

Construction and performance characterization of screen printed and carbon paste ion selective electrodes for potentiometric determination of naphazoline hydrochloride in pharmaceutical preparations

Eman Y. Z. Frag , Gehad G. Mohamed , F. A. Nour El-Dien and Marwa E. Mohamed

Abstract

This paper describes the development of screen-printed (SPE) and carbon paste (CPE) sensors for the rapid and sensitive quantification of naphazoline hydrochloride (NPZ) in pharmaceutical formulations. This work compares the electroactivity of conventional carbon paste and screen-printed carbon paste electrodes towards potentiometric titration of NPZ. The repeatability and accuracy of measurements performed in the analysis of these pharmaceutical matrices using new screen printed sensors were evaluated. The influence of the electrode composition, conditioning time of the electrode and pH of the test solution, on the electrode performance were investigated. The drug electrode showed Nernstian responses in the concentration range from 1×10^{-6} to 1×10^{-2} mol L⁻¹ with slopes of 57.5 ± 1.3 and 55.9 ± 1.6 mV per decade for SPE and CPE, respectively, and was found to be very precise and usable within the pH range 3–8. These sensors exhibited a fast response time (about 3 s for both SPE and CPE, respectively), a low detection limit (3.5×10^{-6} and 1.5×10^{-6} M for SPE and CPE, respectively), a long lifetime (3 and 2 months for SPE and CPE, respectively) and good stability. The selectivity of the electrode toward a large number of inorganic cations, sugars and amino acids was tested. It was applied to potentiometric determination of NPZ in pure state and pharmaceutical preparation under batch conditions. The percentage recovery values for the assay of NPZ in tablets (relative standard deviations 0.3% for $n = 4$) were compared well with those obtained by the official method.

Published In: *Analyst*. 2011 Jan 21;136(2):332-9. doi: 10.1039/c0an00343c. Epub 2010 Oct 20.