

Comparative Study of Different Potentiometric Ion-Selective Electrodes for Determination of Certain Polyionic Drugs

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doi: 10.20964/110369

Received: 14 November 2016 / Accepted: 8 March 2016 / Published: 1 April 2016

Selective polyionic electrodes were investigated; using precipitation based technique forming ion-pair complexes between the polycation Polymyxin B (Poly B) and tetrakis (4-chlorophenyl) borate (TpClPB) (sensor 1) and phosphotungstic acid (sensor 2) and ionophore based technique with 2-hydroxy propyl beta cyclodextrin (HP β -CD) (sensors 3 and 4) for determination of Poly B and Cromolyn sodium (CS), respectively. Also an aqueous dispersion of iron oxide magnetic nanoparticles (NPs) was applied with (HP β -CD) for CS determination (sensor 5). Linear responses within concentration ranges of 10^{-6} to 10^{-2} , 10^{-6} to 10^{-3} , 10^{-7} to 10^{-4} and 10^{-6} to 10^{-3} mol L⁻¹ were achieved, using sensors 1, 2, 3 and 4, respectively. On the other hand the sensitivity was increased up to 10^{-8} mol L⁻¹ on using sensor 5. Near nernstian slopes of 12.68, 53.55, 58.93 and 55.11 mV/decade were observed for sensors 1, 2, 3 and 4, respectively, and an ideal nernstian slope of 59.60 mV/decade was obtained for sensor 5. The developed sensors 1, 2, 3 and 4 showed a reasonable selectivity, whereas the selectivity of sensor 5 was the greatest one. The proposed sensors showed successful application for determination of the investigated drugs in pharmaceutical formulations and biological fluids without pretreatment.

Keywords: Ion exchangers, Ionophores, Iron oxide nanoparticles, Ion selective electrodes, Polyions.

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