

INN PAPER at a glance

Point of care testing requires rapid and accurate diagnostic devices, as demonstrated by the Covid-19 pandemic. Some common diseases, including Influenza and *Streptococcus* A infections, have no such tests available. INN PAPER provides a **novel paper-based diagnostic kit** using inked electronic circuits to overcome current limitations. Our tests are **easy to perform, accurate and quick**, covering the market's demands, but also present **additional benefits** in cost reduction, environmental impact and workers' safety.

INN PAPER is an European research and innovation project focused on printed electronics that involves 15 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**. Diagnostic kits are only one of our three use cases, along with smart food labels and drug detection kits, but the flexibility of the platform allows a wider market placement in the future.

- **Smart labelling**
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

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INN PAPER

Paper electronics for diagnostic testing

The Project

Point of care testing, the future of diagnosis

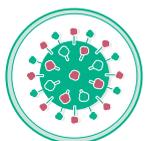
The development of **diagnostic tools** that can be performed **outside laboratories** or healthcare facilities is becoming a **growing trend**. This point of care (POC) market is projected to rise from 18.4 billion dollars in 2017 to 25.5 billion in 2023. They present major benefits as they make testing **available for more patients** and provide quick results. However, regardless of the disease, this testing **requires quick, accurate and easy** to perform diagnostic kits that are not always available. That is the market's need we are covering at INNAPER.

Three targets: SARS-CoV-2, Influenza and *Streptococcus A*

Covid-19 has generated a global demand for **mass diagnostics**, with **SARS-CoV-2** detection now occupying an 84.4 billion-dollar market. The goal is to decrease delay from testing to results, leading to a better control of the pandemic. *Streptococcus A* bacteria and influenza virus also have relevant roles in the point of care (PoC) testing market due to their diagnostic requirements. **Influenza** is in need of a **more sensitive rapid test**, as efficacy of antiviral drugs drops if taken after 24h of disease onset. For ***Streptococcus A***, the goal is to **improve testing accuracy** to avoid misuse of antibiotics.



• Influenza virus

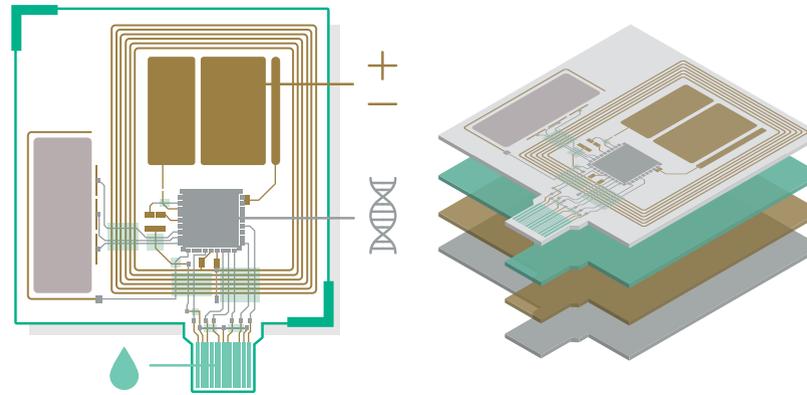


• SARS-CoV-2



• *Streptococcus A*

Testing chip



Testing steps

- 1. Sample collection:** from body fluids as saliva or nasopharyngeal aspirate/swab.
- 2. Processing:** suspended sample is grinded to release cells' DNA or virus RNA.
- 3. Testing:** based on a pH sensor and specific LAMP amplification method (Loop-mediated isothermal amplification).
- 4. Results:** display shows sample status along with negative and positive controls tested simultaneously.

Paper-based diagnostic tests

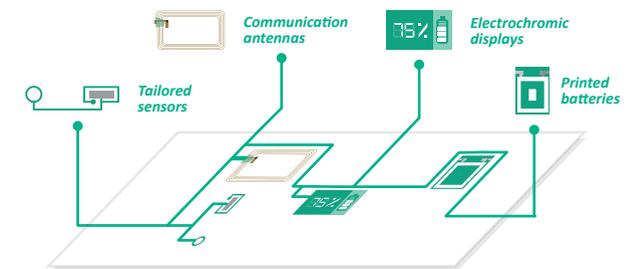
At INNAPER we are developing diagnostic kits using paper and electronic circuits made of ink for SARS-CoV-2, Influenza virus and *Streptococcus A* infections. This technology not only covers the needs of PoC testing but also provides additional benefits compared to other current platforms.



- **Quickness:** estimated diagnostic time of <30min.
- **Sensitivity:** high performing test.
- **Ease:** requires only basic equipment and saliva or respiratory samples.
- **Cost reduction:** in both the manufacturing process and, consequently, end-user price.
- **Environment protection:** using paper as a scaffold lowers electronic and plastic waste.
- **Increased safety:** testing components are easily discarded as medical waste for burning.

Beyond biosensors

INNAPER'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** 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.