

Biosensor device for simultaneous detection of several biological samples in solution

CSIC has developed a new biosensor device that allows the simultaneous quantification of various analytes from a biological sample or of a compound in a multisample format. This technology can be applied by using microarrays, to the detection of analyte traces in different fields, such as control of residues in food, environmental control or disease diagnosis.

An offer for Patent Licensing and/or R+D collaboration

Multisensor device

This biosensor device consists of:

- an array of four sensor systems, where each sensor consists of two interdigitated microelectrodes, chemically modified with biomolecules (receptor molecules, antigens) and separated by insulating dielectric barriers of SiO₂, in order to increase the sensitivity of the signal produced in presence of the analyte
- two flow chambers that can be coupled separately to the array: a single duct cell where a fluid flows sequentially through each electrode system and a multiple duct cell that allows that several samples flow independently through each electrode system.

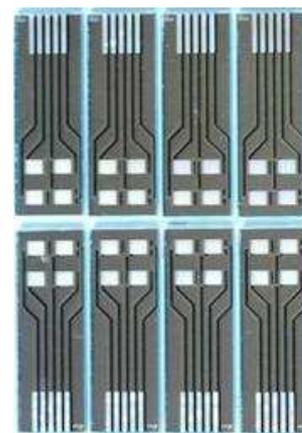
Operation of the biosensor

- Sensor functionalization stage. The array is coupled to one of the two chambers, selected depending on what is going to be analysed, the same analyte in four different samples (single duct cell) or four analytes in the same sample (multiple duct cell). A receptor molecule selective for each analyte, flows for each duct, being fixed to the surface of the corresponding electrode system.
- Measurement stage. The functionalized array is coupled to the cell not used in the previous stage. The test sample flows jointly with an immunoreagent or antibody mixture, to act selectively on each sample analyte and to react with the receptors fixed previously in each electrode system, producing a change of impedance which is going to be detected at a certain frequency.

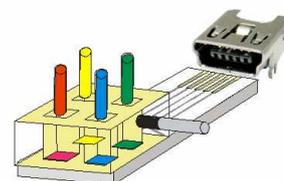
Main applications and advantages

The biosensor allows:

- qualitative and quantitative detection of low molecular weight compounds at the trace level.
- application to different areas: food safety (ex. veterinary drug residues control), environmental control (pesticides), clinical diagnosis (disease diagnosis) or security (drug abuse control).
- *in situ* application (environmental control, food safety) or in the medical centre (diagnosis). Special facilities are not required.
- high miniaturization, microarrays.
- sensitivity comparable to other analytical methods such as ELISA, but the analysis is faster and easier.



Several tetrasensor arrays.



Array inserted into a four duct cell. A different fluid flows for each duct.

Patent Status

Spanish patent application filed

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