Stability Indicating Electrochemical Methods for the Determination of Meclophenoxate Hydrochloride and Pyritinol Dihydrochloride Using Ion-Selective Membrane Electrodes

Hayam Lotfy, Mohammad Galal El-Bardicy, Hayam Mahmoud Lotfy, Mohammad Abdalla El-Sayed, Mohammad Fayez El-Tarras

Professor of Analytical Chemistry

Abstract

The construction and electrochemical response characteristics of polyvinyl chloride (PVC) membrane sensors for the determination of meclophenoxate hydrochloride (I) and pyritinol dihydrochloride (II) in presence of their degradation products are described. The sensors are based on the use of the ion-association complexes of (I) and (II) cation with sodium tetraphenyl borate and ammonium reineckate counteranions as ion-exchange sites in the PVC matrix. In addition beta-cyclodextrin (beta-CD) membranes were used in the determination of I and II. These ion pairs and beta-CD were then incorporated as electroactive species with ortho nitrophenyl octyl ether (oNPOE) as a plasticizer. Three PVC sensors were fabricated for each drug, i.e. meclophenoxate tetraphenyl borate (meclo-TPB), meclophenoxate reineckate (meclo-RNC) and meclophenoxate beta-cyclodextrin (meclo-beta-CD), and the same was done for pyritinol (pyrit-TPB), (pyrit-RNC) and (pyrit-beta-CD). They showed near Nernestian responses for meclophenoxate over the concentration range $10^{-5}$-$10^{-2}$ with slopes of 52.73, 51.64 and 54.05 per concentration decade with average recoveries of 99.92$\pm$1.077, 99.96$\pm$0.502 and 100.03$\pm$0.763 for meclo-TPB, meclo-RNC and meclo-beta-CD respectively. Pyritinol also showed near Nernestian responses over the concentration range $3.162 \times 10^{-6}$ - $3.162 \times 10^{-4}$ for pyrit-TPB and pyrit-RNC, and $10^{-6}$ - $3.162 \times 10^{-4}$ for pyrit-beta-CD with slopes of 30.60, 31.10 and 32.89 per concentration decade and average recoveries of 99.99$\pm$0.827, 100.00$\pm$0.775 and 99.99$\pm$0.680 for pyrit-TPB, pyrit-RNC and pyrit-beta-CD respectively. The sensors were used successfully for the determination of I and II in laboratory prepared mixtures with their degradation products, in pharmaceutical dosage forms and in plasma.

Yakugaku zasshi journal of the Pharmaceutical Society of Japan - 2007, February