PVC membrane and All-Solid-State Sensor for the Potentiometric Analysis of Trimipramine

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Two symmetrical and asymmetrical potentiometric membrane electrodes were developed and evaluated for the analysis Trimipramine (TMP). The symmetrical electrode was a poly(vinyl chloride) (PVC) membrane electrode (PME), a similar membrane of which was further used on an all-solid-state (ASS) electrode to make the asymmetrical ASS-PME. Both instruments function based on the ion-exchange between aqueous solutions of TMP and an organic phase (i.e. the PVC membrane) optimally composed of 6% of an ion-pair of TMP-TPB, 63% of dibutyl phthalate, 30% of PVC and 1% of NaTPB. The optimal electrodes revealed a Nernstian behavior. The ASS electrode was prepared using a conductive composite of graphite, MWCNTs, and epoxy resin which was coated on a copper wire. The ASS-PME, on the other hand, was prepared by covering the ASS electrode with a thin layer of the optimal PVC membrane. The PME and ASS-PME revealed Nernstian slopes of 57.1 ± 0.3 and 58.2 ± 0.4 mV/decade over the concentration ranges of 1.0×10^{-6} - 1.0×10^{-2} and 1.0×10^{-7} - 1.0×10^{-4} M. The method of using the instruments was validated and the applicability of sensors for quality control analyses of TMP in pharmaceutical formulations, was also evaluated.

Keywords: Trimipramine, PVC membrane sensors, All solid state electrodes, Ion-pair complex

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