Contribution ID: **338** Type: **Poster**

COMPARATIVE STUDY OF TWO DIFFERENT LACASSE ENZYMES IMMOBILIZED IN NTC'S USED AS BIOSENSOR TO DETECT CATECHOL

Carbon nanotubes (NTC´s) are novel artificial structures that have good mechanical, electrical and thermal properties. These properties have made the NTC´s object of application in the immobilization of enzymes for the manufacture of biosensors. In the present study, NTCs were used as support for the immobilization of the laccase enzyme to develop an amperometric biosensor for the determination of phenolic compounds in solutions. The enzyme used was obtained from two sources: commercial laccase enzyme from Trametes versicolor (Sigma) and crude enzymatic extract from Trametes versicolor (TA-CMU). The NTC´s were purified and oxidized by acid treatment with a solution of concentrated HNO3 and H2SO4 (1: 3) to leave the surface charged with the carboxyl group and carry out the immobilization of the enzyme. Subsequently, they were characterized by SEM, X-ray diffraction, FTIR and Raman spectroscopy. Electrodes modified with NTCs and both either enzyme or the extract were prepared, later characterized by Electrochemical Impedance Spectroscopy (EIS) techniques, identifying the interface formed on the surface of the electrode, showing the impedance or resistance to the passage of ions that the enzyme presents itself. Alone and by the presence of NTCs bound to the enzyme, was improved the process of electron transfer. Finally, cyclic voltammetry tests were performed in the presence of catechol to evaluate their detection. Values of the oxidation peak were determined in 715,624 µA and 709,224 µA for E-NTC-GA and EXT-NTC-GA, respectively, showing that the extract was capable to detect the phenol compounds.

Keywords

Carbon nanotubes, enzyme

Reference

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This work was supported by

Coordinación de Investigación Científica de la UMSNH

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Session Classification: NANOSTRUCTURES

Track Classification: Nanostructures