

# A DVD-technology-based system that quickly and inexpensively detects SARS-CoV-2 antigens and specific antibodies

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Credit: Universitat Politècnica de València

Researchers from the Universitat Politècnica de València (UPV) have developed a new system at laboratory scale that allows the rapid, cheap and effective detection of COVID-19. The system consists of a biosensor based on DVD technologies that detects specific antibodies

(G, M and A) and SARS-CoV-2 antigens in saliva or blood serum in less than 30 minutes, differentiating them to those of influenza. The price of the test is estimated at less than €2.

"It consists of a semi-automatic system made up of a microfluidic disc and a reader based on DVD technology, which performs microarray format tests with [high sensitivity](#) and selectivity," says Ángel Maquieira, professor of the Department of Chemistry and Director of the Institute of Molecular Recognition and Technological Development (IDM) at the UPV.

Called COMBO-SARS-CoV-2, the system can analyze up to a total of six serum and saliva samples simultaneously, determining type G, M and A antibodies and virus-specific antigens in less than half an hour. "It also includes software for the acquisition, presentation and management of results," says Sergi Morais, professor in the Department of Chemistry and researcher at the IDM.

The IDM researchers have assessed the analytical performance of the biosensor system in a double-blind trial, in collaboration with the Microbiology and Parasitology Service of the Clinical Hospital of València, led by Dr. David Navarro, and the Integrated Occupational Health and Prevention Service of the Universitat Politècnica de València.

Ángel Maquieira says, "The results are obtaining very valuable information to identify asymptomatic positive individuals, differentiating them both from non-infected individuals, with a high degree of sensitivity and selectivity, and from those with other infections such as seasonal flu."

When a patient tests positive, the serological and/or saliva sample generates an optical signal that allows the identification of individuals

who have suffered or are suffering the infection and establishes the concentration of the specific biomarkers.

"The developed system will allow a rapid and automated viral diagnosis at a much lower cost than the kits currently in use. Furthermore, these biosensors will enable a practical and efficient monitoring of the level of neutralizing antibodies once the vaccine is ready," says Sergi Morais.

## **In primary care services, emergencies and ICU**

Given the high performance of the technology, the IDM team of the Universitat Politècnica de València says that the number of health scenarios that can benefit include primary care services, emergency departments and intensive care units, among others.

"The device is very competitive in terms of price, as the disc player has a manufacturing cost of €350. The discs are produced on a pilot scale by a Valencian company at a very affordable cost. Furthermore, its manufacture can be scaled up for mass production by specialized companies with which we have already worked on other projects," says Ángel Maquieira.

"The test goes beyond the COVID19 pandemic, since it can and may be applied to detect other agents with infective capacity such as influenza viruses, adenoviruses and [respiratory syncytial virus](#), which is the main cause of bronchiolitis in children under two years of age," says Sergi Morais.

Provided by Universitat Politècnica de València

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