

NEW POTENTIOMETRIC SENSORS FOR DETERMINATION OF MEFENAMIC AND FENAMIC ACID BASED ON ION ASSOCIATE OF ASTRAFLOXINE

Zholt Kormosh

Lesya Ukrainka Volyn National University, Department of Chemistry and Technology, Voli av., 13, 43009, Lutsk, Ukraine; E-mail: kormosh@vnu.lutsk.ua

The issues of quality control of pharmaceutical products remain relevant to modern analytical chemistry. This is due to an increase in the number of registered pharmacopoeia medicines (often different manufacturers), and the introduction of pharmaceutical practices of high-level substances belonging to the new classes of natural and synthetic compounds, and economic changes in the pharmaceutical market through the introduction of the scope of treatment at the international and regional levels of various substances in addition to ready-made drugs.

Mefenamic acid (Mef) is used in medicine about half a century. Mefenamic acid is the derivative fenamic acid (Faa). It has analgesic, antipyretic and anti-inflammatory activity, with both anti-inflammatory agent for the superior activity of salicylates. Known various methods (chromatographic, spectrophotometric, titration, etc.) for mefenamic acid determination. But need to find a simple, fast and simple in implementation in hardware design methodology for determining not lost its relevance. Direct potentiometry is the best satisfies these requirements. Therefore, the development of new potentiometric sensors (ISE) using ion associates of basic dyes is of current interest. The simultaneous study of chemical-analytical characteristics of isolated solid ion associates, the effect of the EAS used, pH of the analyzed solution, properties of the membrane plasticizer, etc. are also of importance. The combination of those factors which define the electrochemical properties of ISEs and the determination and consideration of the relations between certain parameters would permit, in our opinion, the improvement of the electrochemical characteristics of electrodes and would predict the properties of other ISEs in their development for new classes of substances.

The present communication describes satisfactory PVC potentiometric sensors for Mef and Faa determination. The sensors based on ion associate of Mef (Faa) and Astrafloxine. The modeling of the membrane composition of the ion-selective sensors utilised high molecular weight polyvinylchloride (PVC), dibutyl phthalate (DBP), dibutyl sebacate (DBS), dioctyl phthalate (DOP), dinonyl phthalate (DNP), tricresyl phosphate (TCP) and tetrahydrofuran (THF). All were obtained from Sigma-Aldrich.

The influence of solvent mediators, pH, and the concentration of internal reference solution and other characteristics on the potentiometric response of the Mef (Faa) ISEs were investigated. Various parameters for the determination of the Mef (Faa) have been evaluated and conditions have been optimized. Among different solvent mediators tested, dibutyl phthalate (DBF) exhibited a proper behavior including Nernstian slope of calibration curve, fast response time and good reproducibility of the emf values. The electrode exhibits a Nernstian slope of 73 ± 2 mV decade⁻¹ for Mef (84 ± 2 mV decade⁻¹ for Faa) in the concentration range 2×10^{-4} to 1×10^{-2} mol l⁻¹ (2×10^{-3} to 1×10^{-1} mol l⁻¹) with the limit of detection of 9.3×10^{-5} mol l⁻¹ (7.9×10^{-4} mol l⁻¹). The electrode displays a good sensitivity with the respect to a number of common inorganic and organic species. It can be used in a pH range of 8,0 – 10,5.

It was used for the direct assay of Mef and Faa in commercial pharmaceutical preparations and chemicals.