

Inkjet printing of electrochemical biosensors with consumer printers

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Between all the fabrication methods, inkjet printing has been studied during the recent years, and showed to be a promising technique for electrochemical platforms for its excellent proprieties and versatility. Between the classes of equipment available, an increasing part of the scientific community is adopting consumer/desktop like printers for developing their technologies. This approach has advantages mainly in the ease of use and high throughput this systems can give, with a good compromise in regard to the resolution and precision. Merging this printing world with the nanomaterials is the key ingredient to transform office equipment in technology able to produce performing nanofunctional devices. Metal nanoparticles ink or two dimensional material can be explored and added to the library of the possibilities offered using this approach.

The aim of this tutorial is to show how consumer inkjet printers can be used to produce electrochemical biosensors, in an easy and accessible way, making the manufacturing of the device possible in an office-like equipment.

It is possible to combine the nanomaterials with a wide range of biomaterials like antibodies and thiolated aptamers, or integrating more advanced biotechnological approaches such as nanoswitching labelled aptamers, covering a wide range of detectable biomolecules and analytes.

Lastly, is possible to combine these platforms with portable and wireless systems, maybe with a smartphone readout, with the concept idea of producing the device and measure the sample directly at the point of need.

This decentralized approach may be the key for future outbreaks and emergencies, as well as, embracing to a deep level the concept of point-of-care biomedical devices following the **RASSURED** criteria: **R**ead-time connectivity, **E**ase of specimen collection, **A**ffordable, **S**ensitive, **S**pecific, **U**ser friendly, **R**apid and **R**obust, **E**quipment-free, **D**elivered to those who need it.



Figure 1. Examples of the electrochemical platforms produced using consumer inkjet printers and metal nanoparticles inks