SQUARE-WAVE CATHODIC ADSORPTIVE STRIPPING VOLTAMMETRY OF RISPERIDONE

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Electrochemical properties and diffusion-adsorption behavior of risperidone (RPN), an antiphyscotic drug, on hanging mercury drop electrode (HMDE) were carried out in Britton–Robinson (BR) buffer. Some electrochemical parameters such as diffusion coefficient, number of transferred electrons and proton participated to its reduction mechanism and surface coverage coefficient were calculated from the results of cyclic voltammetry, square-wave voltammetry and constant potential electrolysis. RPN was found to be reduced with single two-electron/two-proton quasi-reversible mechanism controlled mainly by adsorption with some diffusion contribution at the potential about –1.58 V (vs Ag|AgCl electrode). Experimental parameters were optimized to develop a new, accurate, rapid, selective and simple square-wave cathodic adsorptive stripping voltammetric (SWCAdSV) method for direct determination of RPN in pharmaceutical dosage forms, spiked human urine and human serum samples without time-consuming steps prior to drug assay. This method was based on the relation between the peak current and the concentration of RPN and it was recognized that peak current of reduction wave linearly changes with the concentration of RPN in the concentration range of 1.5–150 nM, when optimum preconcentration potential –0.65 V and optimum preconcentration time 60 s were applied. In this method, limit of detection (LOD) was found as 5.18 nM (2.12 ppb). The method was successfully applied to determine the RPN content of commercial pharmaceutical preparations, spiked human serum and spiked human urine. The method was found to be highly accurate and precise, having a relative standard deviation of less than 4.80% for all applications.

Keywords: Cyclic voltammetry; Electrochemistry; Risperidone; Drug assay; Square-wave adsorptive stripping voltammetry; Electrochemical behavior.

Risperidone (RPN) belongs to a class of antipsychotic drugs known as atypical neuroleptics. It was approved in 1993 for the treatment of schizophrenia. In 2007, risperdal (RPL) was approved as the only drug agent available

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