Investigation Of Electrochemical Behaviour of 2-(5-Bromo-2-Pyridylazo)-5-[N-Propyl-N-(3-Sulfopropyl) Amino] Phenol Disodium Salt Dihydrate

Yeliz KARAMAN, Necati MENEK, Saim TOPCU and Serpil BAŞARAN
Ondokuz Mayis University Sciences and Arts Faculty Department of Chemistry, 55139 Kurupelit-SAMSUN, TURKEY
ykaraman@omu.edu.tr

Aromatic azo compounds constitute a very important class of organic compounds because of their widespread applications in many areas of technology and medicine. A number of azo dyes, which are becoming extensively scattered throughout the environment around manufacturing plants, exhibit genotoxic or ecotoxic properties leading to the need for sensitive analytical methods for their determination. Modern polarographic and voltammetric methods are particularly suitable for these purposes because of their high sensitivity, their applicability over an unusually wide concentration range, and their low investment and running costs. Since aromatic azo compounds generally are electrochemically active, much effort has been undertaken to study the redox chemistry of such compounds, mainly by polarography and voltammetry. The presence of conjugated bond system and chelating moiety gives rise to a considerable shift of the polarographic and voltammetric peak potentials and currents. Therefore such compounds can be used as metallochroic indicators [1-5].

This work deals with the determination of electrochemical behaviour of 2-(5-Bromo-2-pyridylazo)-5-[N-propyl-N-(3-sulfopropyl)amino]phenol disodium salt dihydrate (5-Br-PAPS) in different electrolyte media. The polarographic and voltammetric behaviour at static mercury drop electrode (SMDE) and hanging mercury drop electrode (HMDE) has been studied in aqueous and ethanolic media. For these purposes polarograms and voltammograms of the azo compound were recorded with a Metrohm 757 VA Computrace Electrochemical Analyser by employing square wave voltammetry (SWV), differential pulse polarography (DPP), direct current polarography (DCP) and cyclic voltammetry (CV) techniques. A three electrode combination system was used. This consisted of a Multi Mode Electrode (DME, SMDE and HMDE), a Ag/AgCl reference electrode and Pt wire auxiliary electrode. The effect of the composition of the solvent on the electrode process and on peak currents and peak potentials has been also investigated in presence of Britton Robinson buffer solutions.

The research is based on the comparisons of electrochemical behaviour of the azo compound in aqueous and ethanolic media. The polarograms and voltammograms of the azo compound show one reduction peak in different ranges of pH between pH’s 3.0 and 11.0 for SWV, CV and DPP techniques. Plots of reduction peak potentials (E) versus pH shift to more negative values with increasing of pH for %10, %20, %30, %40 and %50 ethanol contents. However, the plots of peak potentials versus % ethanol are approximately constant with increasing of ethanol concentration. The plots of reduction peak currents of 5-Br-PAPS versus % ethanol are also decreasing with an increase of ethanol content for SWV, CV and DPP techniques [6].

References