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Simultaneous voltammetry detection of dopamine and uric acid in human serum and urine with a poly(procaterol hydrochloride) modified glassy carbon electrode

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Abstract

In the present study, procaterol hydrochloride (ProH) was successfully electropolymerized onto a glass carbon electrode (GCE) with simply cyclic voltammetry scans to construct a poly(procaterol hydrochloride) (p-ProH) membrane modified electrode. Compared with the bare GCE, much higher oxidation peak current responses and better peak potentials separation could be obtained for the simultaneous oxidation of dopamine (DA) and uric acid (UA), owing to the excellent electrocatalytic ability of the p-ProH membrane. And it's based on that a square wave voltammetry method was developed to selective and simultaneous measurement of DA and UA. Under the optimum conditions, the linear dependence of oxidation peak current on analyte concentrations were found to be 1.0 – 100 $\mu\text{mol/L}$ and 2 – 100 $\mu\text{mol/L}$, giving detection limits of 0.3 $\mu\text{mol/L}$ and 0.5 $\mu\text{mol/L}$ for DA and UA, separately. The as prepared modified electrode shows simplicity in construction with the merits of good reproducibility, high stability, passable selectivity and nice sensitivity. Finally, the proposed p-ProH membrane modified electrode was successfully devoted to the detection of DA and UA in biological fluids such as human serum and urine with acceptable results.

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