

Electrochemical characteristic of Biotinyl Somatostatin- 14/Nafion modified gold electrode in development of sensor for determination of Hg(II)

ABSTRACT

Electrochemical sensor for Hg(II) has been developed using Biotinyl Somatostatin-14 peptide modified gold electrode utilizing nafion as the immobilizing agent. Experimental conditions such as pH, supporting electrolyte and scan rate were optimized. Detection of mercury using Biotinyl Somatostatin-14 peptide/Nafion has been observed to be optimum under acidic conditions. Good relative standard deviation of 3.7% has been obtained indicating reliability of the detection system. A linear calibration plot in the range of 40-170 $\mu\text{g L}^{-1}$ was obtained with sensitivity value of $1 \times 10^{-10} \text{ A } \mu\text{M}^{-1}$. Limit of detection (LOD) obtained is 0.4 $\mu\text{g L}^{-1}$ which is below the WHO guidelines for drinking water. The scan rate study showed that the process is a complex surface process, mostly involving an adsorption process. This developed method was applied for determination of Hg(II) in actual waste water samples and a good agreement was obtained between the proposed method and ICP-MS based on the analysis of the waste water samples.

Keyword: Hg(ii) detection; Modified electrode; Electrochemical sensor