DETERMINATION OF DOPAMINE USING POLY (1-(2-CYANOETHYL) PYRROLE) COATED CARBON FIBER MICRO ELECTRODE

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Catecholamines utilized in adrenergic synapses of brain, smooth muscle. Dopamine (DA) is one of the most important catecholamine which is facilitates critical brain functions when present in normal level. DA is involved in many behavioral disorders such as reward deficiency syndrome, Parkinson's disease and Schizophrenia. Due to its cationic structure in brain extracellular fluid (at pH=7.4) several report were published modification of the electrode surface by anion repelling agents i.e. Nafion[1,2], overoxidized polypyrrole[3,4], and poly(1,2-phenylenediamine)[5].

In this study, 1-(2-Cyanoethyl)pyrrole coated carbon fiber micro electrodes (CFMEs) were employed to measure dopamine from 1mM to physiological concentration (1-50nM). 1-(2-Cyanoethyl)pyrrole was electrochemically deposited from 1 mM solution of monomer and tetrabutylamoniumhexafluorophosphte (TBAFP) **(Figure 1)**. Polymer coated electrode was washed with water and measurements have performed immediately. A quasi-reversible cyclic voltammogram **(Figure 2)** was observed in the case of 1mM DA at 300mV/s in phosphate buffer solution (pH=7.4) which is prepared using NaH_2PO_4 and $Na_2HPO_4.2H_2O$.

The properties and behavior of the poly(1-(2-cyanoethyl)pyrrole) coated CFMEs were investigated by CV. Reproducibility, reversibility and stability of the electrodes were studied in detail.

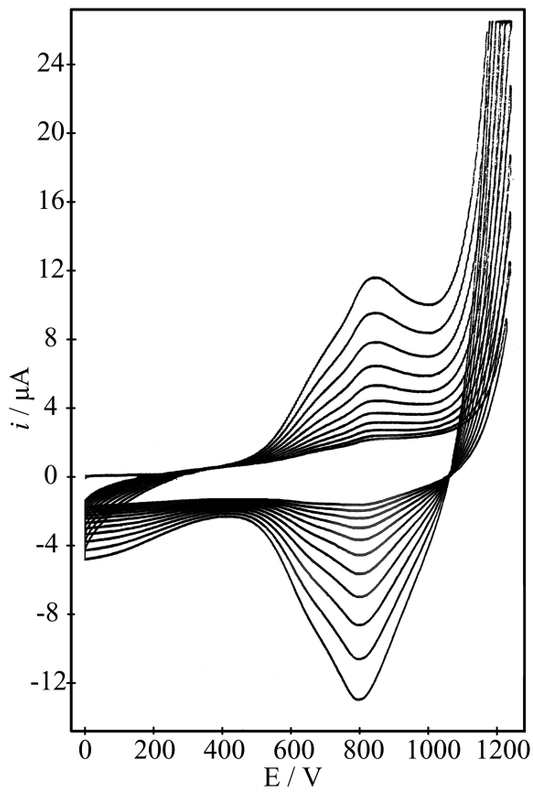

Figure 1: Electrodeposition of 1-(2-Cyanoethyl)pyrrole by potential scanning from a 10^{-3} M solution of monomer in 0.1 M TBAFP / Acetonitrile at 100 mV s^{-1} on the carbon fiber micro-electrodes (electrode area = $1.0x10^{-3}$ cm^2)

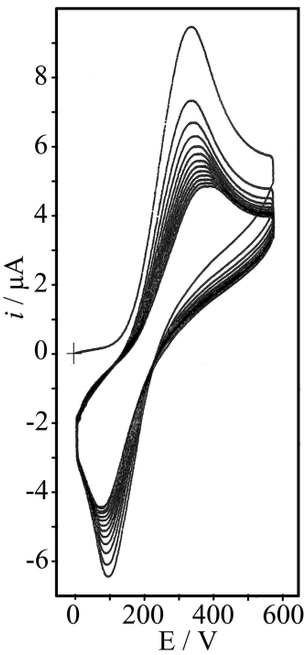

Figure 2: Response of poly(1-(2-Cynoethyl)pyrrole) coated carbon fiber micro-electrodes in 1mM DA and in phosphate buffer solution at 300 mV s^{-1}.

References

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