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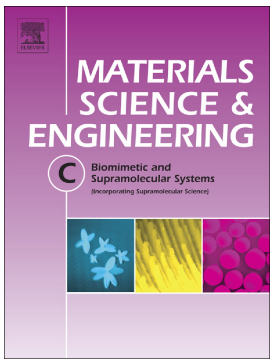

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A novel simple biosensor containing silver nanoparticles/propolis (bee glue) for microRNA let-7a determination

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Abstract

A novel sensitive electrochemical sensor for microRNAlet-7a detection in normal serum samples, hepatocellular carcinoma patients and human liver cancer cells, has been excellently synthesized. The sensor constructed of carbon paste (CP) amended with silver nanoparticles (AgNPs) and extracted propolis (bee glue). The AgNPs/P modified carbon paste electrode (APCPE) displayed a high electrocatalytic activity in a Britton Robinson (BR) buffer (pH = 7.4). The techniques utilized to prepare this work are square wave voltammetry (SWV) and electrochemical impedance spectroscopy (EIS). Surface characteristics were achieved using scanning (SEM), Fourier-transform infrared spectroscopy (FTIR), Spectrophotometer, transmission (TEM) electron microscope, energy dispersive X-ray analysis (EDX) and elemental mapping (EM) techniques. Under optimal conditions, the suggested sensor exhibits good rapid and sensible response reaching a very low detection limit of 10^{-3} femtomolar.

Keywords: MicroRNAs; Ag Nanoparticles; Propolis; TEM; EIS.

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