Application of Sensitive Sensor Modified with MWNTs/Al₂O₃/poly-L-lysine Composite for 17 β –estradiol Determination in Pregnant Woman Blood

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A novel disposable sensor modified with MWNTs/Al₂O₃/poly-L-lysine film was developed for detection of clinical 17 β -estradiol (17 β -E₂) urine samples in this study. The electrochemical behavior of 17 β -E₂ was greatly increased due to the good electrocatalytic activity of MWNTs/Al₂O₃/poly-L-lysine nanocomposites. The optimum experimental conditions such as scan rate, pH, accumulation time were obtained, and the peak potentials of 17 β -E₂ was explored at about 530mV. The peak current of 17 β -E₂ measured by CV displayed the good linear property with the increasing of the concentrations. Under optimized conditions, the disposable sensor displayed excellent analytical performance with linear ranges of 17 β -E₂ from 0.5nM to 50nM. And a very low detection limit of 0.014 nM was attained. Furthermore, the MWNTs/Al₂O₃/poly-L-lysine SPE was used to the rapid and successful determination of the hormone in spiked synthetic and real clinical pregnant woman urine samples with wonderful selectivity and sensitivity.

Keywords: Disposable sensor, 17 β -estradiol, clinical pregnant woman urine samples, modified screen printed electrode

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