

## Low cost and reusable, non-invasive wireless chemical sensor for biological fluids

Researchers from the Spanish National Research Council (CSIC) have developed a novel wearable sensor technology, which is suitable to detect and monitor in a non-invasively-way metabolites and biomarkers such as glucose, lactate and/or alcohol. The sensor is based on an electrochromic-electrochemical and wireless optical sensing basis, and is suitable to be used on biological fluids (included human or food one). Its mass-production capability by using conventional screen-printing process enables their easy and low-cost integration in multiple form factors.

Industrial partners interested on mass production of electrochemical sensors for smart patches, food packaging and textiles (clothes and shoes) applications are being sought to exploit the technology through a license or collaboration agreement.

### *An offer for Patent Licensing*

#### Wireless glucose sensing

Wearable sensors are expected to facilitate the detection and monitoring of various metabolites and biomarkers non-invasively. However, their use on biological fluids present significant technological challenges related to their manufacture, operation, and life cycle.

CSIC's sensor platform is actuated by radio-frequency signal, and a colour changing electrochromic transducer, which provides information on the concentration of the target analyte in a fluid (sweat, food fluid). This colour change can be read qualitatively by the naked eye, but quantitatively by means of image analysis system, such as a mobile device camera or photodetector.

Sensor operation has been successfully demonstrated through a glucose biosensor, however can be made for lactate or alcohol detection in sweat or any other biological liquid or foodstuffs, which makes it suitable to be implemented in various form factors including wearable devices (skin patch) or smart labels such as sensing RFID tags. The sensor is reusable.



Fig. 1- Wireless electrochromic sensor prototype .

#### Main innovations and advantages

- Reusable, non-invasive and wireless operation.
- Fully screen-printed: scalability to cost-effective mass production process.
- The lack of a reference electrode makes the system more robust.
- Can be used as non-invasive monitoring system for glycemia measuring in body fluids such as sweat.
- Multiparametric sensors can be built using this approach to detect several analytes simultaneously (glucose, alcohol, lactate,...).
- Both single point measurements and monitoring modes possible.

#### Patent Status

Priority patent application filed suitable for international extension

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