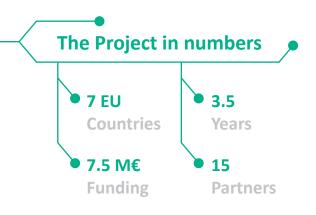## INNPAPER at a glance

Fresh food products constitute a complex market of high demand, subject to constant transportation and fast spoilage. To secure the goods, a quality control and proper tracking of the food during its supply chain and before consumption is essential. INNPAPER provides a **novel paper-based smart label** using inked electronic circuits designed to suit this market's needs. Our platform provides **information about the cold-chain maintenance, proper handling and product freshness** in a single label, all **using a sustainable and cost-efficient technology.**

INNPAPER is a European research and innovation project focused on printed electronics that involves 15 scientific and industrial partners. We are developing new paper platforms and conductive inks to produce batteries, displays, antennas and sensors that **can be used industrially in many other sectors.** Smart labels are only one of our three use cases, along with diagnostic platforms and drug detection kits, but the flexibility of the platform allows a wider market placement in the future.

Smart labeling
of fresh food products

Drug testing
of caffeine and THC

Diagnostic testing
of SARS CoV-2, Influenza virus and *Streptococcus* A

The Project in numbers

7 EU
Countries

3.5
Years

7.5 M€
Funding

15
Partners

Partners

Use case:

Find out more!

www.innpaper.eu

🐦 @INNPAPER_EU

f /INNPAPER

✉ avinuales@cidetec.es

INNPAPER

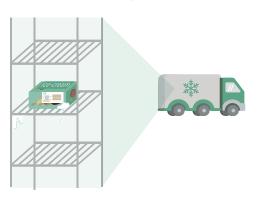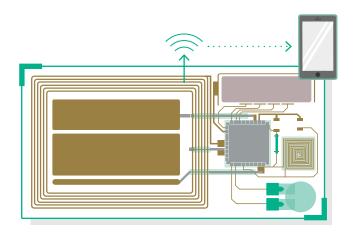## Paper electronics for smart labeling of fresh food products

The Project

Smart product tagging for a smart future

Product identification systems that provide status updates about an item, such as its condition or location, form a **growing market that will rise to 12 billion dollars by 2023.** It is estimated that up to 80% of products will feature a smart label in the next five years in the **food, cosmetic and healthcare industries.** Perishable food products are one of the main drivers of this labelling trend, as they present special tracing needs during their supply chain and before consumption.

Fresh food market, first in line

Perishable food is part of the fast-moving consumer goods market, a sector characterized by **rapid spoilage** and the **extensive and constant distribution** of products due to high demand. There is a crucial need to **control the food conditions during the supply chain**, in order to avoid massive product and economic losses for both producers and retailers and to ensure consumer safety.

Paper-based smart labels

At INNPAPER we are developing a **smart label using paper and electronic circuits made of ink** for fresh food products. This system will allow producers and retailers to optimize product tracking and waste management, while providing additional benefits compared to other available technologies.

• **Cost-efficient system** combining sensors with INNPAPER's other printed electronics.
• **Environment protection** by using paper as a scaffold to lower electronic and plastic waste.
• **Unified functionalities** in just one label, which will measure different physical conditions.
• **Product tracking** as the labels can send information about the product's condition to other devices.

Detection systems

INNPAPER smart labels accurately measure physical changes in packages thanks to the incorporation of:

• **Temperature sensor** able to detect changes from -6 to 60 ºC, which report if the cold-chain has been maintained.
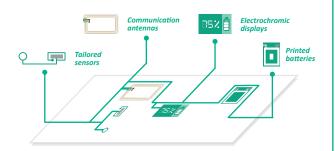
• **Humidity sensors** that can measure from 30 to 90% of relative humidity, able to detect product spoilage.

• **Shock detection sensors** with a large stress range from 100 to 500kPa to ensure a proper handling of the goods during the entire supply chain.

Beyond tags

INNPAPER's common platform offers a combination of electronic components, all printed on paper using functional inks, that provide a configurable board **applicable to many other electronic purposes.**

Tailored sensors
Communication antennas
Electrochromic displays
Printed batteries

• **Tailored sensors** adapted to the application.
• **Batteries** to power the platform.
• **Antennas** able to send information from the sensors to other electronic devices.
• **Displays** that can show information in the device.