NANOSTRUCTURATED BIOSENSORS FOR THE ANALYSIS OF PHENOLIC COMPOUNDS

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Biosensors represent an interesting alternative for the detection of phenolic compounds. Many different approaches can be found in the literature including carbon-paste biosensors [1], graphite composite electrodes [2], conducting polymer modified electrodes [3], and silica sol–gel composite films [4]. Some of these methods are relatively complicated, require the use of several reagents and often the biosensor produced presents stability problems. For that reason new alternative biosensor designs for phenolic compounds are being developed and investigated by our research group. These are based on screen-printed carbon electrodes modified with carbon nanotube and Au electrodes modified with conducting polymer nanolayers.

The use of carbon nanotubes (CNT) has become relevant due to their excellent conductivity including the improvement of electron transfer between the enzymes and the electrode surfaces [5]. CNT works as electron mediators and at the same time provides a very good matrix for enzyme immobilization [6]. On the other hand, the biosensors based on nanostructured layers [7] have demonstrated to be simple in preparation, allowing the easy electrostatic attractions of biomolecules and offering a great promise for developing amperometric biosensors.

Some preliminary results related to the detection of phenolic compounds achieved using different platforms based on either conducting nanolayers or carbon nanotubes structures including enzymes will be shown. The Layer-by-Layer (LbL) technique used to modify the Au electrode with ultra-thin conducting films (i.e. polyaniline) seemed to result the most interesting approach in relation to the preparation of tyrosinase-based biosensors for the analysis of phenolic compounds.

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