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## Application of graphite screen printed electrode modified with dysprosium tungstate nanoparticles in voltammetric determination of epinephrine in the presence of acetylcholine

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**Abstract:** The current work focuses on the development of a sensitive and selective electrochemical device based on a graphite screen printed electrode modified with  $Dy_2(WO_4)_3$  nanoparticles (DWO/SPE) for the analysis of epinephrine in samples also containing acetylcholine. The study proves that the sensor has excellent electron-mediating behavior in the oxidation of epinephrine in a 0.1 mol/L phosphate buffer solution (PBS) (pH 7.0). The application of the DWO/SPE in differential pulse voltammetry (DPV) is found to lead to distinct response for the oxidation of epinephrine and acetylcholine, with the potentials of the epinephrine and acetylcholine peaks ( $\Delta E_p$ ) to be 550 mV apart. The detection limits of the method for epinephrine and acetylcholine are 0.5 and 0.7  $\mu\text{mol/L}$  ( $S/N=3$ ) and the responses were found to be linear in the concentration ranges of 1.0 to 900.0  $\mu\text{mol/L}$  and 1.0 to 1200.0  $\mu\text{mol/L}$  in a PBS buffer (pH=7.0) respectively. The modified electrode was used for the detection of epinephrine and acetylcholine in real samples and found to produce satisfactory results. These results can be a proof that  $Dy_2(WO_4)_3$  nanoparticles can find promising applications in electrochemical sensors to be used for the analysis of (bio) chemical species.

**Keywords:** Epinephrine; Acetylcholine;  $Dy_2(WO_4)_3$  nanoparticles; Graphite screen printed electrode; Rare earths

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