Microscale Electrodes integrated on non-conventional substrates for Real Sample Campylobacter spp. detection

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Abstract

Campylobacter spp. are responsible of acute bacterial diseases in human worldwide. Nowadays campilobacteriosis is considered the most common foodborne illness in the European Union [1]. To our knowledge, there no commercial biosensors and very few examples of detection of Campylobacter spp in food matrices [2]. In this work the first electrochemical genosensor based on thin-film gold electrodes deposited onto Cyclo Olefin Polymer (COP) substrates was fabricated for the detection of Campylobacter spp in food matrices. The sensing element is characterized by several surface techniques and the sensitivity of the biosensor has been analyzed. A good linear relationship was obtained for the concentrations of PCR amplicon of Campylobacter spp. between 1 and 25 nM with a LOD of 90 pM. Real samples have been validated with poultry meat samples and results were comparable with the PCR product samples. The experimental CVs and SWVs obtained before and after hybridization suggest that the device presents a high potential to integrate electrochemistry and microfluidics for analysis of microorganism in food and therefore the samples with current values lower that 30 μA can be considered as negative. This is the last step for the fabrication of a Lab on a Chip (LOC), a biodevice integrating DNA sensor technology into microfluidic system, believed to perform an automated and complete assay, including sample preparation, PCR amplification, and electrochemical detection of *Campylobacter spp*. in raw poultry meat sample.

References

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[2] Yang, X.; Kirsch, J.; Simonian, A., Journal of microbiological methods, **95,** (2013), 48-56**.**

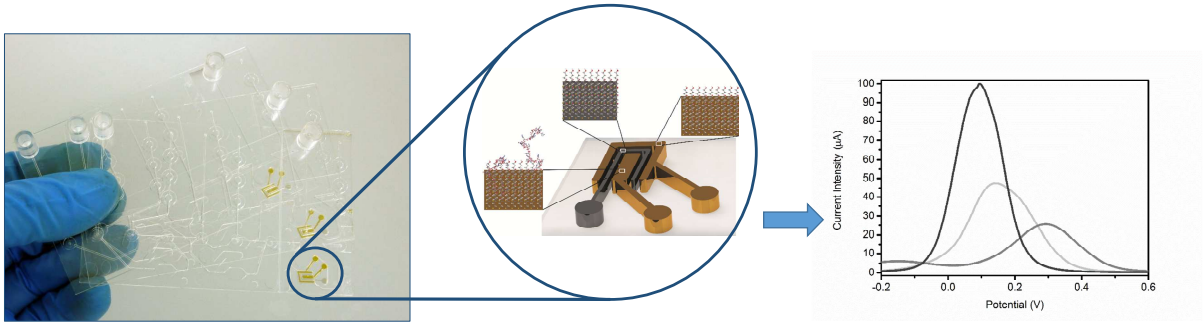

Figure 1. Image of the electrochemical sensor with three-electrode configuration sputtered onto the COP layer and Square-Wave Voltammograms (SWV) before and after hybridization