β - Cyclodextrin / Carbon Xerogel Based Potentiometric Screen Printed Sensor for Determination of Meclofenoxate Hydrochloride

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The present work described the fabrication protocol of disposable screen printed sensors for the potentiometric determination of meclofenoxate hydrochloride (MFX). Incorporation of the carbon xerogel (CG) as transducer, and (2,3,6-tri-O-methyl)-beta-cyclodextrin as molecular recognition elements in the electrode matrix improved the sensor performance. Comprehensive studies were performed on the sensing membrane components including; the nature of the sensing material, additives, plasticizers and nanomaterials. Improved sensitivity and selectivity were achieved in the MFX concentration ranged from 10^{-6} to 10^{-2} mol L⁻¹ with Nernstian compliance 62.7 ± 0.9 mV decade⁻¹. Addition of carbon gel as a novel carbon nanomaterial within the electrode matrix enhanced the potential reading stability, response time (< 4s) and prolonged lifetime of the fabricated sensors (5 months). Flow injection analysis (FIA) offers the advantages of automation feasibility, accuracy and high sampling output. The developed sensors were successfully applied for analysis of MFX in presence of its degradation products with agreeable average recoveries compared with the official methods.

Keywords: Carbon Xerogel; β - Cyclodextrin; Screen-printed potentiometric sensors; Meclofenoxate hydrochloride; Pharmaceutical samples

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