Low-cost and Highly Sensitive Sensor for Determining Atorvastatin Using PbTe Nanoparticles-Modified Graphite Screen-Printed Electrode

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In this work, PbTe nanoparticles-modified graphite screen-printed electrodes (PbTe NPs/SPE) has been designed for electrochemical determination of atorvastatin for the first time. Striking advantages, including easiness, low manufacturing cost, and being one-use are exhibited by the sensor. Analyte electrochemical behavior was characterized by cyclic voltammetry. Electrochemical behavior of atorvastatin at PbTe NPs/SPE was also discussed. Additionally, quantitative detection of atorvastatin was done by differential pulse voltammetry. Under optimized conditions, the resulting signals were linearly inserted within an atorvastatin concentration range of 1-70 μM . High diffusion coefficient of $3.7 \times 10^{-5} \text{ cm}^2 \text{ s}^{-1}$ and low limit of detection of 0.05 μM were obtained for atorvastatin detection using PbTe NPs/SPE. Moreover, the usability of the PbTe NPs/SPE sensor by measuring atorvastatin in real samples was reported. The sensor offers greater accuracy, which implies its massive capacity for functional uses.

Keywords: Atorvastatin, PbTe nanoparticles, Electrochemical sensor, Graphite screen-printed electrode, Cyclic voltammetry.

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