

CURCUMIN IMPRINTED POLYPYRROLE ION SELECTIVE ELECTRODES

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Curcumin is the main curcuminoid that exists in *Curcuma longa* (turmeric). Curcumin and its synthetic derivatives have been researched excessively due to its metal binding ability. All research carried out on these substances have geared towards the medicinal capability of the metal-curcumin complexes. This study focused on harnessing the metal binding ability of curcumin to develop an economical metal ion selective electrode. Identifying curcumin as an ionophore also adds value to a readily available plant in Sri Lanka. Ion selective electrodes were prepared by electro polymerising 0.1 M pyrrole solution saturated with curcumin on to pencil lead against a Pt counter electrode. The solutions used for polymerization were deoxygenated by passing N₂ for 20 minutes prior to polymerization. A voltage of 4.0 V was applied for 15 minutes to complete the polymerization. Blank electrodes were also prepared using 0.1 M pyrrole solution in the same manner. These electrodes were conditioned overnight in 0.1 M metal ion solutions before calibration. Curcumin incorporated polypyrrole electrode conditioned in 0.1 M Zn²⁺ ions studied in duplicates showed a Nernstian response of 31.5 mV/dec at room temperature to Zn²⁺ ions. The lowest detection limit of the electrodes was found to be 10⁻⁴ M for Zn²⁺. Curcumin incorporated polypyrrole electrode conditioned in 0.1 M Cu²⁺ ions too exhibited a lowest detection limit of 10⁻⁴ M for Cu²⁺ in a calibration curve that showed a Nernstian response slope of 32.1 mV/dec. Blank electrodes that were electropolymerised in the absence of curcumin showed that the response was indeed due to imprinted curcumin. As a consequence it can be concluded that curcumin can be used successfully to develop ion selective electrodes selective for cations such as Zn²⁺ and Cu²⁺. However, further studies have to be carried out, such as selectivity, signal drift and long term stability of the signal on these electrodes.

Keywords: Curcumin, *Curcuma longa*, Nernstian response