

A Novel Potentiometric Ion Selective Electrode Based on Piperine for the Determination of Fe(III) Ions

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Abstract: A new potentiometric sensor highly selective to Fe³⁺ was prepared using piperine as a neutral ionophore. The electrode exhibits a linear response for Fe³⁺ ions in the citrate buffer medium over a concentration range from 1 × 10⁻⁴ to 1 M (detection limit of 6 × 10⁻⁵ M) with a Nernstian slope of 20.5 mV per decade. The electrode can be successfully used in the pH range of 3.15–7.85. It has a fairly good discriminating ability toward Fe³⁺ ions among some other metal ions such as K⁺, Ca²⁺, Mg²⁺, Cu²⁺, Ba²⁺, Co²⁺, Al³⁺ and Cr³⁺ with selectivity coefficients of -2.11, -9.02, -10.38, -8.34, -8.12, -8.79, -8.41 and -3.69, respectively. The electrode can be used for 10 weeks without any considerable divergence in the observed slope. It has been successfully validated using atomic absorption spectrometry and used in the determination of Fe³⁺ in chewable iron capsules.

Citation

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