Electrochemical and spectroscopical characterization of apta-sensor based on gold electrodes functionalized with poly-L-DOPA film

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Abstract: The development of new biotechnological integrated and miniaturized devices is an interesting aspect of biosensors application in different biomedicine fields, for example for detection of microorganisms responsible for food poisoning, such as *Salmonella*, *Clostridium botulinum* and *Listeria monocytogenes*. A fast and easy detection of a particular target is the aim of these kind of new biosensors, which promise to be fast and reproducible portable devices. In this work, gold screen printed electrodes (SPEs) are modified by electrochemical deposition of a polymer, able to work as linker for a specific aptamer that will detect the target of interest. The polymer used to functionalize this biosensor is L-Dopa, a chiral amino acid known for its adhesive properties. Because of L-Dopa electro-polymerization has not been well characterized yet [1], the experiments conducted in this work are aimed at better characterization of L-Dopa polymeric film, trying to understand the functional groups that could bind the suitable aptamer for detection of Internalin-A, a *Listeria monocytogenes* surface protein. Gold SPEs were first electrochemically modified with poly-L-Dopa film, then InlA aptamer was drop-casted on working electrode. The modified SPEs characterization was performed by Cyclic Voltammetry (CV) and Electrochemical Impedance Spectroscopy (EIS) in ferrocyanide; to appreciate polymerized L-Dopa characteristics, Infrared (IR) and Raman Spectroscopies were performed too.
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