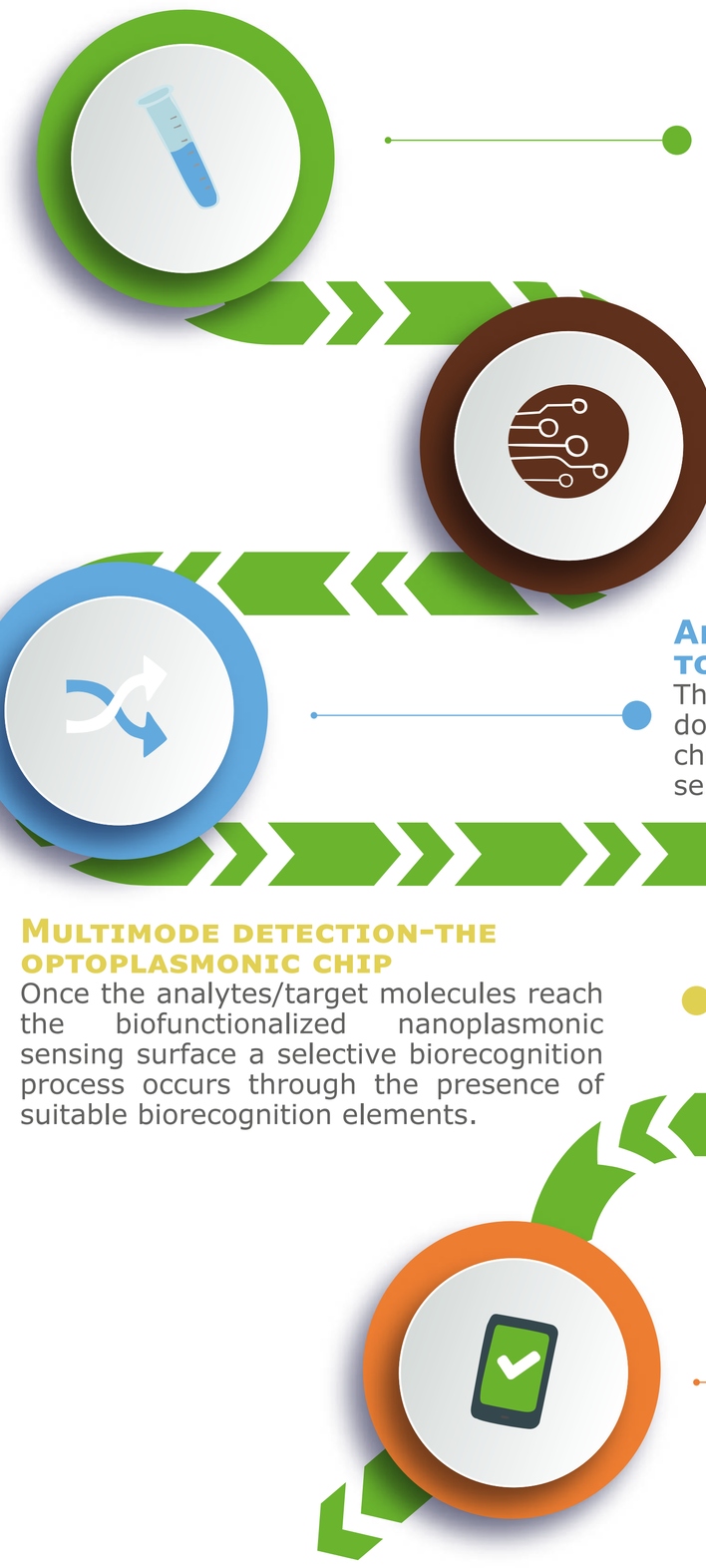
AQUAPONICS

ORGANIC HONEY

RAW MILK

CRAFT BEER

THE h-ALO SENSOR: HOW IT WORKS



SAMPLE PREPARATION BY AN USER-FRIENDLY SAMPLING KIT

The overall sample preparation is simple and fast.

ANALYTE EXTRACTION – THE SMART MICROSIEVE MEMBRANE

The analyte concentration step is automatically performed by filtering the sample in a disposable cartridge which contains a smart microsieve membrane.

ANALYTES TRANSPORTANTION TOWARDS THE OPTOPLASMONIC CHIP

The different analytes are released for downstream transport to the optoplasmonic chip located in the microfluidic re-usable sensor cartridge.

MULTIMODE DETECTION-THE OPTOPLASMONIC CHIP

Once the analytes/target molecules reach the biofunctionalized nanoplasmonic sensing surface a selective biorecognition process occurs through the presence of suitable biorecognition elements.

SIGNAL HANDLING, DATA MANAGEMENT AND VISUALIZATION

The on-chip electronics collects and refines the signal which is visualized on the mobile app. Analytical data are elaborated, transmitted and stored in a database accessible on cloud through mobile application.

PROJECT DETAILS

PROJECT TITLE: photonic system for Adaptable muLtiple-analyse 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

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