Optimised Ion Selective Electrode for Direct Determination of Tamsulsoin Hydrochloride in the Presence of Co-formulated Drug, Deflazacort and Application to Analysis of Uroselective Drug in Tablet Dosage Form and Human Urine

Mohamed Mohamed ,Shereen A. Boltiaa, , Taghreed A. Mohamedc, Nahla N. Mostafac,,1*

Abstract

Direct analytical methods offer an excellent tool for rapid determination of pharmaceuticals without deviation from the green analytical chemistry principles. In this work, a potentiometric ion selective electrode (ISE) method for the selective determination of the Ŭ1A-adrenoceptor blocker, Tamsulosin HCl was developed, optimized and assessed for greenness. Six different PVC-membrane sensors were fabricated using 2-nitrophenyl octyl ether (NPOE) as a plasticizer. Three ion exchangers were used, namely sodium tetraphenyl borate (Na.TPB), sodium tetrakis- [3,5-bis (trifluoro- methyl) phenyl] borate (Na.Tetrakis) and ammonium reineckate (Amm. RK) in exchange with the two ionophores, 4-tert-Butylcalix [8] arene (Calix.) and 2-hydroxypropyl-ɓ-cyclodextrin (ɓ-CD). The electrochemical responses of all sensors were studied and recorded. The sensor which consisted of sodium tetraphenyl borate as ion exchanger and 4-tert-Butylcalix [8] arene as ionophore was selected for application to analysis of Tamsulosin HCl in dosage form and human urine. The electrochemical performance characteristics of the electrode were validated as per IUPAC recommendations. Analytical Eco Scale assessment was used for evaluation of the greenness of the method and compared with the USP official method for the determination of Tamsulosin HCl.

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