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Electrochemical Behaviors of Cefotaxime Sodium and Doxorubicin Hydrochloride

한영희
상명대학교 화학과

Cefotaxime sodium and doxorubicin hydrochloride are antibiotics which belong to cephalosporins and anthracyclines, respectively. In order to develop the speedy analytical procedures of the antibiotics which are based on the electrochemical properties of their chemical structures, cefotaxime sodium and doxorubicin hydrochloride have been studied by cyclic voltammetry, differential pulse polarography and square wave voltammetry.Cefotaxime sodium exhibited a little different DPP and SWV peak patterns, although the trends of peak appearing were similar in the phosphate buffers. The potential shift of the first peak was -98 mV/pH in the pH range between 2 and 9, while the second peak appeared in the buffers of pH values less than 4 by SWV. The linearity was observed when the first peak currents were plotted vs. concentrations of cefotaxime sodium(1.0×10^{-7} M - 1.0×10^{-5} M).
Doxorubicin hydrochloride studied at the glassy carbon electrode showed the well defined single cathodic and single anodic peaks between ±1.0 V when CV was run without delay time at the vertex potentials; Epc at -0.378 V, Epa at -0.202 V in the supporting electrolytes of 0.10 M KCl/0.01 M HCl.

However, the reduced form of doxorubicin hydrochloride was chemically converted to the another electroactive species with a delay time of 45 seconds. DPV at a glassy carbon electrode and SWV at a hanging mercury drop electrode exhibited a well defined single peak of doxorubicin which was shifted to the negative potentials as the pH value of acetate buffer was increased. The ratio of H^+/e^- was one. The calibration curve was linear at the concentration range between 5.0×10^{-7} M and 1.0×10^{-5} M.