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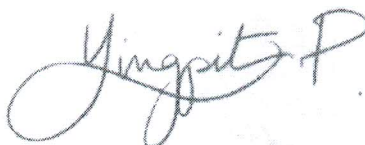
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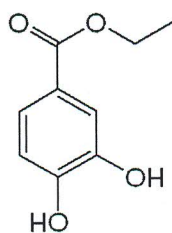
Electrochemical performance of protocatechuic acid ethyl ester as a new transition metal-selective ionophore in modified PVC-based membrane sensor

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Protocatechuic acid ethyl ester (PCAEE) is one of *o*-dihydroxy phenolic derivatives which is commonly used as antioxidant, antiulcer, and hydroxylase inhibitor. This research aims to alternatively investigate the electrochemical property of PCAEE due to its *o*-dihydroxy recognition unit suitable for binding the transition metal ion. A simple reusable polymeric membrane electrode was prepared by incorporating PCAEE ionophore into plasticized PVC membrane in the presence of ionic additive. Potentiometric measurements were carried out using the proposed membrane electrode towards metal ions such as Al(III), Cr(II), Fe(II), Co(II), Ni(II), Cu(II), and Zn(II). The interaction between PCAEE as a chelating ligand and the most selective metal ion takes place at the membrane-aqueous interphase, enhancing the membrane potentials according to the Nernst's equation. Such ions were comparatively examined in terms of membrane sensitivity and selectivity, response time, linear concentration range, detection limit, working pH range, and also lifetime of sensor. Preliminary results indicated the fast response and strong ion-ionophore interaction across the membrane. However, there have been two competitive ions, Cu(II) and Cr(III), showing good response to PCAEE over other cations. The detection limit was in a micromolar range. Therefore, the membrane composition needs to be further optimized in order to find the most selective ion. The best performance electrochemical sensor will be chosen and expected to be applied for the determination of target ion in environmental samples without interference by other metal ions.



PCAEE

Keywords: Protocatechuic acid ethyl ester (PCAEE); Polymeric membrane electrode; Ionophore