Comparative Investigation of β - and γ -cyclodextrin as Ionophores in Potentiometric Based Sensors for Naltrexone

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The formation and developed of Polyvinyl chloride (PVC) membrane sensors for naltrexone (NALT) are examined. The electroactive elements contains molecular recognition components β - or γ -cyclodextrin as ionophores. Sensor 1 was fabricated using β - cyclodextrin, while sensor 2 was used γ -cyclodextrin in presence of potassium tetrakis (4-chlorophenyl)borate as ion additive , PVC as matrix and dioctylphthalate as plasticizer. The sensors show rapid, fixed and sub-Nernstian response (38 and 34 m/ decade) meantime a relative wide naltrexone dynamic range (1×10^{-2} - 5.8×10^{-6} and 1×10^{-2} - 4.0×10^{-6} M), with detection limits of 5×10^{-6} , and 3.0×10^{-6} M for β - or γ - cyclodextrin sensor, respectively. The optimum pH was in range of 2.0 - 7.0. The investigated sensors show a good selectivity for NALT with respect of different ions. The determination of 300 μ g/ml of naltrexone appear a recovery value of 97.2% and 97.5%, respectively with mean RSD values of 1.7% and 2.0% for sensors 1 and 2. The examined sensors have been used for the assay of NALT in its dosage form. The outcome data for the assay of naltrexone in tablet using the investigated sensors are good convention with the published spectrophotometric procedure. Potentiometric titrations of naltrexone using the examined sensors have been carried out.

Keywords: Naltrexone HCl, β - and γ - cyclodextrin, PVC, Potentiometry.

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