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ACTPHAST 4R Press Release

FAO: SCIENCE, TECHNOLOGY, FOOD, ENVIRONMENTAL EDITORS

## **New monitoring system to save tons of wasted food**

**Thousands of tons of wasted food could be saved every year thanks to a new monitoring system in development that promises to pinpoint the expiration of perishable produce, even after a ‘use-by’ date has expired.**

Blanket ‘use-by’ dates could be a thing of the past thanks to a new accurate monitoring system being developed by Italian scientists at the University of Cagliari that aims to check the past exposure to warmth and genuinely tell whether food is unfit for human consumption.

A staggering [88 million tonnes \(€143 billion\) of food is wasted](#) every year in the EU based on estimated dates for when food items are no longer safe to eat.

The key to solving this major problem is having a simple low cost technology which provides a precise and reliable indication of whether food is still perfectly edible - even after the ‘use-by’ date has passed – exactly the technology breakthrough of Professor Carlo Carbonaro and his team of researchers at the University of Cagliari.

Prof Carbonaro and his team are working with ACTPHAST 4R – an EU innovation hub designed to give researchers working in academia throughout Europe access to top-level expertise and technologies in photonics to produce demonstrators for their scientific breakthroughs, similar to the supports provided by the separate ACTPHAST 4.0 innovation hub for European companies, especially for SMEs – to further develop their food monitoring device that relies on photonics (the technology of light).

### **Heat Map**

Tracking historic temperatures of perishable food with a handheld scanner and a sticky label that reacts to ultraviolet light, the breakthrough technology can monitor past conditions that crucially alter shelf-life.

Creating a historic ‘heat map’ that indicates exposure to warmth, the technology can provide an accurate window of expiration and give food companies a precise picture of whether a food item has been affected during transit.

Containing a tiny sachet of powder patented by the Italian scientists, the sticky label reacts to the ultraviolet light scanner, indicating the food item’s unique status on a particular day.

Supply chain workers can then assess the likely expiration date against a set of pre-programmed criteria in real-time to optimise the transport of goods - effectively fine-tuning the food item’s use-by date by the time it reaches a supermarket shelf.

Prof Carbonaro, as the lead researcher from the University of Cagliari, said: “Thousands of tons of wasted food can now be saved every year with our highly accurate optical food monitoring label.

“The handheld scanner allows us to extract an average temperature of the food: we exploit UV to activate our labels, and then use visible light to excite the Optically Stimulated Luminescence to read its history - extracting an average temperature which is compared to an expected value.

“Changes in temperatures during transportation can affect the shelf-life of fruit, for example, so we can tell instantly whether the foods have been exposed and how likely this will modify the expiration period. We can add a level of assurance even after a food item has passed its use-by date.”

While the innovation project began approaching the technology from a food waste point of view, it soon became apparent that the UV monitoring labels had other beneficial uses.

“Our studies on wine showed that although the expiration period is not necessarily affected by the changes in temperature, the heat can have an impact on flavour, which is a very important criterion for vendors, producers and consumers,” Prof Carbonaro said.

### **Innovation Support for Researchers**

Prof Carbonaro and his research team have been supported in taking their innovation to the next level of industrialisation by ACTPHAST 4R, a photonics innovation hub designed to give researchers in academic institutes all over Europe the chance to turn their breakthrough scientific concepts into industrially-relevant demonstrators.

Prof Carbonaro said: “ACTPHAST 4R has provided us with the expertise in optics and photonics that is essential to building a demonstrator for our breakthrough concept. ACTPHAST 4R provided open access to Europe’s top experts in the accelerated development and deployment of photonics. We also were able to access the cutting-edge equipment and hands-on training in photonics that are essential to further developing our scanner and sticky labels, and that are not available to us locally within our own university or within our region”.

The research team also received business coaching to develop their commercialisation strategy for their innovations.

“In parallel with our technical development work, we have also been working with prospective industrial users of the innovation to gain their feedback, so that we can better understand their requirements and validate the application use cases. We hope to license the technology or create a new spin-out company to bring the innovation to market in the next two years.”

### **Hands-on-Training**

As part of the ACTPHAST 4R collaboration, the lead researchers also complete an internship at the relevant photonics competence centre within the ACTPHAST 4R network where they

receive hands-on training in working with the cutting-edge photonics technologies that are essential to building their demonstrator.

"For any researchers facing the 'valley of death' between research and development, ACTPHAST 4R gives you a support structure like no other. It's very fast, there is very little paperwork and the staff are both helpful and sympathetic," said Prof Carbonaro. "The application process via the ACTPHAST 4R website was quick and easy too. We would recommend working with ACTPHAST 4R to any researchers looking to innovate with photonics".

ACTPHAST 4R operates a continuous open call for researchers who wish to apply for innovation support. Applications can be made online via the ACTPHAST 4R website at the following link: <https://researcher.actphast.eu/en/register-your-interest-as-researcher>.

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### About ACTPHAST4R

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<https://cordis.europa.eu/project/rcn/219086/factsheet/en>.

ACTPHAST 4R combines the expertise and technologies of the following 24 top European photonics competence centres covering the full spectrum of photonics technologies and supply chain capabilities:

Participant No *	Participant organisation name	Short name	Country
1 (Coord.)	Vrije Universiteit Brussel	VUB	Belgium
2	Center National de la Recherche Scientifique	CNRS	France
3	Karlsruhe Institute of Technology	KIT	Germany
4	Politechnika Warszawska	WUT	Poland
5	Institute of Communication and Computer Systems	ICCS	Greece
6	Tyndall Institute, University College Cork	UCC	Ireland
7	Technische Universiteit Eindhoven	TUE	Netherlands
8	Interuniversitair Micro-Electronica Centrum VZW	IMEC	Belgium
9	Teknologian Tutkimuskeskus VTT oy	VTT	Finland
10	LioniX International	LIO	Netherlands
11	Universitat Politècnica de València	UPV	Spain
12	Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung E.V.	HHI-FEP	Germany
13	Fundacio Institut de Ciències Fotoniques	ICFO	Spain
14	University of Southampton	ORC	UK
15	Itä-Suomen Yliopisto	UEF	Finland
16	Conorzio Nazionale Interuniversitario per le Telecomunicazioni	CNIT	Italy
17	Uniwersytet Marii Curie-Skłodowskiej	UMCS	Poland
18	Instytut Technologii Materialow Elektronicznych	ITME	Poland

19	Foundation for Research and Technology Hellas	FORTH	Greece
20	Leibniz-Institut fuer Photonische Technologie E.V.	IPHT	Germany
21	Joanneum Research Forschungsgesellschaft mbH	JR	Austria
22	Polytechnic University of Catalonia	UPC	Spain
23	Consiglio Nazionale delle Ricerche - Istituto di Fotonica e Nanotecnologie	CNR	Italy
24	SMART Photonics BV	SPH	Netherlands

For more information, please visit [www.actphast.eu](http://www.actphast.eu).