PREPARATION OF HYDROGEN ION-SELECTIVE ELECTRODE BASED ON ZOFENOPRIL CALCIUM

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The pH-glass electrodes have been widely used for more than 60 years. In spite of the distinctive potential characteristics of pH-glass electrodes and their use in routine pH measurements for many years, they have certain limitations such as their high resistance, brittleness, instability in hydrofluoric acid and fluoride containing media and their problems to be constructed as microelectrodes for biological applications and in vivo measurements. However, poly(vinyl chloride) (PVC) membranes are preferred materials due to their low electrical resistance, ease of construction and they are unbreakable. These properties are critical especially in biological pH measurements.

The aim of this study is to develop a new hydrogen ion-selective PVC membrane electrode by using zofenopril calcium (Scheme 1) as an ionophore and to determine its response characteristics. The influences of internal filling solution and membrane composition on the potentiometric response of the electrode were investigated. It showed linear response with a sub-Nernstian slope in the range pH 1.0 - 10.0 at ambient temperature, a rapid response time of a few seconds and a long lifetime (> 6 months).

The proposed electrode was prepared as described previously [1]: 0.0085 g of ionophore and 0.2935 g of o-nitrophenyloctylether were dissolved in 5 mL tetrahydrofurane. PVC of 0.1276 g was slowly added to this mixture. The homogenous mixture formed was poured onto a glass disc with a diameter of 3.5 cm attached to a glass plate and was kept at ambient temperature for 24 h for the evaporation of tetrahydrofurane. The 0.7 cm diameter disc of the polymer membrane was cut and fixed to the end of a glass tube with a diameter of 0.5 cm and a length of 10 cm. An internal filling solution of $1.0 \times 10^{-3}$ M CaCl$_2$ was put into this glass tube and a AgCl-coated silver wire was placed into it. It was successfully employed as an indicator electrode in acid-base titrations. It is possible to prepare a PVC micro pH electrode for further purposes.

The question whether this electrode can be used for other applications in aqueous solutions was investigated. Because of the biocompatibility of zofenopril calcium it can be concluded that the proposed electrode is expected to be used in vivo applications for pH measurements.

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Reference