

Electrochemical detection of a local anesthetic dibucaine at arrays of micro liquid liquid interfaces

ABSTRACT

Electrochemical characterization and detection of protonated dibucaine (DIC⁺) at microinterface array across water|1,6-dichlorohexane were performed using cyclic voltammetry (CV) and differential pulse voltammetry (DPV). Some thermodynamic parameters of dibucaine, such as the standard transfer potential, the Gibbs energy of transfer and the partition coefficient, were estimated by CV. In addition to the analytical parameters, the impact of bovine serum albumin (BSA) on dibucaine detection (in artificial serum matrices) was also investigated. DPV was applied to detect a lower concentration of DIC⁺, resulting in a detection limit of $0.9 \pm 0.06 \mu\text{M}$. While the presence of BSA affected CV, demonstrated as reduced current responses, DPV was confirmed to be an efficient method for lowering concentrations of the dibucaine detection in the artificial serum matrix in the presence of BSA, with a limit of detection (LOD) of $1.9 \pm 0.12 \mu\text{M}$.

Keyword: Ion transfer; Dibucaine; Microinterfaces; Voltammetry; Drugs monitoring