Solid Contact Potentiometric Sensors Based on Host-Tailored Molecularly Imprinted Polymers for Creatine Assessment

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Potentiometric sensors for organic ions are in principle suitable for quick in situ determinations. A basic point in the improvement of these sensors is to discover particular receptors. In this examination, the probability of developing solid state potentiometric sensors with molecularly stamped polymers (MIP) as a recognition element was researched. Preparation of molecular imprinting polymers (MIP) as synthetic receptors for creatine and implemented in potentiometric sensors based on the epoxy-graphite matrix as a conductive solid contact. These MIPs are depending on the utilization of methacrylic acid (MAA) and 2-vinyl pyridine (2-VP) as utilitarian monomers. Sensors based on (MAA) and (2-VP) exhibited a stable response over a linear range 9.0×10^{-6} - 10^{-2} and 1.0×10^{-5} - 10^{-2} mol L⁻¹ creatine with slopes of 57.1 ± 0.2 and 54.1 ± 1.2 mV decade⁻¹ and detection limits of 7.0×10^{-6} and 6.0×10^{-6} mol L⁻¹ in 10^{-2} mol L⁻¹ citrate buffer solution has pH 3, respectively. It was worth noting that the developed membrane sensors exhibited good selectivity towards creatine over many organic and inorganic cations, as well as some additives encountered in the pharmaceutical preparations and so these sensors, were successfully used for determination of creatine. The created sensors were also utilized effectively for the quantification of creatine in serum as biological fluids. The results obtained were in great concurrence with the information got by the measure spectrophotometry.

Keywords: Creatine, Molecularly imprinted polymers, potentiometric sensors

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